

DRINKING FROM OWN CISTERN: CUSTOMARY INSTITUTIONS
AND THEIR IMPACTS ON RURAL WATER MANAGEMENT
IN TANZANIA

By

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B.A., University of Dar-es-Salaam, Tanzania, 1997
M.A., Kansas State University, U.S.A., 1999

AN ABSTRACT OF A DISSERTATION

Submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Sociology, Anthropology, and Social Work
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Manhattan, Kansas

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ABSTRACT

Increasing human population, economic development and climatic changes in Sub-Saharan Africa have caused water scarcity, hence an urgent need for institutional arrangements that will lead to sustainable water management. This study analyzes the impact of customary institutions on rural water management in Tanzania, and shows how they might be used to complement the statutory institutions. The study was conducted in Bariadi district, northwestern Tanzania. The data were collected from household surveys, focus group discussions, key informants, participant observations, photographs, and secondary data sources. The results indicate that customary institutions are the most commonly used in regulating equitable access to water, prevention of water pollution and abuse, and natural resource conflict resolution. The awareness of the customary laws was higher than statutory laws because of the participatory nature of the customary institutions. Statutory institutions were found to be important for regulating water development issues. Villagers were not aware of statutory laws related to equitable water access, and prevention of water pollution and abuse. The study also found that customary institutions tend to discriminate against women. Women do not have land rights and were not allowed to participate in customary institutions activities. These results suggest the need for the government to recognize the importance of customary institutions in water management. The government needs to design policies and strategies that will ensure that women's rights are respected by the customary institutions. There is also a need for fostering women's participation in decision making, and designing cooperative institutions that are organized and governed by resource users themselves.

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LIST OF ACRONYMS

AEZ	Agro-Ecological Zone
BWB	Basin Water Board
CBNRM	Community-Based Natural Resource Management
CEDAW	The Convention on the Elimination of All Forms of Discrimination Against Women
CIA	Central Intelligence Agency
COM	Community Ownership and Management
CRLP	Center for Reproductive Law Policy
CWB	Central Water Board
DRA	Demand Response Approach
FAO	Food and Agriculture Organization
GNP	Gross National Product
GDP	Gross Domestic Product
HESAWA	Health Through Sanitation and Water
ICC	International Coordinating Council
IFP	International Fellowship Program
ILO	International Labor Organization
IWMI	International Water Management Institute
IRWR	Internal Renewable Water Resources
MWLD	Ministry of Water and Livestock Development
NAWAPO	National Water Policy
NEAP	National Environmental Action Plan

NEP	National Environmental Policy
NGOs	Non-Governmental Organizations
NWSDS	National Water Sector Development Strategy
PWO	Principal Water Officer
SADC	Southern Africa Development Community
SIDA	Swedish International Development Cooperation Agency
SSA	Sub-Saharan Africa
TASAF	Tanzania Social Action Fund
TLU	Tropical Livestock Unit
TNW	Tanzania National Website
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USDA	United States Department of Agriculture
URT	United Republic of Tanzania
VEO	Village Executive Officer
WFP	World Food Program
WUAs	Water User Associations
WRI	World Resource Institute

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DEDICATION

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CHAPTER ONE

1. INTRODUCTION

1.1. Research Problem

Water is one of the most important natural resources, without which life cannot exist. Households use water for drinking, cooking, sanitation, for irrigating their crops, and watering their livestock. Water is also used for industrial production, for water-based recreation and transportation. Water provides energy through hydro-electric power, it affects environmental quality and food production. In that respect, the United Nations (UN) has designated water as a basic need and right for all human beings (Ramaswamy 2003). Access to safe water is very important for human survival and very crucial when addressing poverty and health problems. Without enough water for hygiene, the health of human beings will suffer; and without sufficient water to consume, human beings will perish (White et al. 1972).

In Sub-Saharan African (SSA) countries today, the demand for water resources is increasing. Rising demand is caused by rapid population growth, industrialization and urbanization (Mollinga 2000). Since water supplies have not kept pace with demand, water resources have been over-utilized, polluted, and water shortages have emerged (Huggins 2000). Most people in SSA experience lack of access to safe water, a great concern especially in rural areas where most of the poor live. It is estimated that only about 51 percent of the population in SSA has access to safe water, and 45 percent to sanitation (UNDP 1997). Lack of access to safe water has a disastrous impact on society especially on women and children who suffer in terms of illnesses and lost opportunities (Kaliba 2002). It is estimated that rural people in SSA, mainly women and children, spend about 40 billion hours each year fetching water.

Moreover, lack of access to safe water traps rural people in the vicious cycle of poverty: water related illnesses reduce one's ability to engage in a full day of productive work, which in turn increases poverty and the risk of subsequent illnesses. For these reasons, efficient management of water resources is a fundamental building block for sustainable development and improvement in the quality of peoples' lives (WFP 2001).

During the past thirty years, the management of water resources in most SSA countries was the responsibility of central governments. Unfortunately, many large water projects that were established and managed by central governments in SSA failed mainly due to a lack of community participation in planning and implementing such projects (The World Bank 1996a). In the 1990s, many SSA governments decided to embark in decentralization of their administrative and legislative powers. Decentralization refers to the transfer of authority to plan, make decisions, and manage public affairs from central government to local government (Rondinelli 1981; Smith 1985). Decentralization has greatly affected local institutions, which are increasingly being viewed as important actors in natural resource management (Rasmussen and Meinzen-Dick 1995; Baland and Platteau 1996; Blackburn and Holland 1998; Raussen et al. 2001).

Decentralization has presented many challenges that most countries are still struggling to address. For example, the cost of managing water resources forces local governments to impose burdensome taxes on the local community. Local government may lack the specialized experts needed to manage water development projects. As a result, a few financial elites or people who are well-connected to the government buy favours or obtain access to community natural resources and other privileges.

Another challenge facing local governments is inadequate knowledge or legal recognition of the customary laws and institutions that governed African communities and resources prior to colonization. In many SSA countries, management of water resources is governed by multiple legal systems with various kinds of laws. The common types of laws found in SSA countries are:

- (i) *Statutory laws*. These are laws that are formally written and changed in legislation and court judgments, and are enforced by the central government (Meinzen-Dick and Pradhan 2002). In countries with decentralized governments, the lower level governments (local governments) also enact subsidiary laws called ordinances and by-laws.
- (ii) *Customary laws*. These are unwritten laws that are maintained from one generation to another through various transmission mechanisms such as imitation, oral tradition, and teaching (White 1965). They are based on society's implicit understanding including the community's perceptions, the accumulated wisdom from past experiences, and a current set of values. Examples of customary laws include cultural norms, taboos, superstition, beliefs, values, and social codes of conduct (Pejovich 1999).
- (iii) *Organization laws*. These are laws that are made by a formal group of people such as water-user groups or associations.
- (iv) *Religious laws*. These are codes of ethics and morality, including written doctrines and accepted practices based on certain religious beliefs.
- (v) *Project/donor laws*. These are laws associated with particular programs or projects such as rural water supply project.

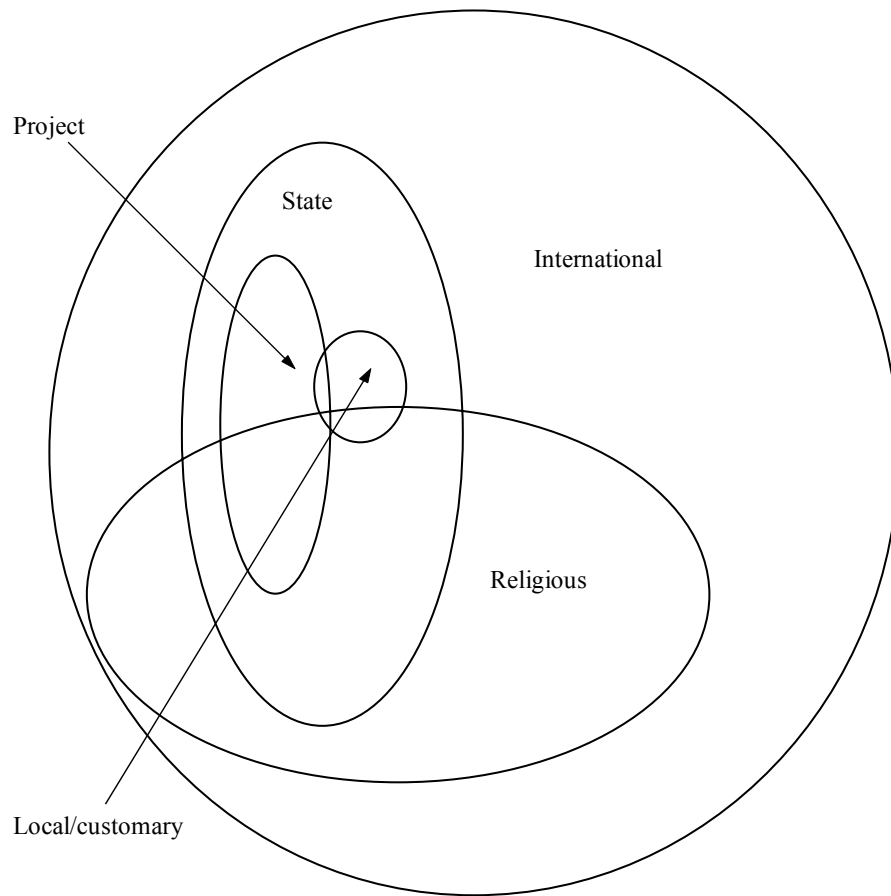
The different kinds of laws tend to interact and coexist in everyday social life, creating “legal pluralism” (Griffiths 1986; Meinzen-Dick and Pradhan 2002; Merry 1988).

In some situations, there is a possibility for the different kinds of laws to overlap as illustrated in figure 1.1. Local level institutions are embedded in other institutions at the local, organizational, national and international levels. The statutory, religious, project and organizational institutions are also embedded in the same institutions as the local level institutions.

Although these laws tend to interact and co-exist, they do not have equal power status. Meinzen-Dick and Pradhan (2002) argue that the state law is usually more powerful especially when it comes to state and local community relationships. However, this does not mean that statutory laws are the only relevant ones. Other types of laws may be viewed as relevant and more effective by local communities as well. Additionally, the different sets of laws may be applied at different places and times by different groups of people (Bruns and Meinzen-Dick 2000:28). The different types of laws have a different impact on different groups of people in a community. For example, Meinzen-Dick and Pradhan (2002) observed that women may be excluded from decision making bodies due to customary or religious laws even if state laws prohibit gender discrimination.

The multiple legal institutions play a vital role in property rights and natural resource management (Meinzen-Dick and Pradhan 2002). At the local level, management of water resources may be guided and defined by local or customary laws that may significantly differ from other laws. Religious law can have a great impact on water management in one way or another even if people appear not to seriously abide with it. Moreover, state laws may be composed of different sets of laws that may interact with each other. Likewise project or donor laws may have an impact on water management.

Figure 1. 1: Co-existing Multiple Legal Systems



Source: Meinzen-Dick and Pradhan 2002:4.

As observed earlier, management of water resources using statutory institutions is faced with major challenges, such as interest capture by local elites. Other problems relating to statutory institutions include over-exploitation of natural resources driven by the need to create local revenues, inadequate financing (taxation), arbitrarily imposed fees and levies, and lack of human resource capacity at the local level to plan, manage and implement developmental activities and policies. In this study, the effectiveness of the local and central governments in water management is analyzed and compared to the customary institutions.

1.2. Research Questions and Objectives

The objective of this study is to analyze the impact of customary institutions on rural water management and show how they might be used to complement statutory institutions. This study uses Bariadi district, located in northwestern part of Tanzania, as a case study. Institutions are defined as humanly devised rules and norms that structure human interactions. They are made up of formal constraints (rules, laws, constitutions) and informal constraints (norms of behavior, conventions and self-imposed codes of conduct), and their enforcement characteristics (North 1990), or alternatively as complexes of norms and behaviors that persist over time by serving collectively valued purposes (Uphoff 1986). Although other scholars have defined institutions as organizations or establishments founded for a specific purpose based on a set of working rules (Jaspers 2003:80), it is important to distinguish between the two. Organizations are groups of people bound together by a common purpose of achieving certain shared objectives. They include political, economic, social and educational bodies (Colding and Folke 2000). Institutions are codes of conducts and rules that are used by these bodies to define practices, assign roles, and coordinate interaction within and among them (Berkes 1995; North 1990). These rules originate from customs and laws or relationships in a community, and can be formal or informal.

Formal institutions refers to rules that are observable through written documents and are executed through formal positions or authority. They include constitutions, statutes, ordinances, laws, by-laws, property rights and other governmental regulations. Pejovich (1999) points out that informal institutions determine the political system (the governance structure and individual rights), the economic system (property rights and contracts), and the enforcement system (the judiciary and the police).

Hereafter, the formal institutions will be referred to as “statutory institutions.” The enforcement of formal rules by the government is carried out through the use of sanctions such as fines and imprisonment (Pejovich 1999:167).

Informal institutions refer to unwritten social norms and codes of conducts based on implicit social understandings (North 1990; Pejovich 1999). They include the community’s perceptions, the accumulated wisdom and knowledge of past events, and a current set of values. Informal institutions are the part of a community’s heritage or culture that is maintained and transmitted from one generation to another through imitation, oral tradition, and teaching (Pejovich 1999). Examples of informal institutions include sanctions, taboos, traditions, cultural norms, beliefs, values, social networks, kinship ties, and codes of conduct (Nemarundwe 2003; North 1990).

Informal rules are enforced through the use of sanctions such as fines, expulsion from the community, ostracism by friends and neighbors,¹ or loss of reputation (Pejovich 1999). Hereafter, the informal institutions will be referred to as “customary institutions.” These methods of customary law enforcement contrast starkly with the methods used to enforce statutory laws. This difference has a strong bearing on the degree of compliance and cost of enforcement. Moreover, the understanding of the relationship and impact of both types of institutions is very crucial for an assessment of whether formal institutions support or undermine the contribution of informal institutions for water management.

¹ Ostracism is defined as social form of rejection and exclusion whereby disapproved individuals are excluded from interaction with a social group. The word ‘ostracism’ is derived from a Greek word that means the broken shards on which the citizens of ancient Athens recorded their votes that expelled individuals regarded as threats to the state (Hirshleifer and Rasmussen 1989).

To achieve the purpose, this study has four main objectives. More discussion of these objectives is done in chapter four:

- (i) To analyze the determinants of compliance with both customary and statutory institutions;
- (ii) To analyze the role of gender in water management and identify the customary and statutory institutions that offer opportunities and/or impede the role of women in water management. This includes an analysis of how institutions affect women's and men's access to water and whether the current institutional arrangement promote the sustainable management of water resources in rural areas;
- (iii) To determine the effectiveness of customary and statutory institutions in water management;
- (iv) To determine the strengths and weaknesses of customary and statutory institutions for water management;
- (v) To determine role of customary and statutory institutions in access to water for different uses. The main water uses that will be investigated are: water for domestic use, water for animals and water for crop irrigation. The analysis of different water uses will reveal whether the type of water use has an impact on institutional arrangement in determining who has rights to water.

The importance of customary institutions in Africa cannot be underestimated. Most of human behaviors are defined, shaped and influenced by society's norms, values and customs (Steins 1999). For example, the majority of the population in many African countries prefers to use customary institutions to resolve conflicts than use statutory institutions. Moreover, customary land tenure covers about 75 percent of the land in Africa. In that regard, this study

will investigate the importance of customary institutions in rural water management in Tanzania.

Chirayat et al. (2005) argues that ignoring customary institutions may create numerous problems:

1. The failure by the state to recognize different institutions may in itself be discriminatory or exclusionary, and hence inequitable.
2. Local communities have very good reasons why they chose to use customary institutions which should be considered and understood.
3. Ignoring customary institutions and believing that top-down strategies might change the local level strategies for managing resources may mean that ongoing discriminatory practices and the oppression of marginalized groups in the local context goes unchallenged.
4. Focusing purely on statutory institutions in some ways assumes that these institutions can be made accessible to all, while clearly even in the most developed countries this is not the case.

1.3. Justification of the Study

Researchers have tried to understand how customary institutions affect natural resource management, but only few have analyzed how customary institutions might complement the efforts of local governments and the state. While many studies have examined the weaknesses of statutory institutions, few have examined the weaknesses of customary institutions.

Understanding the weaknesses of customary institutions is important because they remain the *de facto* institutions for most poor rural areas on issues such as land tenure, intra-household resource allocation, and conflict resolution. This understanding could potentially help policy makers to enact laws and design policies that address these weaknesses.

This study will contribute to the literature by filling three major gaps that past researchers have not adequately addressed. First, the literature fails to appreciate the differential impact of customary institutions on drinking and irrigation water management. Most sociological studies on rural water management in SSA have addressed water management issues without adequately analyzing customary institutions and showing how they affect rural water management. Most studies in river basin management focus on water for irrigation (Boesen et al. 1999; Jaspers 2003; Kashaigili et al. 2003; Lankford and Mwaruvanda 2005; Lankford et al. 2004; Machibya et al. 2003; Maganga 2003; Sokile et al. 2002; The World Bank 1996b). Few studies have examined how the customary and statutory institutions influence water management for different water uses. This research will look at how the management of water for domestic use differs from the management of water for livestock and small scale irrigation.

The second weakness in literature is the failure to analyze the role of women and to understand how customary and statutory institutions affect women's participation in water management. Few studies have looked at the role of women and their contribution to rural water management. Where scholars have studied this, they have focused on the statutory institutions. There is a need to seek deeper understanding of the role of women in water management and their use of customary institutions in rural areas (Nemarundwe 2003).

The third weakness is the absence of studies that compare the effectiveness of the statutory and customary institutions in enforcement of their regulations, resolving natural resource conflicts, and in ensuring access to water for different uses. Although many researchers recognize the importance of customary institutions, they tend to focus their analysis on the statutory institutions for water management (Uphoff 1986). Few studies have done a rigorous comparison of customary and statutory institutions and how they each affect rural water

management. Some studies have noted that statutory systems for water management have caused an increase in upstream-downstream conflicts because those who live upstream and pay for the water rights feel that they can use the water any way they like (Huggins 2000; Jaspers 2003; Lankford 2004; Van Koppen et al. 2004). Other studies have observed that many water users rely on customary institutions to settle their water disputes (Sokile and Van Koppen 2004). This study will investigate the effectiveness of customary institutions as compared to statutory institutions, and examine the nature and pattern of interaction between customary and statutory institutions.

1.4. Water Situation in Africa

This section highlights the water situation in Africa in general. The African continent has abundant freshwater resources from large rivers and lakes such as the Congo, Nile and Zambezi river basins, and in Lake Victoria. However, access to water within Africa and between African countries is affected by uneven distribution of water resources. A large percent of the continent (54 percent) is arid to semi-arid, 14 percent is humid to very humid and only 31 percent has good rainfall (Rached et al. 1996). Water supplies have failed to keep pace with fast population growth and rapid economic development. As a result, many people in Africa are facing water scarcity and conflicts over water.

According to Hinrichsen et al. (1997), Africa is one of the two regions in the world facing serious water shortages. Currently, there are 14 countries in Africa facing water stress or water scarcity. Water stress occurs when there is insufficient water to satisfy the demand or when poor quality of water restricts its use, leading to water shortage. A country is termed as “water stressed” when its annual supply of renewable fresh water is about 1,700 m³ or less per person.

On the other hand “water scarcity” is a situation where annual supply of renewable fresh water drop to 1,000 m³ or less per person (Gardner-Outlaw and Engelman 1997; Hinrichsen et al. 1997). Water scarcity and stress can be caused by physical, economic, and institutional factors.

Physical water scarcity and stress occur when the demand for water exceeds the capacity of potentially utilizable water resources (PUWR). This condition can occur when a country’s primary water supply exceeds 60 percent of its PUWR. Economic water scarcity and stress occur mainly due to lack of water infrastructure. Countries with economic water scarcity and stress have sufficient water resources to meet their primary water supply needs, but lack financial resources, economic incentives and development capacity to invest in water management and development (Molden et al. 2001). This condition is experienced by the majority of poor people in SSA, especially in rural areas. Economic water scarcity and stress may also be caused by institutional failures. This can occur in a situation where a country has available water resources and infrastructure, but people are water-poor. Water poverty can occur when people are landless or do not have rights to land or water.

In SSA, physical water scarcity is experienced by arid areas of North and South Africa. Most SSA countries are classified as economically water scarce or stressed mainly because even though water resources are abundant, water development and management is still a big problem. Currently, Northern Africa is facing the worst water situation in Africa. More countries (11) are expected to experience economic water scarcity and stress in the next 20 years. Thus, by the year 2015, it is expected that about 25 African countries (including Tanzania) will be experiencing water scarcity or water stress, as shown in tables 1.1 and 1.2, and figure 1.2.

Table 1. 1: Water Scarcity in Water Short Countries in 1995 and/or 2025

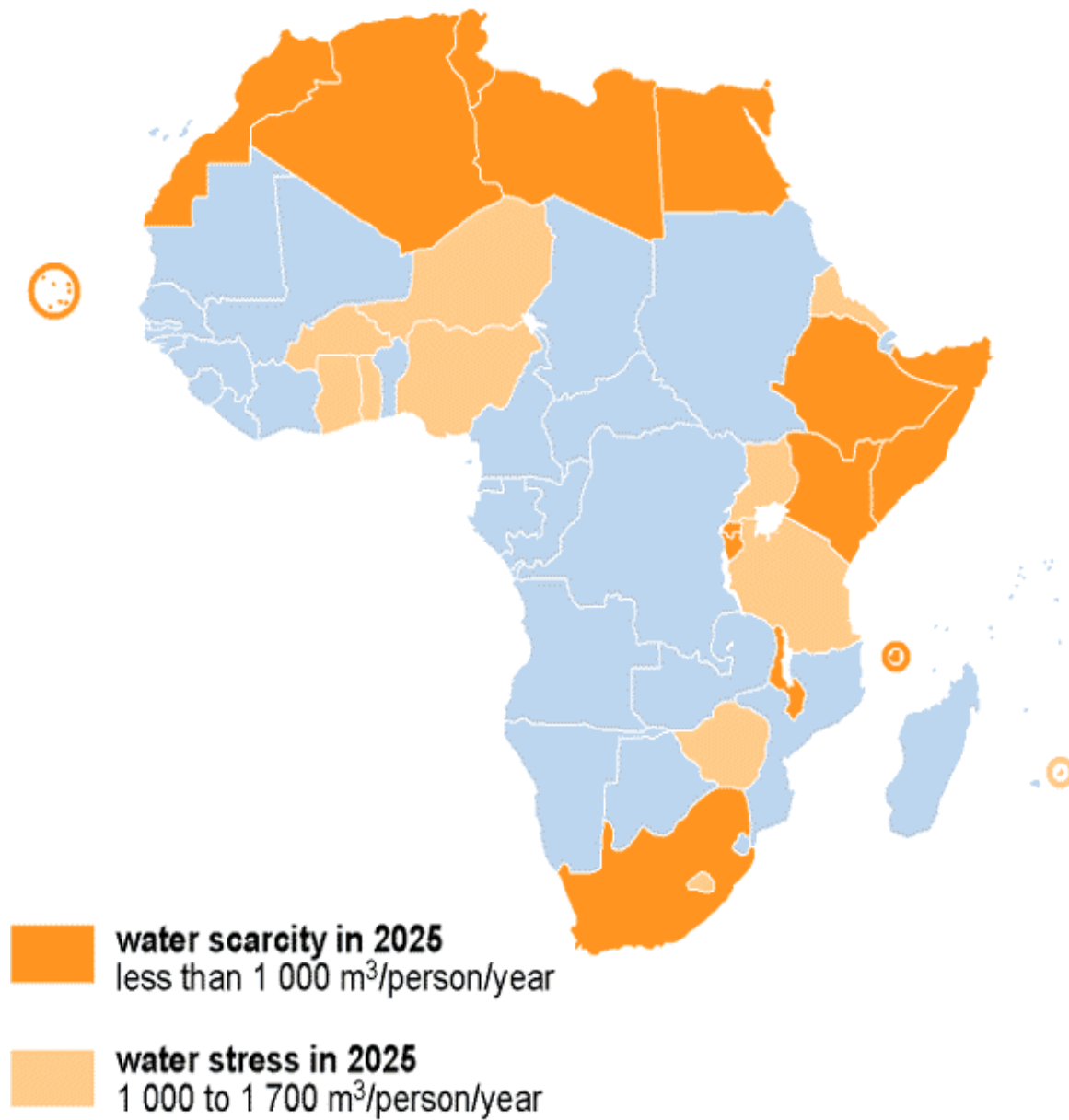
Country	Population in millions		Water per capita in cubic meters per year	
	1995	2025	1995	2025
Burundi	6.1	12.3	594	292
Cape Verde	0.4	0.7	777	442
Comoros	0.6	1.3	1,667	760
Egypt	62.1	95.8	936	607
Ethiopia	56.4	136.3	1,950	807
Kenya	27.2	50.2	1,112	602
Libya	5.4	12.9	111	47
Malawi	9.7	20.4	1,933	917
Morocco	26.5	39.9	1,131	751
Rwanda	5.2	13.0	1,215	485
Somalia	9.5	23.7	1,422	570
South Africa	41.5	71.6	1,206	698
Tunisia	9.0	13.5	434	288

Table 1. 2: Water Stress in Water Short Countries in 1995 and/or 2025

Country	Population in millions		Water per capita in cubic meters per year	
	1995	2025	1995	2025
Burkina Faso	10.5	23.5	2,672	1,194
Eritrea	3.2	6.5	2,775	1,353
Ghana	17.3	36.3	3,068	1,464
Lesotho	2.0	4.0	2,565	1,290
Mauritius	1.1	1.5	1,970	1,485
Niger	9.2	22.4	3,552	1,452
Nigeria	111.7	238.4	2,506	1,175
Tanzania	30.7	62.4	2,964	1,425
Togo	4.1	8.8	2,938	1,370
Uganda	19.7	45	3,352	1,467
Zimbabwe	11.2	19.3	1,787	1,034

Source: Gardner-Outlaw and Engelman 1997.

**Figure 1. 2: Map of Africa Showing Water Scarcity and Water Stress
in the Year 2025**



Source: Clarke 1999.

Tables 1.1 and 1.2 show that per capita water availability is decreasing in 25 African countries. The factors contributing to decreasing water availability are inadequate assessment and underdevelopment of water resources, little stakeholder and community participation in setting water policies and laws, the lack of technical and institutional infrastructure, and the lack of investment in water resource development. The situation is worse in rural areas where only 50 percent of the population has access to safe water (Hinrichsen et al. 1997).

The water situation in Africa indicates that as the demand of water continues to grow, African countries will need to manage their water resources in a more sustainable way. Sustainable water management refers to water management systems that will satisfy the changing demands on water resources and take into account the needs of present and future water users without any degradation of water resources. Without sustainable water management, communities will continue to experience water scarcity and water stress. Water scarcity and stress causes a chronic and widespread shortage of water that affects human health, blocks development, deepens inequality, and undermines the survival of the entire society (Brooks 2002). Moreover, water scarcity and stress cause competition and trigger conflict among different water users. These conflicts can occur within a community, between villages, districts, regions and even countries. With the current state of affairs, Tanzania and other African countries need to take corrective measures to avoid the deterioration of the water resources.

1.5. Anticipated Outcomes

The findings of this research will serve as the basis for formulating policies and programs that include customary institutions in the management of rural water resources in Tanzania. In Tanzania, lack of access to safe water for many rural populations is a major concern.

Lack of safe water has implications for rural people and the country as a whole. Policy makers, non-governmental organizations, planners and water providers need to be informed so they can incorporate customary institutions into policies and strategies for management of rural water resources.

1.6. Organization of Chapters

This study is presented in six chapters. Chapter one introduces and provides a general background for the research. It also presents a snap shot of water management issues and water situation in Africa and discusses the objectives and justification and anticipated outcome of the study. Chapter two provides background information on Tanzanian water resources, a history of water development in Tanzania and national policies that relates to water management, property rights, and customary and statutory institutions.

Chapter three presents a conceptual framework and the theoretical foundation for the study. Theoretical propositions on the relationship between customary and statutory institutions for managing water resources are also presented, and the importance of incorporating and recognizing customary institutions in the management of rural water resources are highlighted

Chapter four describes the methods used in data collection and analysis. This includes description of household surveys, focus group discussions, key informant discussions, participant observation, and secondary data collection. Methods of data analysis, both qualitative and quantitative, the definition of variables used, and the explanatory variables of the econometric model to be used in the analysis are discussed.

Chapter five presents an in-depth analysis of customary institutions and water resources in the study area. This includes an analysis of both private and community-owned water

resources, how communities get access to these resources and an analysis of customary institutions used for management of water resources in the study area.

Chapter six presents an analysis of statutory and customary institutions, their effectiveness, the level of compliance with these institutions and their role in water allocation for different water uses. This includes an analysis of three categories of water management laws: equitable water access laws, prevention of pollution and water abuse laws, and water development laws. An analysis of compliance and of the role of each institution in water management is provided for domestic use, livestock watering, and irrigation. Moreover, an econometric analysis of factors affecting compliance with customary and statutory laws is conducted.

Chapter seven presents an analysis of gender and water management offering an assessment of both statutory and customary institutions. By using gender analysis, the chapter will explore the status of women in Tanzania, gender relations and property rights, gender perceptions, the gender division of labor, and the relationship between gender and institutional arrangements for management of water resources.

Chapter eight analyses the effectiveness of statutory and customary institutions in terms of conflict resolutions, community participation and gender considerations. The chapter also compares customary and statutory institutions by looking at the strengths and weaknesses of each institution and at how these two institutions complement and compete with each other. Chapter nine provides the conclusion and recommendations for policy makers to design policies and strategies that will use customary laws to promote a more sustainable rural water management and help prevent a “tragedy of the commons.”

CHAPTER TWO

2. BACKGROUND INFORMATION

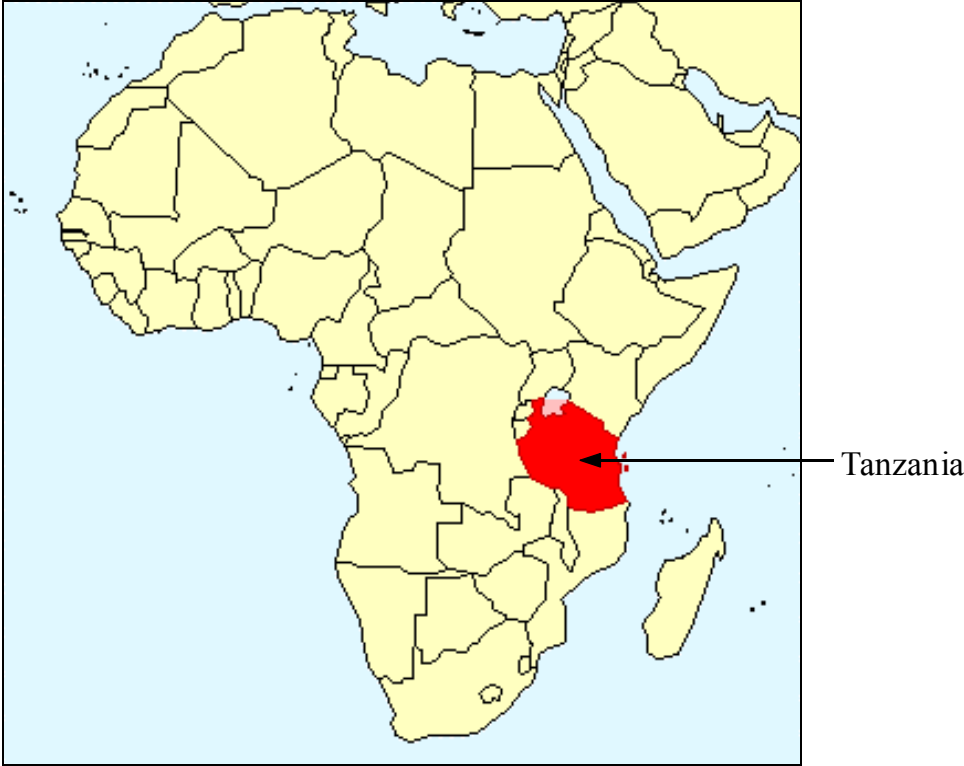
2.1. Introduction

Tanzania is located in the Eastern part of Africa (Figure 2.1), with Kenya to the north, Rwanda, Burundi, and the Democratic Republic of Congo to the west, Zambia, Malawi and Mozambique to the south and Indian Ocean to the east (Kashaigili et al. 2003). Tanzania is the largest country in East Africa comprising both the mainland and the Zanzibar islands.

Tanzania has an area of 945,000 square kilometers (387,000 square miles) with about 46 percent of the total land area being arable (The World Bank 2002a). Tanzania mainland covers more than 99 percent of the total area and the Zanzibar Islands cover one percent of the total area. The 2002 national population census estimated an average growth rate of 2.9 percent per year. The population of Tanzania has grown from 12.3 million people in the first census after independence conducted in 1967 to 34.6 million people in the 2002 population census as shown in figure 2.2. The majority of people (77 percent) live in rural areas (TNW 2003).

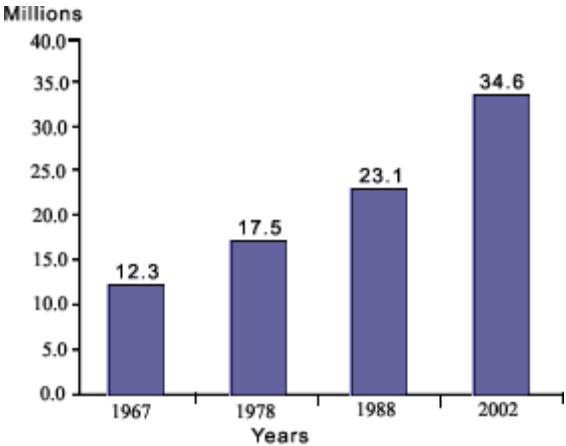
Tanzania is one of the poorest countries in the world. Its economy is heavily dependent on agriculture which employs over 70 percent of the labor force in Tanzanian, contributes nearly 45 percent of Gross Domestic Product (GDP), and is a major source of livelihood to about 80 percent of the population (Sarris et al. 2006). The climate of Tanzania ranges from tropical in coastal zones to temperate in the highlands. About one third of Tanzania is arid or semi-arid, receiving on average less than 800 mm of rainfall per year. The average precipitation is 937 mm per year, with about 50 percent of the country receiving less than 750 mm, and 80 percent receiving less than 1000 mm per year (FAO 1995).

Figure 2. 1: Map of Africa Showing the Location of Tanzania



Source: The World Gazetteer 2004.

Figure 2. 2: Population Growth in Tanzania



Source: TNW 2003.

2.2. Water Resources in Tanzania

Tanzania is rich in water resources. The water resources consist of open water bodies (surface water) and groundwater (URT 200a). These water resources are used for human consumption, irrigation, industrial uses, livestock/wildlife consumption, marine transport, and hydro- electric power generation.

2.2.1. Surface Water

Surface water in Tanzania consists of lakes, rivers, springs, natural ponds, and man made reservoirs. About 7 percent (about 60,000 sq. kilometers) of the land area is covered by fresh water lakes. The lakes include Lake Victoria, Tanganyika, Lake Nyasa, Rukwa, Eyasi, Natron, and Manyara (Kashaigili et al. 2003; URT 2002a). Lake Victoria is the largest lake in Africa and second largest fresh water lake in the world after Lake Superior in US/Canada. Lake Tanganyika is the longest freshwater lake in the world (419 miles) and the second deepest lake in the world. Lake Nyasa is another narrow and deep fresh water lake (Laure and Etagale 1995). There are numerous rivers, which flow to the lakes, and bigger rivers which flow into the Indian Ocean. About 50 percent of the surface run-off is obtained from the main rivers that flow directly to the Indian Ocean. These rivers include Wami, Ruvu, Rufiji, Pangani, Ruaha, Matandu, Mbwemkuru, and Ruvuma. The remaining 50 percent of surface run-off is divided into surface water drainage and the main internal drainage basin, which has no outlets to the sea such as Lake Rukwa, Lake Manyara, and Lake Eyasi. Other numerous rivers flow into Lake Victoria and into Lake Tanganyika (Kashaigili et al. 2003).

Rainfall is the major contributor of water to the surface water bodies through run-off. The amount of run-off is regulated by the combined effect of the rain water that falls on earth and evapo-transpiration processes. Surface water is the major supply of water in urban areas. Figure 2.3 shows the major lakes and rivers in Tanzania.

2.2.2. Underground Water

Underground water is also another important source of water for both rural and urban population. It refers to the water that has accumulated in the aquifers located below the earth's surface. This water can be extracted through springs, boreholes, and dug wells such as deep and shallow wells. The availability of underground water depends on the topography, climate, and rainfall pattern. Underground water is the most viable alternative supplement for water needs especially in the central and northern parts of Tanzania, which are semi-arid. Most people who live in rural areas depend on underground water sources for domestic, irrigation, and livestock water needs. This is because most of available surface water resources are seasonal.

The preceding discussion shows that Tanzania is richly endowed with water resources, especially in the areas around Lake Victoria, the northeastern highlands and the southwestern highlands. The central region around Dodoma and Singida are less endowed with surface water, hence more likely to experience severe water shortages. Although Tanzania has sufficient water resources, access to safe drinking water remains a problem for many people. One of the major factors that leads to water scarcity in Tanzania, despite its abundant water resource endowment, is limited water development and management as explained in chapter one. Most communities experience economic rather than physical water shortage.

Figure 2. 3: Major Rivers and Lakes in Tanzania²

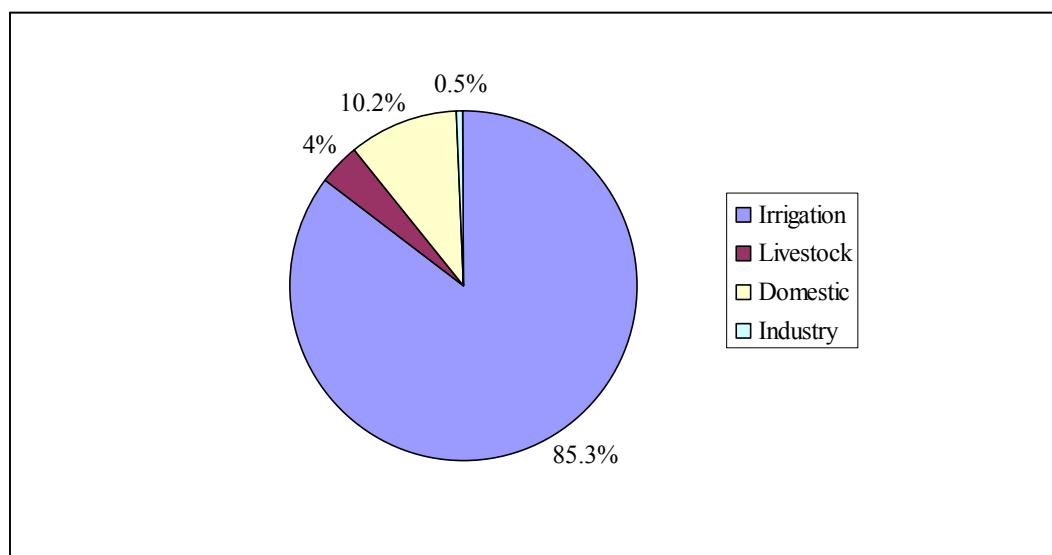


² Adapted from FAO. 2003. "Gateway to Land and Water Information"
http://www.fao.org/ag/agl/swlwpnr/reports/y_sf/z_tz/tzmp311.htm

The internal renewable water resources (IRWR)³ in Tanzania amount to about 82 km³ per year, of which 30 km³ is groundwater (Table 2.1). Surface water produced is about 80 km³ per year. Tanzania does not receive much water from neighboring countries. Only one major river, the Kagera, flows into Tanzania from the Rwandan highlands. The country shares three major lakes (Victoria, Tanganyika and Nyasa) as well as the Ruvuma River on the border with Mozambique (Figure 2.3).

Figure 2.4 shows total water withdrawal in Tanzania in 2002.⁴ Water withdrawal for agricultural, domestic and industrial purposes was estimated to be 5184 million m³.

Figure 2. 4:Water Withdrawal by Sector in Tanzania



Source: FAO 2005a.

³ This is the average annual flow of rivers and recharge of ground water (aquifers) generated from endogenous precipitation, i.e. precipitation from within the country's boundaries (WRI 2004). It is measured in cubic kilometers per year (km³/year).

⁴ The total water removed for human uses in a single year, not counting evaporative losses from storage basins. This includes water from nonrenewable groundwater sources, river flows from other countries, and desalination plants. It is measured in million cubic meters.

Agriculture accounted for 4632 million m³ (89.4 percent), of which 4425 million m³ (85.4 percent) was for irrigation and 207 million m³ (4 percent) for livestock. Withdrawals for domestic and industrial use were 527 million m³ (10.2 percent), and 25 million m³ (0.5 percent) respectively (FAO 2005a). Tanzania water resources are grossly under-utilized, primarily because much of the unused land either does not have good soils or is not located near a source of water (FAO 2002a).

Table 2. 1: Water Resources in Tanzania and other Tropical Regions

	Tanzania	Sub-Saharan Africa	Asia (exclude Middle East)	South America
Surface water produced internally ⁵ (km ³)	80	3812	10985	12198
Groundwater Recharge ⁶ (km ³)	30	1549	2472	3693
Overlap ⁷ (km ³)	28	1468	2136	3645
Total IRWR ⁸ (km ³)	82	3901	11321	12246
Per capita IRWR ⁹ (m ³ /person/year)	2227	5705	3241	34428

Source: WRI 2004.

⁵ The average annual flow of rivers generated from endogenous precipitation and base flow generated by aquifers. It is computed by measuring or assessing total river flow occurring in a country on a yearly basis.

⁶ Total volume of water entering aquifers within a country from endogenous precipitation (precipitation from within the borders of a country or region) and surface water flow.

⁷ The volume of water shared by surface and ground water. It is subtracted when calculating IRWR to avoid double counting. Two types of exchanges create overlap: contribution of aquifers to surface flow, and recharge of aquifers by surface run-off.

⁸ The sum of surface water and groundwater recharge minus overlap. Natural incoming flow originating outside a country's borders are not included in the total.

⁹ This is annual flows of rivers and recharge of ground water (aquifers) generated from endogenous precipitation. It is measured in cubic meters per person per year (m³/person/year).

According to URT (1997a), Tanzania has 43 million hectares of land which are suitable for agriculture, of which only 6.3 million hectares are under cultivation. This represents 15 percent of arable land (URT 2002a). The majority of people in Tanzania are subsistence farmers who practice small-scale agriculture in rural areas. The main farming activities are food, cash crop, and livestock production. The potential for irrigation development is estimated to be 828,000 hectares based on soil and water availability- that is 2.2 percent of the cultivable area. URT (2002a) states that only 150,000 hectares (18 percent) of irrigable land is irrigated. Irrigation potential exists in river valleys and alluvial plains. The major river basins and alluvial plains in Tanzania are the Ruvu, Kilombero, Wami Valleys, Kilosa, Lower Kilimanjaro, Ulanga, Kagera Basin, Kyela, Usangu, Rufiji, and the black cotton clay soils around Lake Victoria. The main crop in large and small scale irrigation projects is rice. Sugar cane occupies about 10,000 ha of the irrigated area.

Most irrigation in Tanzania (80 percent) consist of small-scale indigenous schemes where production of irrigated vegetables is commonly undertaken more extensively than any other crop on a much smaller scale of typically less than half an acre. The remaining 20 percent comprises large irrigation schemes that are centrally managed and owned by public or private institutions and individuals (URT 2002a). Table 2.2 presents a summary of irrigation facts in Tanzania.

Table 2. 2: Tanzania Irrigation Facts

Characteristic	Statistic
Total land area (million ha)	94.5
Percent of arable area	40.0
Irrigation potential (million ha)	0.83
Area irrigated(thousands ha)	150.0
Percent of irrigable area irrigated	18.1
Percent of irrigated area under small holder farmers	80.0

Source: Tafesse 2003.

2.3. History of Water Development in Tanzania

To understand the current water management systems, this section reviews the history of water development in Tanzania. Tanzania was colonized by Germany from the 1880s to 1919. It came under British colonial rule from 1919 to 1961. The mainland Tanzania (known as Tanganyika during colonial times), became independent in 1961. Shortly after independence, Tanganyika merged with its neighbouring country Zanzibar on April 26, 1964 (Zanzibar received its independence from the United Kingdom in 1963). The union of Tanganyika and Zanzibar formed the United Republic of Tanzania.

Colonialists wanted to supply water to areas where they resided, in government offices and residences occupied by the colonial rulers, missions, large estates, cities, and trading centers. During the period of British colonialism, Tanzania (Tanganyika then) formed the Department of Water Development, which was later called Water Development and Irrigation Supplies. This department was established to develop and manage domestic water supplies. The government owned these resources and people who were supplied with water were required to pay for it. Some local governments managed to raise money to maintain the water supplies installed by the central government (Maganga et al. 2001).

After independence from the British rule in 1961, the new socialist government was committed to providing free basic social services to the population. To minimize the costs of providing basic social services to the dispersed rural communities, the government forcefully moved villagers into “*Ujamaa*” (socialist) villages. The government then built schools, health clinics, water supply, and road systems to serve the *Ujamaa* villages. The central government took responsibility for developing water projects in the country, and “decided to meet the costs of operation and maintenance of all rural water supply projects” (Maganga et al. 200:172).

The government's goal was to provide free access to safe water for all. There was, however, no plan to provide free water in urban areas. For example, urban residents who had water piped into their houses paid for the water they used. But people who collected their water from a public water source did not have to pay for it. Unfortunately, because of economic problems, the government failed to meet its objective of providing safe water to everyone. As the population grew, water supplies failed to keep up with rising demand.

The International Monetary Fund and World Bank austerity program that was introduced in the late 1980s led to cuts in social services, and the government reduced spending on water infrastructure. Some of the water supply systems that had already been installed ceased to function. More than 90 percent of piped water supplies in Tanzania ceased to work because of inadequate repair and maintenance. This greatly reduced water quality and many people came to rely on untreated water sources, which were a threat to their health. The following section discusses policies and legal instruments related to water management in Tanzania.

2.4. National Policies and Water Management¹⁰

Water is a basic natural resource that is essential to human health in low-income countries like Tanzania. So the degradation of water resources contributes to poverty and undermines economic development. The government of Tanzania recognizes that protection of the environment and water is a social and economic necessity and a crucial ingredient of sustainable development.

¹⁰ "Water" here refers to various types of water uses.

In that regard, in 1997, the government's National Environmental Policy (NEP) was adopted to provide policy guidelines and regular policy review to ensure sustainable use of the natural environment. The goals of the NEP are to ensure sustainable and equitable use of resources without degrading the environment or risking health or safety, prevent and control degradation of land, water, vegetation, and air, conserve and enhance the country's ecosystems, improve the condition and productivity of degraded areas so that all Tanzanian citizens may live in a safe and productive environment, raise public awareness on the importance of environmental conservation, promote individual and community participation in managing the environment, and promote national and international co-operation (URT 1997b).

NEP uses different policy instruments to achieve its goals, including environmental impact assessments, environmental legislation, economic instruments and environmental standards and indicators. The National Environmental Action Plan (NEAP) was developed to reinforce the sustainable use of natural resources by incorporating environmental issues in development policies. In that regard, the government has designed the National Water Policy, the Land Policy, Agriculture and Livestock Policy, and decentralization policies to protect the environment and ensure that natural resources are used in a sustainable way.

2.4.1. National Water Policy

Since 1974, water management in Tanzania has been governed by the Water Utilization (Control and Regulation) Act. More discussion of this Act is provided below in section 2.5.2. In 1991, the government formulated the Water Sector Policy which marked a shift from the "free water era" that began in 1967 when the country followed socialist policy, to cost sharing in the operation and maintenance of water supply schemes. But, as explained above, Tanzania has

been experiencing water scarcity. Water supplies failed to cope with the increased water demand because of lack of clearly defined and comprehensive legal and institutional framework (URT 2002a).

The Water Sector Policy was revised in 2002, and was replaced by the National Water Policy (NAWAPO). NAWAPO included issues like demand responsive approach (DRA) principle leading to community ownership and management (COM) of water/sanitation facilities, private sector participation, integration of water supply and sanitation, and decentralization of service delivery from central government to district councils. The major goal was to ensure active participation of communities, private sector and local government in the management of water resources as the central government reduced its role in the provision of social services (URT 2002a). This policy forms the basis for the creation of the institutional framework for sustainable development and management of water resources in Tanzania. NAWAPO tries to lay a foundation for stakeholders' active participation in planning, construction, operation, maintenance and management of community water supply schemes. In rural areas, local governments are assigned the responsibility to maintain and run small-scale water systems.

According to NAWAPO, the government will provide financial support for water development, but communities are required to demonstrate their ability to sustain their water sources before they can be granted financial support. The NAWAPO requires the rural communities to share the costs of managing water supplies and to participate in financing their water supply programs. Rural people share the costs of managing water supplies by paying part of the capital costs, both in cash and in kind, whenever they develop a new scheme, rehabilitate or expand an existing water scheme (URT 2002a:63). In many rural areas such as Bariadi district, this includes development and maintenance of water supply for domestic and livestock

watering (charco-dams) because most irrigation is small-scale and uses natural water sources like rivers. Larger water sources like lakes are maintained by regional/national authorities.

However, customary arrangements for water management were hardly considered in the Water Utilization Act of 1974 and in the NAWAPO. The government continues to regulate the water sector and “impose” formal registration of water entities (URT 2002a). This creates competition between the customary and statutory legal systems. Future policies need to consider and incorporate customary arrangements to ensure sustainable water management.

2.4.2. National Land Policy

The National Land Policy in Tanzania stipulates that all lands in Tanzania belong to the Republic and are vested in the President as the trustee for and on behalf of all citizens. People cannot own land privately but instead can obtain the right to use and occupy land through a system that assigns a right of occupancy, which is granted by the government. The policy recognized that customary laws tend to discriminate against women and have stipulated that every citizen shall have equal and equitable access to land.

The National Land Policy of 1997 was designed to promote and ensure security of tenure to all citizens. Specific objectives of the Land Policy included: providing equitable land distribution and access to all people; ensuring that customary land rights were recognized; clarified and secured, protecting land resources from degradation; improving land management systems; ensuring that land was put to productive use; and setting ceilings to prevent the concentration of land ownership. Moreover, section 4.2.10 of the National Land Policy stresses the protection of highly “sensitive” areas including water catchment areas, forests areas, rivers, river basins and banks, and wetlands (URT 1997).

The policy explained:

In order to ensure and guarantee women access to land and security of tenure, women will be entitled to acquire land on their own right, not only through purchase, but also through allocation. However, inheritance of clan land will continue to be governed by customs and traditions provided such customs and traditions is not contrary to the constitution and is not repugnant to principle of natural justice. (URT 1997c:13).

The actual implementation of the Land Policy with regard to womens' right to land is still limited because most of the land in rural areas is already controlled by men. Moreover, acquiring land through allocation is difficult for rural women because most of them are not able to pay the costs involved in acquiring a formal land right. More discussion about the land tenure system and land rights will be done in section 2.4.1.

2.4.3. National Agriculture and Livestock Policy

A majority of people in Tanzania live in rural areas and depend on agriculture as their major means of survival. Most of these people are livestock keepers and small holder farmers. They depend on rain fed agriculture, which is susceptible to drought and unreliable rainfall. The National Agriculture and Livestock Policy of 1997 recognized the need to improve agricultural technology and agriculture practices and increase productivity. The major goal was to improve the well being of people by ensuring food security at all levels. The policy focused on increasing income generation from agriculture and livestock production, promoting irrigated agriculture, and irrigating high value crops such as vegetable and fruits. The policy focused on the commercialization of agriculture and the transformation from the subsistence agriculture to market-based production (URT 1997a). This policy was designed to ensure sustainable

management of natural resources since agricultural activities contributed to water pollution from agrochemicals that were washed into water sources.

2.4.4. Decentralization

The management of water resources in Tanzania is the responsibility of the Ministry of Water and Livestock Development (MWLD). Water resources management involves development of water resources, water allocation, pollution control and environmental protection. Decentralization was introduced in Tanzania to increase the participation of local communities in decisions about management of water resources. This followed the view that the failure of the state's management of the environment was connected to the concentration of decision-making powers and ownership of natural resources by the central government (Mniwasa and Shauri 2001). Thus, the top-down approach to environmental management and the lack of participation by local communities in the management of their natural resources contributed to natural resource degradation. A study of 121 rural water supply projects undertaken jointly by 18 development organizations found that community participation in decision-making and local ownership resulted in more effective and sustainable rural water systems (Narayan 1995).

Under the decentralization policy, the central government transferred management of water resources to local government. The local government authorities were required to protect and properly utilize the environment for sustainable development. They have been given legislative power under Act No. 7 of 1982 and Act No. 8 of 1982 to enact and enforce water ordinances and by-laws that are appropriate in their areas of jurisdiction (Mniwasa and Shauri 2001).

Tanzania operates with two levels of government: the central and local governments. The central government has authority and control over all matters in the country. It has three organs: the executive, judiciary, and the legislature. The local government structure is subdivided into village, ward, and district levels. At the village level, there is a village council whose members are elected by a village assembly. The assembly is comprised of all members of the village who are 18 years and older (Huggins 2000; Mniwasa and Shauri 2001). The major functions of the village council are to plan, coordinate, propose by-laws, and mobilize villagers to participate in development activities and water management. Each village has a committee in charge of water management. The major task of the water committee includes local water allocation, resolving disputes among water users, and crisis management particularly during drought (Mujwahuzi 2002). The village is the lowest level of the local government structure.

Next to the village is the ward development council, which is responsible for formulation of general development plans and environmental management within its ward. The highest level of the local government structure is the district councils. The district councils are required to take the necessary measures to protect and manage the environment. They have legal power to pass by-laws that can be applied to the whole district. The by-laws are then submitted to the regional officer who will comment and then submit the draft by-laws to the minister of local government affairs for approval. Once approved, the by-laws are gazetted and are enforceable from the date of publication or from the commencement date specified in the by-laws (Mniwasa and Shauri 2001). The by-laws and ordinances passed by the local councils must be in accordance with the state law and constitution. So while the government in Tanzania recognizes the existence of customary institutions, it imposes an institutional framework that seriously undermines the efficiency of customary institutions.

2.5. Property Rights and Water Management

This section reviews how customary and statutory institutions affect water and land rights. Property rights affect how people interact with natural resources because they dictate who may use what and how (Meinzen-Dick and Pradhan 2002). Property rights refer to “the capacity to call upon the collective to stand behind one’s claims to a benefit stream” (Bromley 1991). This capacity can be derived from the state, customary, religious and other normative institutions. Property rights include bundles of rights that can be characterized as use and control rights. Use rights, which include access and extraction rights, determine whether an individual has the right to cross a particular piece of land and to obtain access to or fish in a particular water source and whether an individual has the right to draw water from a river. Control rights include management, exclusion, and alienation. These rights determine whether an individual has the right to modify or transform the resource, or restrict how much can be taken from the resource, determine who else can use the resource, and determine whether the rights can be transferred through inheritance, gift or sale (Meinzen-Dick et al. 1999; Schlager and Ostrom 1992). Property rights determine who has the right to access, use, manage, transfer to others, and exclude others from using the resource (El-Mikawy et al. 2003; Schlager and Ostrom 1992).

De Soto (2000) theorized that property rights are an essential ingredient of economic development. He emphasized that statutory or formal laws had to be amended to bring them into congruence with the customary or informal property rights that have arisen through negotiation. When this is accomplished, De Soto argues, a huge source of capital will be mobilized, a factor that will facilitate development. From this perspective, customary property rights may be effective if they are formally recognized by the state. If not, customary communities may fight with people who hold formal property rights. In some instances, village customary resource users

have lost access to resources when non-villagers or people with access to courts or government agencies override customary property rights by using statutory law (Meinzen-Dick and Pradhan 2002). The following section will discuss property rights to land and water.

2.5.1. Land Rights in Tanzania

In addition to the Land Policy discussed earlier, there are customary land rights among all ethnic groups in Tanzania. Typically, the customary land tenure systems require heads of households to hold land in trust on behalf of the clan and their families. Land is passed from one generation to another through inheritance. Holders of land are not allowed to sell their land without the express permission of elders or clan leaders. Although the state recognizes the existence of customary land tenure systems and rights of occupancy (Shivji 1999), the statutory laws prevail whenever customary laws are in conflict with statutory laws.

The statutory land tenure system in Tanzania can be divided into three groups: village land, general land, and reserved land. Village land is all the land within the village and is managed by the village council. General land refers to the land under the management of the Commission of Lands. This includes lands in urban areas, land that is "free" for allocation, and all the land that has been allocated by the government. Reserved land refers to lands reserved for various conservation purposes: wetlands, land on steep slopes, wildlife, forests, national parks, land within 60 meters of riverbanks, and mangrove swamps. Both reserved and general lands are regulated by the Land Act of 1999, which deals with lands outside villages or reserved areas. Village land is regulated by the Village Land Act of 1999 (Shauri 1999; Wily 2003).

According to the Village Land Act of 1999, all land in the village is vested in the village assembly. Land rights are administered by the village council through the authority of the village

assembly. The Village Land Act recognizes customary rights of land occupancy and treats them as having equal status to a granted (statutory or formal) right of occupancy. The problem with customary land rights is that they are insecure because people lack formal documentation of their rights. In order to have secured rights, holders of customary rights are required to register their land and receive a certificate of customary right of occupancy. The procedures of acquiring customary land rights are the same as those of statutory rights and are too expensive to most rural people. In addition to official cost, unofficial charges or bribes and a complicated and bureaucratic registration process discourage many villagers from registering their lands.

2.5.2. Water Rights in Tanzania

Water is not static. It moves from one place to another. Multiple users of water tend to have different rights to the same water. It is therefore very important to understand the types of water rights because water rights are a source of conflicts and are important for water allocation and water markets.

As with the case of property rights,¹¹ water rights entail a bundle of rights that include use, control and decision-making rights. Water use rights include the right to use and obtain benefits from water. Control and decision-making rights include the right to determine who will or will not have access to water (exclusion right), the right to regulate water-use patterns, and the right to sell or lease water resources (Schlager and Ostrom 1992). Types of water rights include open access, public, common, and private rights (Bruns and Meinzen-Dick 2003; Bruns and Meinzen-Dick 2000; Paul 2003).

Public rights are water rights held by the government. The government can obtain water rights through establishment of laws that give the state control over water allocation (Paul 2003).

¹¹ See section 2.4 above.

Water rights in Tanzania are regulated by the Water Utilization (control and regulation) Act number 42 of 1974, and its subsequent amendments. This is the major legislation on water in Tanzania. The Act declares all the water in the country to be the property of the Republic of Tanzania, and gives everyone the rights to use but not to own water (URT 1974). In this Act, water is considered as a public resource that belongs to the whole nation and needs to be available to every citizen (Mwaka et al. 1999). The Act established control and regulatory mechanism to administer water rights and to make water available to everyone.

Because the Water Utilization Act of 1974 prohibits private ownership of water, it provides the need for water users to obtain rights to use water by acquiring a water permit, which gives them legal license to use water but not to own it. The government issues water permits based on the needs of the applicant and the expected benefits of the proposed water use. The Act requires the applicant to state the use of water, the amount required, and the period of use. The water use right is classified in order of priority. Water for domestic use is given the highest priority, followed by livestock use, irrigation, industry, power generation, and mining (Mwaka et al. 1999). Once a water right is acquired, an individual is required to pay water user fees depending on the quantity of water abstracted (Sokile and Van Koppen 2004).

In rural communities, individual water users are authorized to have water use rights without any payment, registration or licensing if the water is used for domestic purposes, small gardening and for animal watering. If the water is used for commercial purposes, then individuals are required, under the Water Utilization Act, to obtain a legal entitlement or license to use water. Regulations to public water rights are meant to control water use and resolve problems that might occur as a result of water over use, and resolve conflicts that arise from competing uses. Statutory law requires people to obtain water rights for extraction of surface

water (except for minor water collection). Ground water extraction of 22,700 liters or more per day also requires a water right (URT 1974). Shallow wells with a hand pump do not need water rights, but users are required to obtain land rights to the area around a shallow well. However, many rural people are not willing to apply for water rights and pay water fees because water permits are expensive and because rural communities believe that water is a common property resource.

Common water rights refer to communal water rights where water is free and open for all the people to use in specified ways. Under customary water law, natural water sources are considered as a community property. There is no private control of natural water sources, but the community leader or customary institutions, have the right to control and determine the use of water resources for the benefit of the whole community. The traditional view on water rights was also incorporated in the Water Utilization Act of 1974. Under this Act, surface water is accessible to everyone. In rural areas, people do not need to acquire water rights if they are using the water for domestic purposes, small gardening, and for animal watering.

Private water rights are rights held by an individual or legal individuals like corporations (Bruns and Meinzen-Dick 2003). They refer to permits or licenses that give an individual a right to use water in certain ways (Paul 2003). In Tanzania, individuals or groups of individuals who want to acquire private rights to water sources are required to obtain land rights before they construct a well. After the wells have been constructed, an individual holds all the rights to both the land and water (Carlsson 2003). The above types of water rights can be contrasted with open access water right where communities have more or less unrestricted right to use the resource. There is no a social authority or institutions that define and enforce the rights to use water. Everyone has free access to water (Bromley 1992; Nemarundwe 2003). Also, there are no

specific rights assigned to anyone and no one can be excluded from using the resource. In African countries, free access may include rangelands, rivers and streams (Bruns and Meinzen-Dick 2003; FAO 2002).

De Soto (2000) argues that people need to have secure water rights, because secure rights give them an incentive to participate in water management programs and to plan and work on long-term water management strategies. Once water rights are secure, people will have confidence that they will benefit from the investments they make in the resource. Moreover, secure water rights give communities a legal authority to manage water resources. They will be able to make decisions and enforce water management rules and regulations. Without secure rights, the potential for rural communities to protect their natural resources remains untapped (De Soto 2000).

In pre-colonial times, the management of rural water resources was determined by customary institutions and behavioral norms. Most of these norms still operate while some of them have been modified or discarded (Huggins 2000; Sokile et al. 2002; Woodman 1996). For the majority of rural people in Tanzania, access to and use of natural resources is regulated by customary institutions that stipulate that all natural resources are owned in common by all members of the community. Membership in a community ensures the right to use communal resources (Carlsson 2003). According to customary law, surface water is accessible to everyone and people do not need to acquire water rights if they use the water for domestic purposes, watering livestock, and small-scale irrigation.

2.5.3. Relationship between Land and Water Rights

Land tenure rights and water rights are legal rights with similar purposes. First, they permit the orderly allocation of valuable resources. Secondly, they confer the necessary security

to invest in the resource or activities entailing its use (Hodgson 2004). It is important to study the issue of land rights because it greatly influences women's access to land and water in general. In many African societies, most men imagine that women need water only for domestic uses. The truth is that women also need water for irrigation and livestock watering.

In many situations, water rights are given to landowners, who are usually men. Women obtain use rights through men. Participation in water users' associations can give women a voice in decisions, but women rarely join these associations. Women's low rate of participation may be caused by rules that may limit participation to only one member per household, in which case the man usually attends meetings, by women's reluctance to appear in public, which may result in a loss of social prestige, by the fact that men do not allow women to talk much at meetings, and because of the fact that many are illiterate, which means they have lower status in meetings (Meinzen-Dick 1999a). The low participation of women in irrigation institutions creates problems for the health and welfare of families, and reduces the economic prospects of women in poverty reduction (Agarwal 1994).

Water is very important for the productive use of land in arid and semi-arid Africa, where agricultural development depends highly on the availability of water. Additionally, land and water rights are very important for allocation of both water and land resources, a factor that affects the use of land and water resources and the manner in which these resources are managed by communities (Hodgson 2004). In many instances, water rights depend on land rights, especially if water is needed for irrigation. Secured water rights are very important for irrigators. Many irrigators in Tanzania will take water from a river by diverting water from a reservoir or a dam. Then water will flow through earthen canals or channels to irrigate the land. An irrigator will require water rights to be able to extract water from a river. Thus, water and land tenure

rights are closely related to each other, as they are both the most important resources on earth (Meinzen-Dick and Nkonya 2005).

2.6. Statutory Water Management Institutions in Tanzania

The British established most of existing statutory water institutions in Tanzania. In 1948, the British colonial government passed a Water Ordinance that stipulated that all water in the country was vested in the Governor (Van Koppen et al. 2004).

After independence in 1961, the government of Tanzania inherited the legal system created by the British, and continued to use the same instruments with limited amendments (Allott 1984).

The major statutory water management institutions in Tanzania that regulate water management at the national level is the Water Utilization (Control and Regulation) Act Number 42 of 1974, and its subsequent amendments as described above (Sokile et al. 2005:1). Tanzania adopted a river basin management approach through Water Utilization Act No.10 of 1981, which was an amendment of the Principal Act No. 42 of 1974.

In addition to the Water Utilization (Control and Regulation) Act, Tanzania designed a National Water Sector Development Strategy (NWSDS) that will be implemented from the year 2005 to 2015, and subjected to a comprehensive review in the year 2010. The NWSDS sets out the implementation of NAWAPO and develops a coherent, holistic, and integrated strategy for the water sector in order to implement NAWAPO (URT 2004a:5). The institutional framework for NWSDS is summarized in figure 2.6. Through this strategy, five levels of operation in management of water resources were established: the national level, basin level, river catchment and sub-catchments level, the district level, and water-user association level.

At the national level, the Ministry of Water and Livestock Development was put in charge of policy formulation, coordination, formulation of standards guidelines, and cross-

sectoral planning through central water boards (CWB). The CWB consists of a chairman (appointed by the President), and 10-15 members (appointed by the Minister of Water). The board's task includes inter-sectoral water resource management planning, coordination of basins and inter-basins planning, and advice to the Minister on matters regarding water management (URT 2004). The Minister of Water is responsible for ensuring that national water policies and strategies are implemented. He or she appoints the Principal Water Officer (PWO) to be in charge of apportioning national water supplies, modifying and granting water rights, and water management. The PWO is the national water officer with absolute authority for setting policy and allocation of water rights at the national level (Mwaka et al. 1999).

At the basin level, Basin Water Boards (BWBs) were established in each basin. A water basin is any area of land designated and declared by the Minister of Water to be a water basin in relation to any river or water source (Maganga 2002; Mwaka et al. 1999). Tanzania has been divided into nine water basins (URT 2002): Pangani, Wami/Ruvu, Rufiji, Ruvuma and Southern Coast, all of which drain to the Indian Ocean, and Lake Nyasa, Lake Rukwa, Lake Victoria and the internal drainage basins such as those of Lake Eyasi and Manyara and Bubu depression (Figure 2.5).

The BWBs are represented by regional secretariat and the district council. The BWBs are responsible for technical functions and regulation. They formulate recommendations on water management issues, enforce pollution prevention and control measures, such as controlling the discharge of effluents by industrial and other water users, and ensure compliance with water management institutions (Maganga 2003). The BWBs are also in charge of approving applications for water use rights and discharge water permits, collect water extraction fees, and

distribute water among different users (Jaspers 2003; URT 2004). Where a conflict arises, the BWB has the power to settle disputes and punish non-compliance (Carlsson 2003).

Each water basin is divided into catchment and sub-catchments. Each catchment and sub-catchment has established water committees. The BWBs delegates responsibilities to catchments and sub-catchment water committees who are responsible for management and conflict resolution. The district councils are supposed to “participate fully” in BWBs and Catchment Committees (URT 2002a:47). They are also responsible with district planning, enacting by-laws, and conflict resolution for the whole. They assess the demand of water in their districts, and “participate fully” in the preparations of Basin plans (URT 2002a:47).

Next to the district level are communities/ water-user associations (WUAs).The WUAs are defined by the NWSDS as:

“Legally constituted bodies drawing their membership from water users in a particular locality. They may need to employ a few staff in order to carry out the limited functions at the local level and the costs of Associations will be borne from charges levied on water users.(URT 2004a:19).

The formal WUAs are expected to operate through formal principals such as electing leaders for the association, paying membership fees, attending meeting, etc. (Sokile et al. 2005:8). WUAs are responsible for management of allocated water resources, crisis management during drought, and for resolving water disputes among water users and between groups within their areas of jurisdiction, implementations of conditions of water rights, and control pollution (URT 2004a: 47-48; URT 2002a).

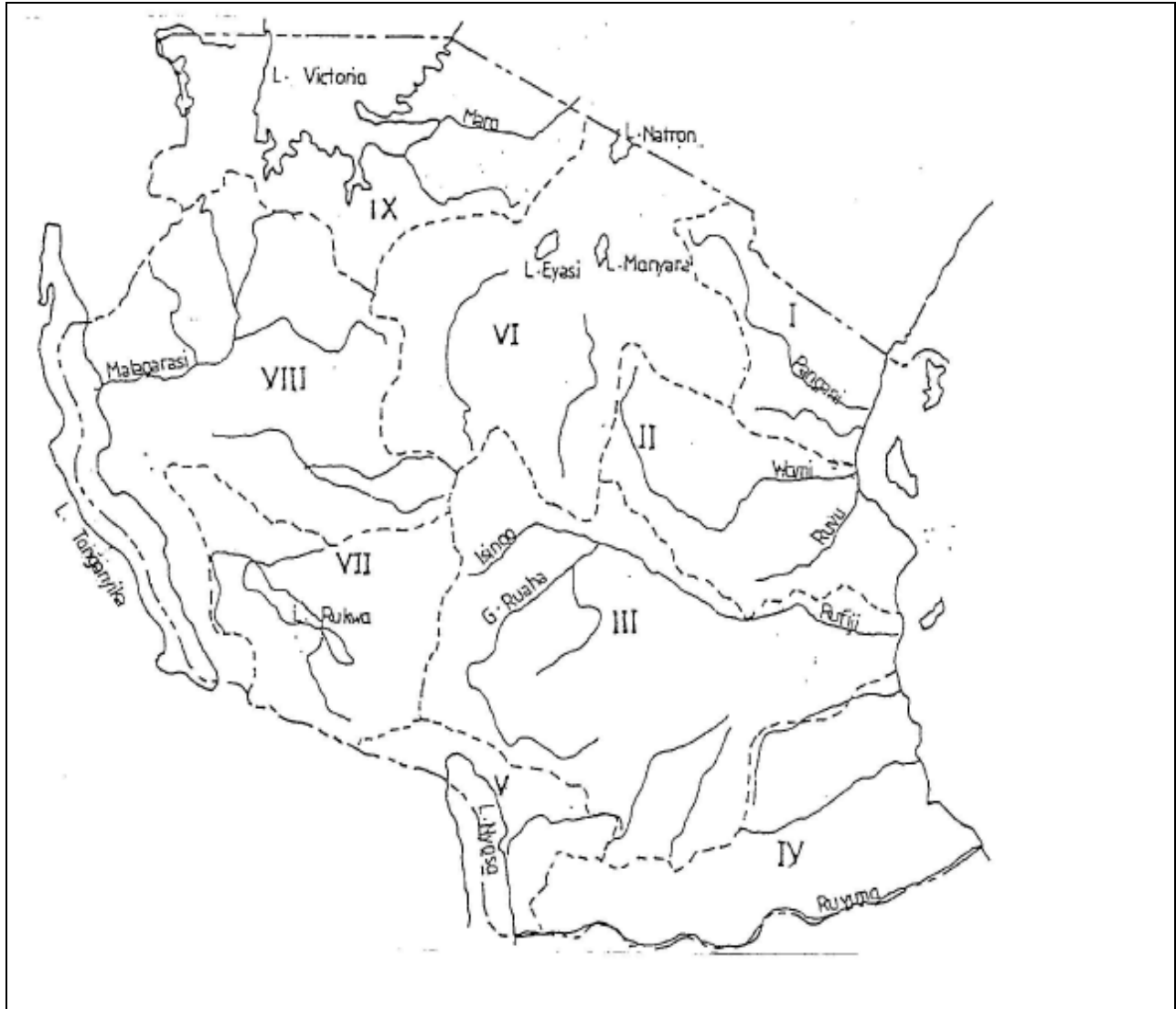
The National Water Sector Development Strategy (NWSDS) outlines the management of water resources through national, catchment and sub-catchment water committees, Water Boards, and Water User Associations (WUAs). This indicates that the river basin management approach is focused on management of irrigation water. The NWSDS's emphasis on basin management does not provide for management of underground water sources which are the major sources of water (especially domestic water) in rural areas. Although the local governments at the district level have roles to play under NWSDS, the role of village councils, small informal associations or cooperatives of water users, and customary institutions are ignored by the National Water Sector Development Strategy.

As Sokile et al. (2005:9) explained:

Formal WUAs have little contact to informal local associations of water users. Furthermore, the formation of WUAs has neither built on nor encouraged the existing local associations of water users. While the formation process of WUAs requires users to come together, hold meetings, write constitutions, pay monetary membership fees and apply for registration with some supra institutions, the informal associations simply require one to have a stake in the water use undertaking.

Therefore, a new approach is needed to incorporate all stakeholders, both informal and formal, and to recognize the importance of local level institutions in the management of water for different uses. The new approach also needs to consider what people can and cannot do, and recognize the needs of different water uses and users. Formal institutions should recognize the formal-informal relationships and provide more opportunities for the informal institutions (Sokile et al. 2005).

Figure 2. 5: Map of Tanzania Showing Water Basins

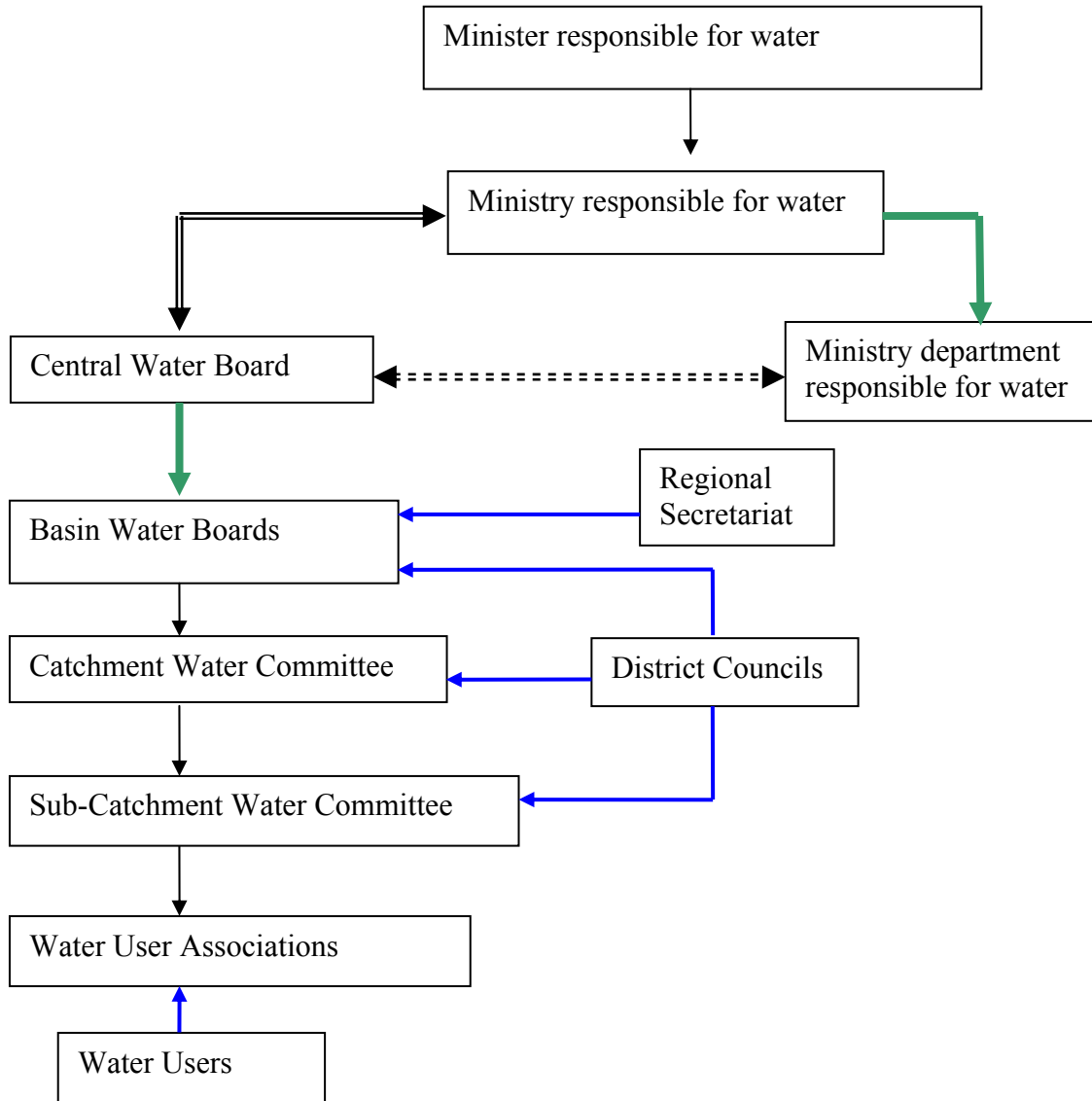


Key

I. Pangani Basin	VI. Internal Basin
II. Wami-Ruvu Basin	VII. Lake Rukwa Basin
III. Rufiji Basin	VIII. Lake Tanganyika Basin
IV. Ruvuma Basin	IX. Lake Victoria Basin
V. Lake Nyasa Basin	----- Basin Boundary

Source: Kalinga and Shayo 1998.

Figure 2. 6: Statutory Institutional Framework for Water Management in Tanzania



- Key
- Delegated authority
 - Water resource management responsibility
 - ↔ Monitoring and evaluation
 - Representation
 - ↔ Coordination

Source: URT 2004a.

2.7. Description of the Study Site

2.7.1. Background to Bariadi District

Tanzania is divided into 26 regions (*mikoa*), 21 of them are in the mainland and five are in Zanzibar islands (Figure 2.7). These regions are subdivided into districts (*wilaya*), which are further subdivided into divisions (*tarafa*), wards (*kata*) and villages (*vijiji*). Villages are further subdivided into the smaller units called sub-villages (*vitongoji*). Sub-villages are further broken down into smallest unit of ten households each (*ubalozi*). Each *ubalozi* is led by a nominated leader called *balazi*.

This study was conducted in Shinyanga region, the 9th largest region in the country. Shinyanga region lies south of Lake Victoria in the North-western part of Tanzania. The region has a population of 2,805,580 with average family size of 6.3 and a growth rate of 2.9 percent per annum (TNW 2003). The region covers 50,781 km² of which 31,140 km² is arable land; 12,079 km² is grazable land, and 7,544 km² is forest reserves (HASHI 2002). Shinyanga region is bordered by Mwanza, Kagera and Mara regions to the north, Arusha region to the east, Singida and Tabora regions to the south, and Kigoma region to the west (Figure 2.7). The people of Shinyanga practice mixed farming, with agriculture as the major source of livelihood followed by pastoralism. Shinyanga region has the largest number of cattle herd of all the regions in Tanzania, comprising about 22 percent of the total cattle population in Tanzania (TMLD 2005).

Figure 2. 7:Map of Tanzania Showing Regions



Source: TNW 2003.

Shinyanga region is divided into eight administrative districts: Bariadi, Bukombe, Kahama, Kishapu, Maswa, Meatu, Shinyanga urban, and Shinyanga rural (Figure 2.8). The districts are subdivided into 27 divisions, 160 wards, and 817 villages.

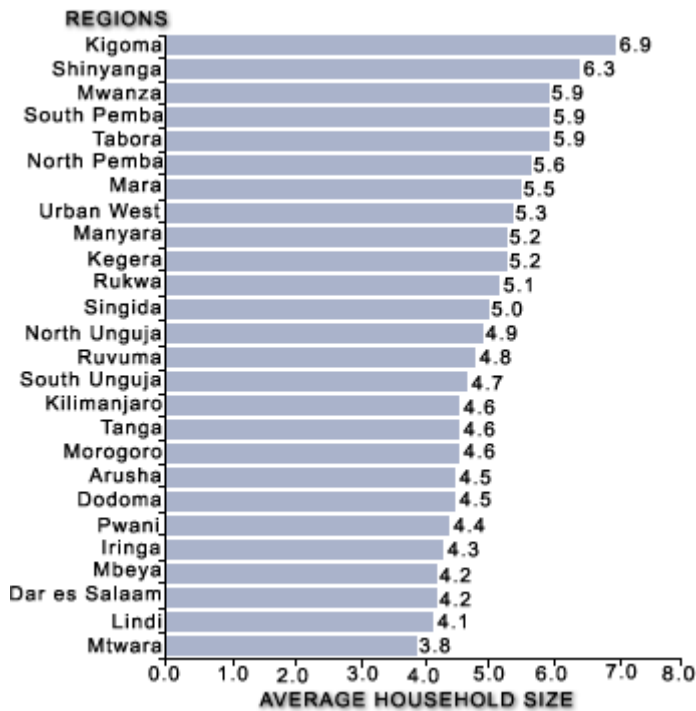
Figure 2. 8: Maps Showing the Location of Bariadi District, Shinyanga Region



Source: TNW 2003.

Shinyanga region is occupied mainly by the *Sukuma* ethnic group. Other groups include *Wanyamwezi*, *Wanyaturu*, *Wasumbwa*, *Wanyiramba*, and *Wahadzabe*. Compared to other regions in Tanzania, Shinyanga region is the second highest in terms of household size as shown in figure 2.9.

Figure 2. 9: Average Household Size in Tanzania



Source: TNW 2003.

Bariadi district was chosen as a focus of this study because the place is typical of most rural areas in the Shinyanga region: relatively high population density, poor soils, and water shortage. Bariadi district has limited permanent water resources due to unreliable rainfall and drought occurrences that affect household water access and leads to crop failures.

Therefore, findings from this research may be applicable to other districts in the Shinyanga region as well as other rural areas in Tanzania which have similar characteristics.

2.7.2. Topography, Climate, and Agricultural Potential

Tanzania is a tropical country, which can be subdivided into seven agro-ecological zones (Figure 2.10). According to FAO (2005a), agro-ecological zones (AEZ) refer to land resource mapping units, such as climate, landform and soils, and/or land cover. These units have specific range of potentials and constraints for land use. The following are the AEZ of Tanzania as explained by FAO (2005a):

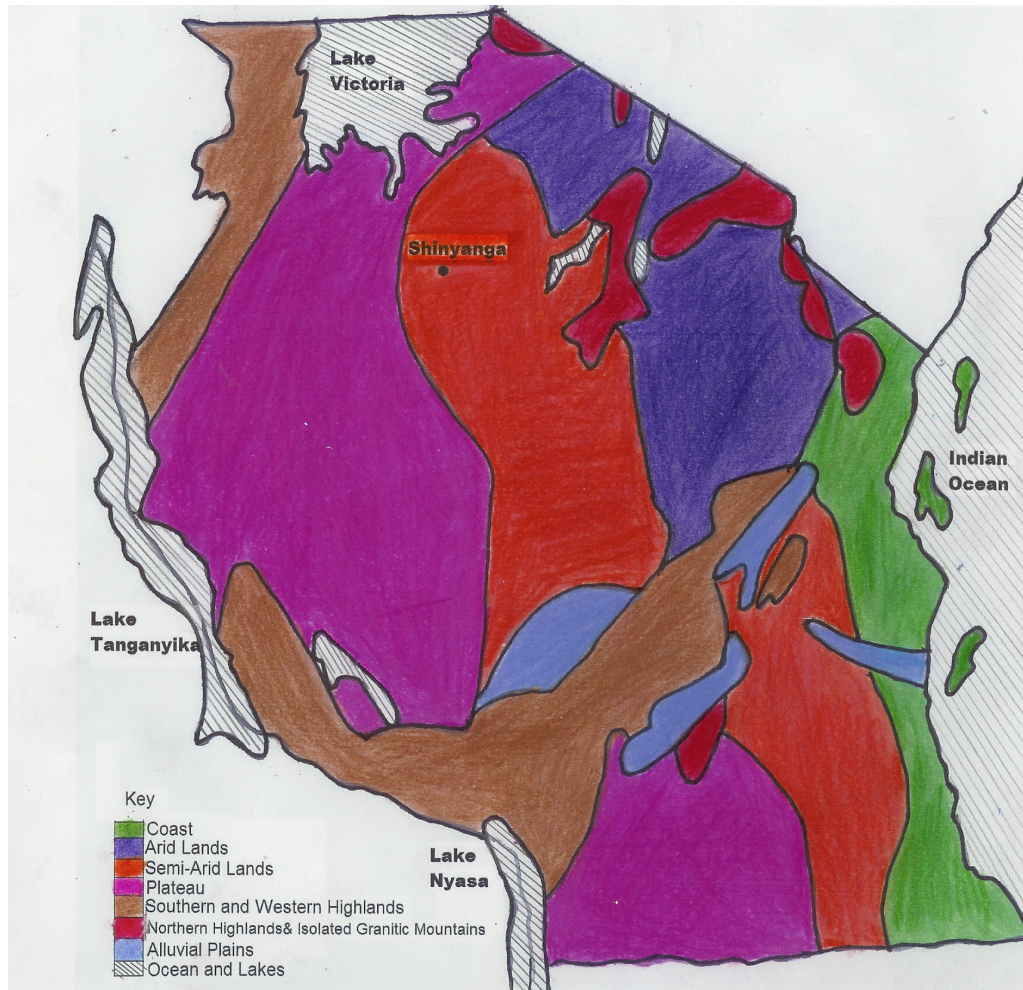
- (a) The tropical coastal plains with rainfall ranging from 750 to 1,200 mm per year and soils with variable fertility. The northern part experiences bi-modal rainfall season while in the south rainfall is usually unimodal.
- (b) The arid lands with low and unreliable unimodal rainfall ranging from 500 to 600 mm per year. The soils are relatively infertile and highly susceptible to erosion.
- (c) The semi-arid lands with unreliable unimodal rainfall ranging from 500mm to 800mm per year, and soils of variable fertility. The area is mainly dominated by low to medium undulating plains with rocky hills and low scarps in central and south-eastern areas.
- (d) The plateau area with generally reliable rainfall ranging from 800 to 1300 mm per year. The area has medium altitude plains (800 to 1,500 meters above sea level) in western and southern areas with some rocky hills, rift valley scarps, and swamps. The soils fertility varies from high fertility soils in the alluvial plains to infertile soils on sandy plains.
- (e) The southern western highlands with rainfall ranging from 800mm to 2000mm per year depending on the location. For example rainfall in the southern and south-western areas

are generally reliable and unimodal ranging from 800 to 1,400 mm per year, while the western areas experience bimodal and higher rainfall ranging from 1,000 to 2,000 mm per year. The area has high altitude plateaus of about 1,200 to 2,300 meters above sea level, dissected hills, and mountains. The soil is of low to moderate fertility.

- (f) The northern highlands and granitic mountains comprises of volcanic highlands and high plateaus of about 1,000 to 2,500 meters above sea level. They have deep and moderately fertile to fertile soils, with bimodal rainfall of variable reliability ranging from 1000mm to 2000mm per year.
- (g) The alluvial plains which comprises of seasonal flooded alluvial fans and swamps with seasonally flooded alluvial and lacustrine sediments. The area experiences a unimodal rainfall distribution ranging from 800 to 1800 mm per year.

Shinyanga region falls under a semi-arid zone with approximately 600 mm to 1000 mm of rainfall per annum. The region has a mean of 700 mm of rainfall per year and a low potential for water resources. The altitude of Shinyanga region varies between 1,000 to 1500 meters above sea level (Blay et al. 2004). There are two rainy seasons: the short rains (*vuli*) which occur from September to November, and long rains (*masika*), which occur from December to April in each year. The average monthly temperature ranges between 82° to 86° F maximum and 59° to 65° F minimum. The region is characterized by small hills, plains, and gentle slopes (Blay et al. 2004)

Figure 2. 10: Map of Tanzania Showing Agro- Ecological Zones¹²



2.7.3. The Socio-Political Context

Bariadi district is one of the eight districts in Shinyanga region (Figure 2.8). It is located in the northwest central region of Tanzania. The 2002 population census in Tanzania shows the district had a population of 605,509, annual average growth rate of 3.3 percent, and a population density of 62 people per km² (TNW 2003). The district has an area of 9,777 km², representing

¹² Adapted from De Pauw (1984), and The World Bank (1994).

19 percent of the total area of Shinyanga region. Compared to other districts in the region, Bariadi district had the highest population during the 2002 population census (22 percent of the regional population) as shown in table 2.3. Bariadi district is made up of four divisions, namely, Dutwa, Itilima, Kanadi, and Ntuzu. There are a total of 26 wards and 125 villages with Ntuzu and Kanadi Divisions having the highest numbers of wards (7 wards each). Others (Dutwa and Itilima) have 6 wards each.

Table 2. 3: Population in Shinyanga Region

District	Total Population
Bariadi	605,509
Kahama	596,456
Bukombe	396,423
Maswa	305,473
Shinyanga (Rural)	277,518
Meatu	248,949
Kishapu	240,086
Shinyanga (Urban)	135,166
Total	2,805,580

Source: TNW 2003.

2.7.4. The Socio-Cultural Context

Tanzania is a multi-ethnic country with more than 120 different indigenous ethnic groups as well as small groups of Asians and Europeans origins.¹³ Bariadi district is mainly occupied by the *Sukuma* ethnic group. The *Sukuma* are Bantu-speaking people who live in North-West Tanzania around Lake Victoria (*Sukumaland*). The *Sukuma* are the largest ethnic group in Tanzania, constituting about 13 percent of the total population (Yasir 2003).

¹³ Tanzania. 2006. "Encyclopedia Britannica." accessed on March 14, 2006, from Encyclopedia Britannica Premium Service <http://www.britannica.com/eb/article-37565>

The *Sukuma* people have very strong primary ties. The strongest intimate ties are usually with immediate kin like children and parents. Although a free rider problem exists among *Sukuma*, they use many organized sanctions to punish free-riders. Free-riders are individuals who fail to participate in collective profitable activities because they believe that they will receive the gain or security even if they do not participate (Popkin 1979:25; Stigler 1974). The *Sukuma* practice reciprocal obligations. In times of need, a family may look for help from friends, villagers, and kinsmen. Free riders such as those who fail to render assistance to communal action are subject to fines. Those who are advantaged have more obligations to help those who are not: “the principle of reciprocity is based on the idea that one should help those who help him” (Scott 1976:167).

2.7.5. Livelihood Sources in Bariadi District¹⁴

2.7.5.1. Agriculture

The people of Bariadi district are mainly agro-pastoralists who rely on a combination of agriculture and livestock keeping. Agriculture is the most important source of livelihood among the *Sukuma*. Small scale subsistence agriculture is common in Bariadi district, with very few large scale farms. The people produce both food and cash crops. Food crops include maize, cassava, sorghum, beans, rice, chickpeas, groundnuts and sweet potatoes. Vegetable and fruits gardening is practiced through small-scale irrigation.

¹⁴ Livelihood sources refer to different activities adopted by the household to generate a living.

Cotton is the only major cash crop grown in Bariadi district. In Tanzania, cotton is the second largest export crop after coffee. Most cotton produced in Tanzania is exported, contributing to about \$90 million to export earnings. Cotton in Tanzania is produced in two zones: the Western and Eastern zone. The Western zone produces over 90 percent of the cotton in Tanzania (Baffes 2002). This zone includes Shinyanga, Mwanza, Tabora, Mara, Singida, Kagera, and Kigoma regions. The Eastern zone includes Morogoro, Coast, Tanga, Iringa, Kilimanjaro, and Manyara regions. Bariadi district lies in the Western zone, hence it is one of the largest cotton producing districts in Tanzania (Figure 2.11). Most of the cotton is produced on small holder farms of about 0.5 to 10 hectares (Baffes 2002).

2.7.5.2. Pastoralism

Tanzania is one of the wealthiest nations in Africa in terms of livestock. It ranks third in livestock population after Ethiopia and Sudan. Tanzania is estimated to have about 105 million acres of pastoral land, with about 17 million head of cattle, 8 million goats, 3.7 million sheep, 750,000 pigs and about 30 million poultry (Table 2.4). Most of the cattle (97 percent) are of the traditional type, the Tanzania Short Horn Zebu. The largest percent of the livestock in Tanzania (99 percent) are owned by pastoral small holders (Arhem 1985; Ndagala 1991). Traditional pastoralism is very important for economic development as it contributes about 18 percent of the GDP produces about 78 percent of the total national milk requirements, as well as a substantial amount of red meat consumed daily all over Tanzania (Bee et al. 2002).

Pastoralism is the second important source of livelihood among the *Sukuma*. The major livestock kept in Bariadi are cattle mainly stunted zebu type (359,760), goats (246,724), and sheep (120,989) (Figure 2.12 and Table 2.4). The local breed of cattle (zebu type) are preferred because they have high rates of reproduction, higher resistance to diseases, and can survive the

chronic shortages of grazing land that affect the district especially during the dry season (Wright 1953).

For the *Sukuma*, livestock have great value. They use cattle for subsistence, security, rituals, paying fines, and as a symbol of wealth and status. Cattle also serve as a medium of exchange and transportation. Cattle also provide traction for ploughing, and payment of bride price before weddings. Moreover, cattle are an object of affection and supreme religious significance (Arhem 1971). Cattle can also be used as a source of family income through milk, meat, skin, and animal sales. Additionally, cattle supply milk for domestic use, an important component of the *Sukuma* diet. Cattle can be obtained through purchase, dowry and “rustling” from neighboring livestock keepers like the *Maasai*. If a household does not have cattle, they may be given some cattle by relatives to look after and use for milk particularly if they have children (Bee et al. 2002).

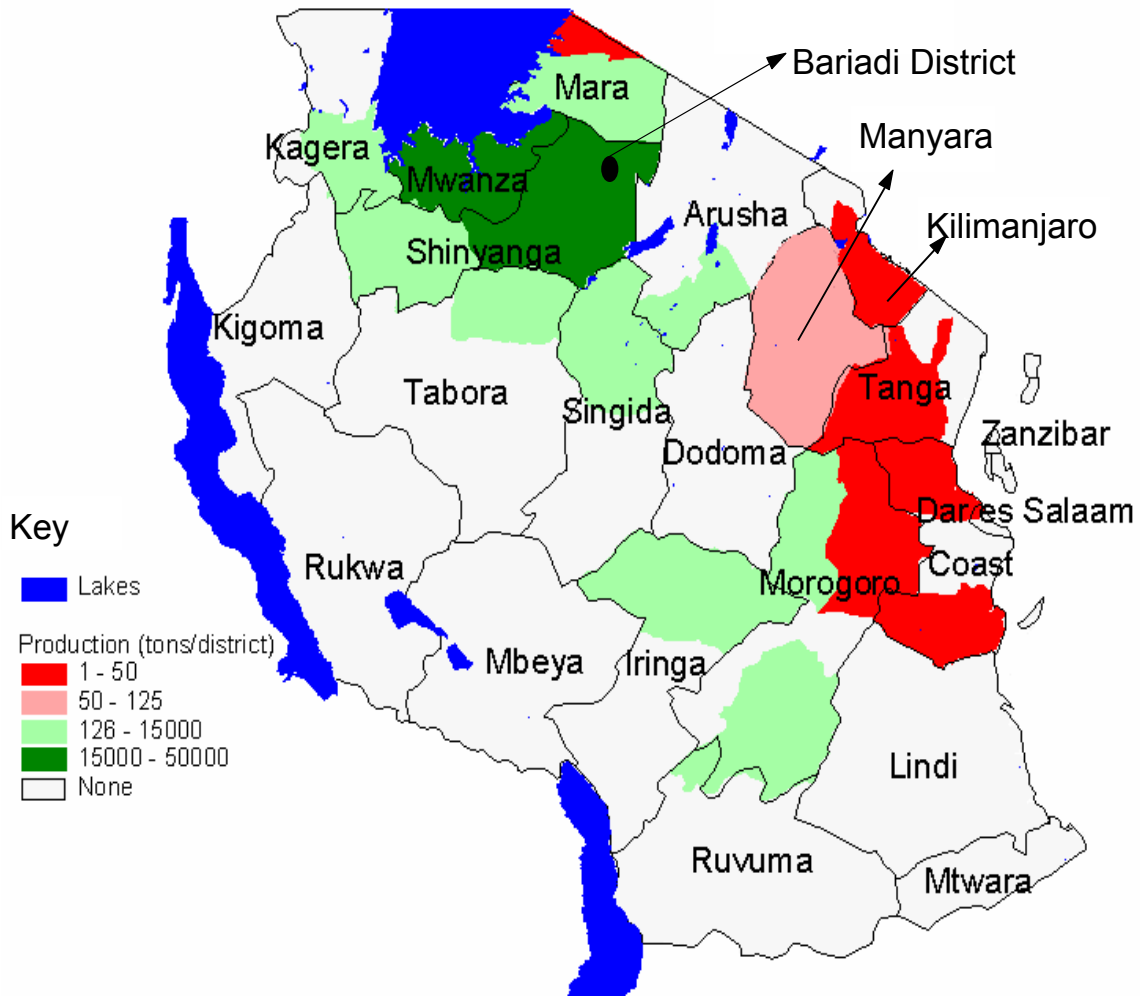
Slaughtering livestock for household consumption among *Sukuma* families is mainly done during special occasions. Livestock are slaughtered for ritual purposes, such as offering to ancestral spirits, rain making, and traditional healing. Also livestock may be slaughtered for a special visitor, when a new baby is born, during weddings, and funeral ceremonies.

Table 2. 4: Livestock Population in Tanzania

Livestock type	Bariadi District	Shinyanga Region	Tanzania
Cattle	359760	3749735	17014969
Goats	246724	1000045	7831199
Sheep	120989	460725	3733078
Pigs	6584	43669	745910
Chickens	673212	4356428	29914247
Total	1407269	9610602	59239403

Source: TMLD 2005.

Figure 2. 11: Map of Tanzania Showing Cotton Producing Regions¹⁵



¹⁵ This map was adapted from USDA (United States Department of Agriculture).2003. Production Estimates and Crop Assessment Division at http://www.fas.usda.gov/pecad2/highlights/2003/03/tanzania/images/cotton_prod.htm

2.7.5.3. Non-farm activities

Non-farm activities in Bariadi district have co-existed along with farm activities, and have been used to supplement farm income (Figure 2.13 to 2.15). There are only a few people who depend on non-farm activities for their livelihood. But over the years, the number of people engaging in non-farm activities has increased due to land scarcity and poor returns from farming. Non-farm activities in Bariadi district can be grouped into three categories: productive, commercial, and service activities. Productive activities include carpentry and local beer brewing. Commercial activities include grocery shops, pottery, butchery and small food and tea rooms (*mama ntilie*). Service activities include traditional healing, rain making, midwifery, bicycle repair, tailoring, shoe repairs, radio repair, pharmacy, grain milling and office work (such as teaching and nursing). Despite the existence of non-farm activities in Bariadi district, farming activities remain the most important source of livelihood among the *Sukuma*. Table 2.5 summarizes the major livelihood sources in Bariadi district.

Table 2. 5: Summary of Major Livelihood Sources in Bariadi District

Livelihood source	Activities
Agriculture	Production of crops like maize, cassava, sorghum, beans, rice, chickpeas, groundnuts, sweet potatoes and cotton.
Pastoralism	Rearing of cattle, goats and sheep.
Gardening	Production of tomatoes, onions, sugarcane, cabbage, fruits, okra, and greens.
Non-farm activities	Carpentry, local beer brewing, traditional healing, rain making, midwifery, bicycle repair, tailoring, shoe repair, radio repair, pharmacy, office work, grocery shops, pottery, butchery, grain milling, and small food and tea rooms.

Figure 2. 12: Pastoralism in Bariadi district



Figure 2. 13: Bicycle repair



Figure 2. 14: Small business by the road (shoes, suit cases, and dresses sale)



Figure 2. 15: Pot business



CHAPTER THREE

3. CONCEPTUAL FRAMEWORKS FOR ANALYZING WATER MANAGEMENT INSTITUTIONS

3.1. Introduction

To conceptualize the impact of customary and statutory institutions on water management, this study will examine three sets of institutional theories. The first set consists of moral theories that focus on moral codes, traditions and value systems that are crucial for the management of water resources. These theories include the moral economy and the “evil-market” thesis. The second set is built on rational choice theories. Rational choice theories view individuals as rational decision makers who calculate the relative costs and benefits of alternative actions, and make choices that will maximize their utility. Examples of these approaches include the tragedy of the commons, political economy and the community-yoke thesis. The weaknesses of the first set and second set of institutional theories can be addressed by the use of Hayami’s (1998) theory, which attempts to reconcile the two sets of theories. The third set of theories consists of the new institutional theories that focus on the importance of self-governance in the management of common-pool resources. Although some of these theories were not specifically designed for water management, they can be used to understand how the customary and statutory institutions work, evaluate their strength and weaknesses and determine what can be done to bring them together for effective water management.

3.2. Conceptual Frameworks

3.2.1. The Tragedy of the Commons Theory

One of the well-known theories of natural resource management is the Tragedy of the Commons Theory. The theory was originally proposed by Hardin (1968), who maintained that resources held in common were bound to be subject to massive degradation, because people did not have an incentive to use common resources in a sustainable way. When resources are free or open for everyone, no one is responsible for their sustainable use. Instead, the self-motivated individuals have an incentive to maximize their profit and take as much as possible from the resources before everyone else does. Hardin proposes that the state needs to use coercive regulations to control and restrict the over-use and degradation of resources. He uses a metaphor of common pastures, the "commons," to refer to the resources that are shared by a group of people. As Hardin explained:

Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Ruin is the destination towards which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. In vying with each other to benefit individually from the commons, each one of the users keeps increasing the number of animals he brings to the common pasture even if he realizes that this in the long run will lead to destruction of the common pastures through overgrazing and bring ruin to all. Each user concludes that the abstinence on his part, if he chose it, would only incur private losses without significantly altering the long term outcome, as others in any case will continue to bring additional animals into the

common pasture. Each user therefore decides upon a course that is rational from his or her individual point of view but which leads to the irrational over-exploitation of the common pool resources and its ultimate and unavoidable destruction. (Hardin 1968: 1244-45).

Hardin's metaphor implies that individuals are self interested and have a tendency to maximize their utility at the expense of group interests. Therefore, Hardin argues, the best way to solve the tragedy of the commons is to use coercion administered by outside agents. This idea involves the use of direct authoritarian control of natural resources by state institutions. Another way to avoid a tragedy of the commons is privatization, which requires external institutions and the force of law to defend the rights of the private enterprises that manage resources. Although Hardin's metaphor has been used by some policy makers to rationalize state control of community resources, his thesis has come under attack by advocates of cooperative management.

Many scholars agree that the tragedy of the commons occurred in many rural communities. But they argue that Hardin failed to recognize the fact that over the years, some communities have struggled successfully to prevent resource degradation, maintained their customary institutions, and organized the effective management of their water resources. Critics of Hardin argue that communities "do devise long-term, sustainable institutions" for managing water resources. They also maintain that the use of privatization and state coercive power as suggested by Hardin, has often failed (Dietz et al. 2003; Ostrom et al. 1999:278). Privatization does not ensure the sustainable use of resources because private resource owners will always try to harvest more profit from the resources. Moreover, critics argue that the use of coercive control by the state may motivate people to be free-riders. This is because there is a human tendency to

react against compulsion. The use of coercion to involve people without their consent motivates them to resist the demanded and want the forbidden (De Young 1999; De Young and Kaplan 1988).

Another criticism of Hardin's thesis is based on his notion of rational choice. From the rational choice perspective, individuals anticipate the outcomes of alternative courses of action and adopt the outcome that is best for them. Rational individuals choose the alternative that will most likely give them the greatest satisfaction (Blau 1994; Carling 1992; Coleman 1990; Coleman 1973; Heath 1976; Human 1990). But rational choice theories have been criticized for defining human behavior in economic terms and for assuming that individuals are rational. Critics such as Simon (1957) argue that individuals are "bounded rational," that is, they have a limited ability to evaluate and verify all possible alternatives when they make decisions. Critics of rational choice have argued that customary institutions are capable of overcoming the problem of free-riders and self-interested individuals through collective action (Gibbs and Bromley 1989; Ostrom 1990).

Perhaps one of the most important criticisms to the tragedy of the commons theory is its failure to recognize the different types of property rights that exist in rural communities. Critics have argued that Hardin assumed that property rights in the "commons" were open access property regimes (Ciriacy-Wantrup and Bishop 1975). Contrary to Hardin's assumptions, literature classifies property rights in the "commons" as public, common, private, and open access based on who holds the right (Table 3.1). As explained in chapter two, in public property, the state holds the rights, in private property, legal individual or firms holds the right, in common property, the rights are held by a group of people, and in open access, there is no restrictions on the use of the resource (Bruns and Meinzen-Dick 2003; Ostrom et al. 1999).

Table 3. 1: Types of Property Rights

Property rights	Characteristics
Open access	Absence of enforced property rights
Common	Rights held by a group of resource users who can exclude others
Private	Rights held by individuals or firms who can exclude others
Public	Rights held by the government that can regulate or subsidize resource use

Adapted from Ostrom et al. (1999).

Although it is possible to differentiate the four different types of property rights, they tend to overlap in practice. Natural resources are rarely managed solely by any one of the four types of property rights (Nemarundwe 2004). Instead, natural resources can be held under more than one or a combination of different types of property rights. For example, in Tanzania the state claims ownership of all the water resources in the country, but recognizes communal rights over public water sources like rivers, springs, and streams. When the water from public sources percolates into the ground, and an individual digs a well to access the water, the well is then considered to be a private property by the individual who developed it (Meinzen-Dick and Nkonya 2005). The same water has multiple uses and rules to govern its use (customary and statutory).

Scholars who study common property regimes have argued that the “tragedy of the commons” is mainly caused by the failure of institutions to enforce water management laws. It is not typically caused by collective mismanagement by users. The problem of resource degradation and over exploitation they argue, can be tackled by proper community participation and strengthening customary institutions (Berkes 1989; Ostrom 1990; Wade 1987).

3.2.2. Moral Theories

Moral theories perceive human actions as being controlled by social norms and traditions. Examples of these theories include the “moral economy” perspective and the “evil-market” perspective. The moral economy approach started with the work of E.P Thompson who focused on impoverished people in England during the 18th century. He maintained that rural communities contained a sense of “traditional rights” or customs that each members of community was aware of (Kurtz 2000; Thompson 1971). Moral economists believe that economic actors are pressured to conduct their activities according to community norms and values, even if the norms and values do not conform to individual’s self interests. Moral economists argue that people behave in certain ways because they are bound by moral obligations. This morality explains and justifies individuals’ support for water management programs in rural areas (Health 2001; Scott 1976).

The moral economy perspective urges traditional communities to organize cooperatively through shared values and communal institutions. The moral economists assume that peasants are risk averse, so their behavior is directed at ensuring survival and developing social insurance mechanisms. To moral economists, peasants are not concerned with maximizing profit, but to reduce vulnerability and to ensure subsistence. This is what is termed as the “subsistence ethic” where community interests override individual interests. Scott (1976) maintained that the “subsistence ethic” defines peasant culture, controls human actions, facilitates collective behavior, and produces a specific set of social relations, including reciprocity and forced generosity, and governs the development of village welfare and social institutions. Through the “subsistence ethic,” every member of the community is allowed access to necessary resources for production so they can maintain their subsistence as households. Individuals in rural

communities have strong ties, community identity and rely on communal property. Therefore, community members are obliged to conduct their economic affairs in a way that allows others to survive. In this regard, the value system, the moral codes of a community, and reciprocity are seen as key to social behavior in peasant societies (Booth 1994; Etzioni 1988; Miller 1998; Scott 1976).

Thus, the moral economists assume that rural communities have shared beliefs and practices. They have “morals” and tend to behave according to “subsistence ethics” (Scott 1976). To moral economists, the state is the major force that weakens the moral economy by encouraging people to act in their own self interest, rather than the interest of the community in general. Moreover, the national state has attacked traditions by imposing external laws in recognizing private, not collective property rights. The moral economist believes that if the state neglects the distinctive and specific character of customary institutions, the consequences can be disastrous (Kurtz 2000). Many scholars have supported the ideas of moral economists by arguing that statutory institutions are unnecessary because customary institutions based on trust and social norms can support greater cooperation at a lowest cost than statutory institutions (Ellickson 1991; Gulati 1995; Powell 1990).

The moral economy theory emphasizes the strengths of the customary institutions, namely their legitimacy and acceptance by rural communities. One implication of this theory is that customary institutions are likely to promote sustainable water management because they are more likely to be sensitive to the local socio-cultural environment and to the physical environment. I will use this theory to explain some of the potential strengths of customary institutions.

3.2.3. Political Economy Approach

A number of scholars have criticized the idea held by proponents of moral economy that human action is guided by moral codes. These critics argue that the moral economy underemphasizes the problem of free riders and over emphasizes the degree of solidarity in traditional rural communities. They also criticized the theory for playing down the problem of elite capture, whereby customary institutions give special favors to few local elites and chiefs. Among critics of the moral economy approach are proponents of the political economy approach.

The political economy approach, which derives from neo-classical economists of the 19th century, argues that individuals generally seek personal gain rather than collective prosperity. The approach rejects the idea that peasant communities are morally obligated to protect the poor among them (Colburn 1982; Popkin 1979). Moreover, political economists argue that individuals are rational economic actors who are interested in maximizing their individual benefit at the lowest possible cost (Carling 1992: 27; Coleman 1973; Heath 1976: 3). An individual's decision to participate in community development involves a trade off between short and long-run investments that will improve the wealth of an individual (Kurtz 2000; Popkin 1979). Individuals contribute to collective action and community development if they think they will be caught if they don't participate, and if they feel that they are better off by participating in collective action.¹⁶ Collective action may be hindered by distrust, suspicion, and lack of skilled leadership, which is common among peasants (Popkin 1979). Community members would like

¹⁶ Collective action is defined as cooperation among individuals in a group to achieve common goals. Hence collective action success is dependent on institutions such as laws, norms, taboos, and organizations set to enforce collective action and manage the distribution of benefits resulting from collective action.

to get a free-ride, that is, receive full benefits of collective action without having to participate. While all peasants would benefit from certain collective goods, some have little incentive to act because they would benefit just as much if others acted and they did not.

Political economists believe that a statutory legal system is required for sustainable development. They believe that state institutions are beneficial because they free rural communities from the control of village elites and allow people to behave based on their own individual economic calculations (Hayami 1998; Popkin 1979). Proponents of political economy argue that free-riders, elite capture, and the lack of expertise to manage and govern complicated processes, are the major weaknesses of customary institutions. But political economists have overlooked the weaknesses of statutory institutions, which may lack the resources to monitor and enforce statutory laws and lack popular legitimacy and acceptance, which may undermine their effectiveness. The political economists also underestimate the enforcement power of customary institutions. As Greif (1997) explained:

This neoclassical view that places the legal system at the center of contract enforcement in market economies has recently been criticized on the basis of evidence indicating that many contemporary exchange relations in the West and elsewhere are informal. The associated contract enforceability is not provided by the legal system but is based on reputation, general morality, and personal trust within social networks. Empirical evidence indicates the importance of two distinct systems of informal contract enforcement: the individualistic system of informal contracts enforcement prevalent in the West, under which the reputation and morality of the individuals are key, and the collectivist system of contract enforcement prevalent in most other societies, under which personal trust within the social network is critical. (P.239-240).

3.2.4. “Community-Yoke” and “Evil-Market” Thesis

The debate between proponents of the moral economy and political economy perspectives was a response to the differences between the community-yoke and evil-market thesis. These differences are explained by Hayami (1998) who argued that the community-yoke thesis viewed traditional institutions as feudal yokes. The community-yoke thesis maintained that the “market” was efficient because it had the capacity to provide rules of justice that free people from the traditional ties and despotism. On the other hand, the “evil-market” thesis maintained that the market was “evil” because it exploited poor people, undermined the traditional moral codes, and contributed to greater inequality and poverty.

Hayami argued that both theses were probably correct. For example, in some situations the market may fail to achieve efficient resource allocation or provide social services. If that occurs, people will use community relations to correct market failures. Customary institutions may be more efficient at settling conflicts and reducing opportunism, cheating, and free rider problems than statutory institutions. This is because customary institutions in rural areas are “enforced through intensive social interactions,” where people watch each other closely and where any misconduct quickly become known, and where the violation of village rules entail a significant cost to the individual (Hayami 1998: 93). This is one reason why customary institutions work better than statutory institutions. People may not violate customary laws, even if they expect a violation to benefit themselves, because they won’t risk the harsh criticism, public disgrace, and possible exclusion from the society that may result if they do (Hayami 1998: 93). At the same time, customary institutions cannot work efficiently without statutory institutions in areas that are highly commercialized or socially heterogeneous (Poteete and Ostrom 2004).

This view is supported by Agrawal and Yadama (1997), Chomitz and Gray (1996), and Poteete and Ostrom (2003), who observed that in the absence of well-enforced regulations, collective action to protect natural resources from over-harvesting in areas with high market access is likely to be difficult.

Hayami (1998) argued that the market and community institutions should be seen as complementary. The management of local resources should be delegated to local communities rather than subjecting the communities to the control of the government through the use of statutory institutions. The state should use the community for the things that it is good at and should facilitate customary arrangements for water management by formalizing them.

Hayami's theory combines the strengths of the moral economy and political economy perspectives. His theory is relevant to this study because the theory will be used to conceptualize the relation between customary and statutory institutions. This research will analyze each institution to determine how they might contribute to poverty reduction and welfare improvement in the study area. In this research, inference can be drawn from Hayami's perspective that water management policy needs to recognize and consider both institutions as legitimate and mutually dependent. Relying on a single institution to manage water resources is not enough. The collaboration of different institutions is essential to the efficient management of rural water resources. Customary institutions require support from the state for them to be effective, and statutory institutions need participation by customary ones.

3.2.5. New Institutionalism

Proponents of new institutionalism have analyzed the factors that lead to successful collective action for the management of natural resources (Poteete and Ostrom 2004). New

institutionalism recognizes that the operation of institutions is constrained by other institutions (institutional environment), but that a mutual monitoring of institutions can motivate community members to participate in collective action to manage their resources. Local resource user groups are capable of managing such resources through collective action (Bromley et al. 1992; McCay and Acheson 1990; Ostrom 1990). The theory maintains that community members will be willing to participate in collective action to manage their resources if they are assured that the benefit of institutional arrangements will be limited to small and stable communities (Berkes 1993; Ostrom 1990).

A seminal paper by Olson (1965) posited that smaller groups are more successful in organizing collective action than larger groups because smaller groups are better able to overcome the common problems of collective action, namely free riding, and the high cost of monitoring and enforcement of regulations. Olson observed that individuals, acting in their self-interest, are unlikely to act in ways that would facilitate the provision of collective goods for a group, even if all group members share the same interests. According to Olson, "unless the number of individuals in a group is quite small, or unless there is coercion or some other special devices to make individuals act in their common interest, rational self-interested individuals will not act to achieve their common or group interests" (Olson 1965: 2). However, other studies (e.g. Agarwal and Yadama 1997) have shown that smaller groups may find it too arduous to create viable institutions that will persist long enough to encourage collective actions.

Assuming well defined and enforced property rights and homogenous groups, Buchanan and Tullock (1962) observed that as group size increases, the costs of decision-making externalities fall but the costs of coordination rise (Tullock 1962: 63-64). As a result, medium-sized groups are more likely to organize themselves for collective action. But group

heterogeneity in terms of resource endowment, ethnic composition, goals and objectives, cultural values, also plays a vital role in effectiveness of organizing collective action in a given group (Poteete and Ostrom 2004). The more heterogeneous a group is, the lower its prospects for collective action (Ibid). The lack of well defined and enforceable property rights are always a problem in communities that can lead to the failure of collective action.

Ostrom (1990) maintains that the best approach to resolving the problem of the commons and achieve sustainable resource management is by designing cooperative institutions that are organized and governed by resource users themselves. Scholars who have studied common pool property management have maintained that the use of customary laws is a crucial strategy to deal effectively with possible “tragedies of the commons.” Statutory institutions should not underestimate the creativity, power, and initiative of community members involved in management of their resources (Bromley 1992). Thus, it is very important to involve the local users and customary institutions to promote successful and sustainable natural resource management (Blomquist 1990; McKean 1992; Pinkerton 1989; Singleton and Taylor 1992; Tang 1992).

The argument here is that both customary and statutory institutions are needed for sustainable management of rural resources. Neither should preempt the other (Lambach 2004). Migdal (2001) pointed out that “states may help mould, but they are continually moulded by the societies with which they are embedded.” This means that statutory institutions and customary institutions need each other because both institutions influence and shape each other (Lambach 2004). Statutory institutions will be more efficient if they are congruent with customary institutions.

Lambach (2004) and Migdal (2001) views are consistent with Rodrick (2000:3), who criticized statutory institutions. Rodrick argued that institutions “must not over-emphasize best practice ‘blueprints’ at the expense of local experimentations” (Rodrick 2000:3). He believed that neither statutory nor customary institution can work effectively on their own, but need each other because they all interact and may complement or substitute each other. Similar view are explained by North and Thomas (1973), and North and Weingast (1989), who observed that stable and secure property rights were crucial ingredients for sustainable development because rural communities won’t have the incentive to invest in the management of water and other resources unless they have adequate control of the resources. Statutory institutions may not work effectively in rural areas unless they offer control rights to rural communities. For example, the state may protect community water resources from outsiders, while customary institutions can be effective in controlling free-riders and the undesirable behavior of individuals in the community. If statutory institutions ignore or undermine customary institutions, conflicts and failure in water management are likely to occur (Grafton 2000).

Figure 3.1 presents a conceptual framework for this study. It shows that sustainable water resources management practices need to deal with water management in a holistic fashion, taking into account various factors that affect water use in rural areas. Sustainable water resource management is defined as the design and management of water resource systems that consider the needs of present and future water users without system degradation (Richter et al. 2003). The conceptual framework in figure 3.1 shows that sustainable water management in rural areas is the outcome of the interaction between the multiple legal framework that govern water management and community characteristics.

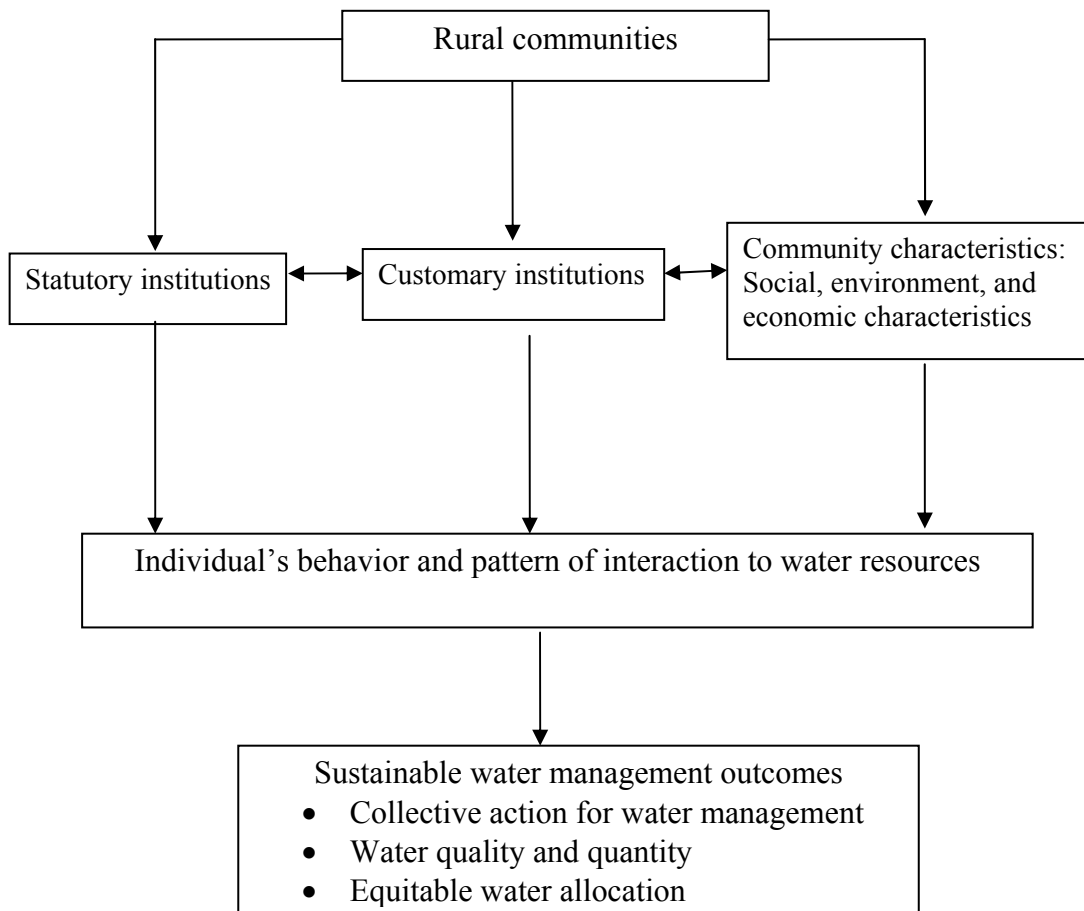
Customary institutions emerge from the interaction between community characteristics and statutory institutions (such as local government officials, state legislators, and village leaders), who make decisions about water management laws and property rights. This indicates that customary institutions are not static, but they emerge and evolve depending on changes that occur in the community. For example, changes in people's behavior may require customary institutions to enact new laws or modify existing laws in order to reinforce desired individual behavior. Institutional arrangements affect individual's behavior and their interaction with water resources through the laws and sanctions imposed to those who fail to comply with the laws. On one hand, statutory institutions may enact laws on land use, property rights, and water management. On the other hand, land use, property rights, and water management in a particular community may be governed by customary institutions. This include social norms and societal expectations that influence individuals' behavior and their participation in the management of water resources

Moreover, community characteristics affect individuals' behavior and interaction with water resources. For example, competition for water resources may be higher in communities with shortage of water than in communities with plenty of water. Also community members may choose to participate in the collective action for management of their water resources according to their resources, needs and values, and their perception of whether statutory or customary institutions will grant them security of tenure and benefit of their actions. Community participation in the management of water resources may lead to sustainable water management, improvement of water access to safe water and equitable water allocation.

Thus, sustainable water management in rural areas must involve a trade off between a multidisciplinary and multi-decision making process that involves all stakeholders and all

institutions in the decision making process. “I believe no single discipline, and certainly no single profession or interest group that has wisdom to make these tradeoffs themselves” (Loucks 2000: 3).

Figure 3. 1: A Conceptual Framework for Analyzing the Impact of Institutions for Water Management



CHAPTER FOUR

4. RESEARCH METHODOLOGY AND DATA ANALYSIS

We need to know how many people you want to interview, how many villages you want to visit and how long it will take you to conduct all this. We want to have your work plan and discuss it because we need to write letters to introduce you to the village executive officer of each village. Can you give us an overview of how you are going to conduct your research? (Bariadi District Water Engineer, June 2005).

4.1. Introduction

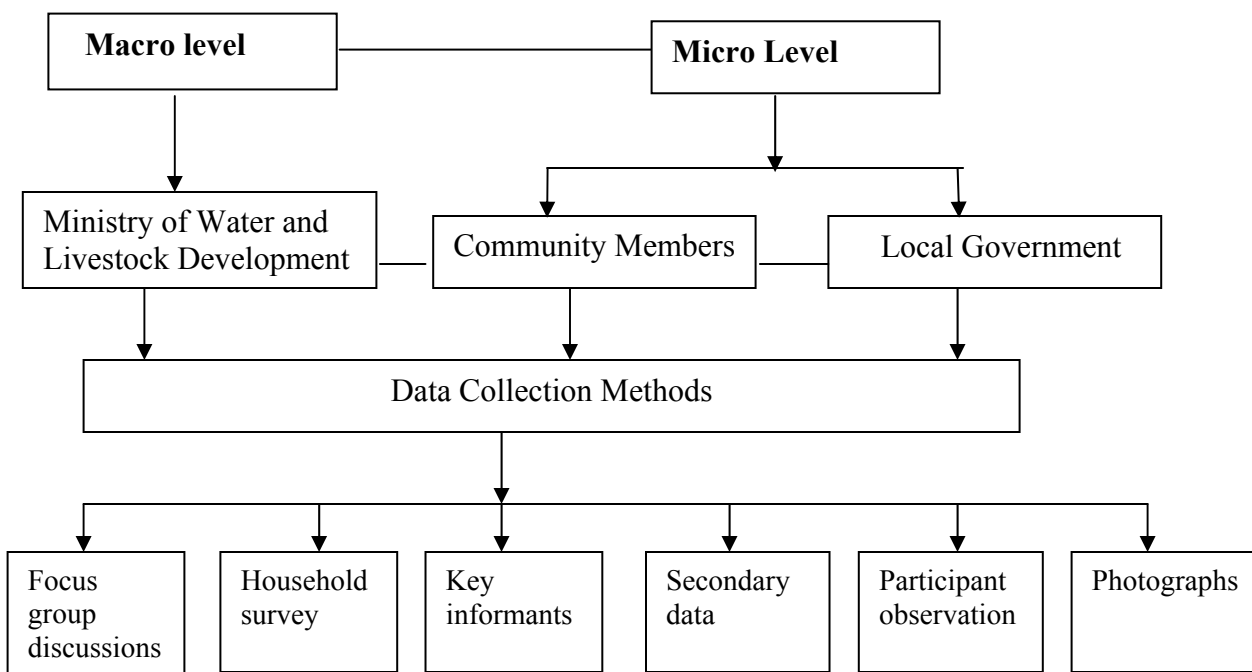
Research methodology refers to the procedures used by the researcher to investigate the research topic and to answer research questions. In other words, methodology refers to how the research is conducted and how the hypotheses are tested. This chapter offers the description of how the research was conducted including the approach used, sampling procedures, data collection, data analysis, and hypothesis testing.

As explained in chapter one, the major objective of this study is to analyze the impact of customary institutions on rural water management, and show how they might be used to complement statutory institutions. Specific objectives are: the analysis of determinants of compliance to water management laws, the role of gender in water management, the effectiveness of customary and statutory water management institutions, the strengths and weaknesses of customary and statutory institutions and their role in water access for different water uses. Data used in this research was collected at both macro and micro levels.

At the macro level, data were collected at the Ministry of Water and Livestock Development. At the micro level, data were collected from the local government offices and

community members. At all levels, a combination of different data collection methods was used. Data collection methods included household survey, focus group discussions, key informants, participant observations, secondary data, and photographing. Figure 4.1 presents a summary of data collection at the micro and macro levels, and shows the different data collection methods used in this research.

Figure 4. 1: Summary of Different Levels of Research and Data Collection Methods



4.2. Household Survey

The major purpose of collecting data from household surveys was to get data on how households use and manage public water sources, develop and manage private water sources, the role of gender in water management, and how households perceive and respond to different institutions that affect water management. To achieve this purpose, three types of water uses,

namely drinking water, irrigation water, and water for livestock, were identified for analysis. The three types of water uses were used to stratify the villages. However, availability of drinking water differed significantly across villages in Bariadi district. There are villages with very severe safe drinking water shortage and others with relatively adequate safe drinking water. Hence the District Water Office in Bariadi district has divided villages into two categories, namely those with severe shortages of safe drinking water and the villages with adequate or less severe safe drinking water. The list of villages that were major irrigators was obtained from the District Water Office and District Planning Office. These villages were those with more small-scale irrigation activities than others. The list of villages that were major livestock keepers was obtained from the District Livestock Development Office.

A total of 16 villages were sampled for the household survey, four villages in each category explained above (severe safe drinking water shortage, less severe safe drinking water shortage, major irrigators, and major livestock keepers). At the village level, households to be interviewed were randomly selected from the village sampling frame. The village sampling frame was obtained from Village Executive Officers (VEOs) in each village. The number of household heads to be interviewed in each village was determined by using population as a sampling weight. Sampling weights weigh the data in order to ensure that the sample is proportional to the target population of interests. A unweighted sample is not representative of the target population. The weight reflects unequal sample inclusion probabilities, and compensates for sampling bias, and for over and under representation of the sample (Pfeffermann 1993). In this research, the sample weight was obtained by dividing the population of people in each of the purposively sampled villages with the total population in all sampled

villages. To obtain sample size of households in each village, the total sample size planned to be collected in the district (223 households) was multiplied with the sample weight of each village.

To allow analysis of gender aspects, the weighted sample in each village was divided into female and male headed households. The village sampling frame was obtained from Village Executive Officers (VEOs) in each village. From the male and female-headed list, households were randomly sampled, with 28 percent of the total sampled households in each village being female-headed households. A total random sample of 223 households was selected and interviewed from all four divisions of Bariadi district. To capture the socio-economic heterogeneity of communities, two wards hosting division headquarters (namely Dutwa and Bumera) were purposively selected. The interview was carried out by trained research assistants in the *Sukuma* language. The household heads were interviewed at their households. The interview consisted of both open and closed ended questions. Information on customary institutions and their water management practices was collected.

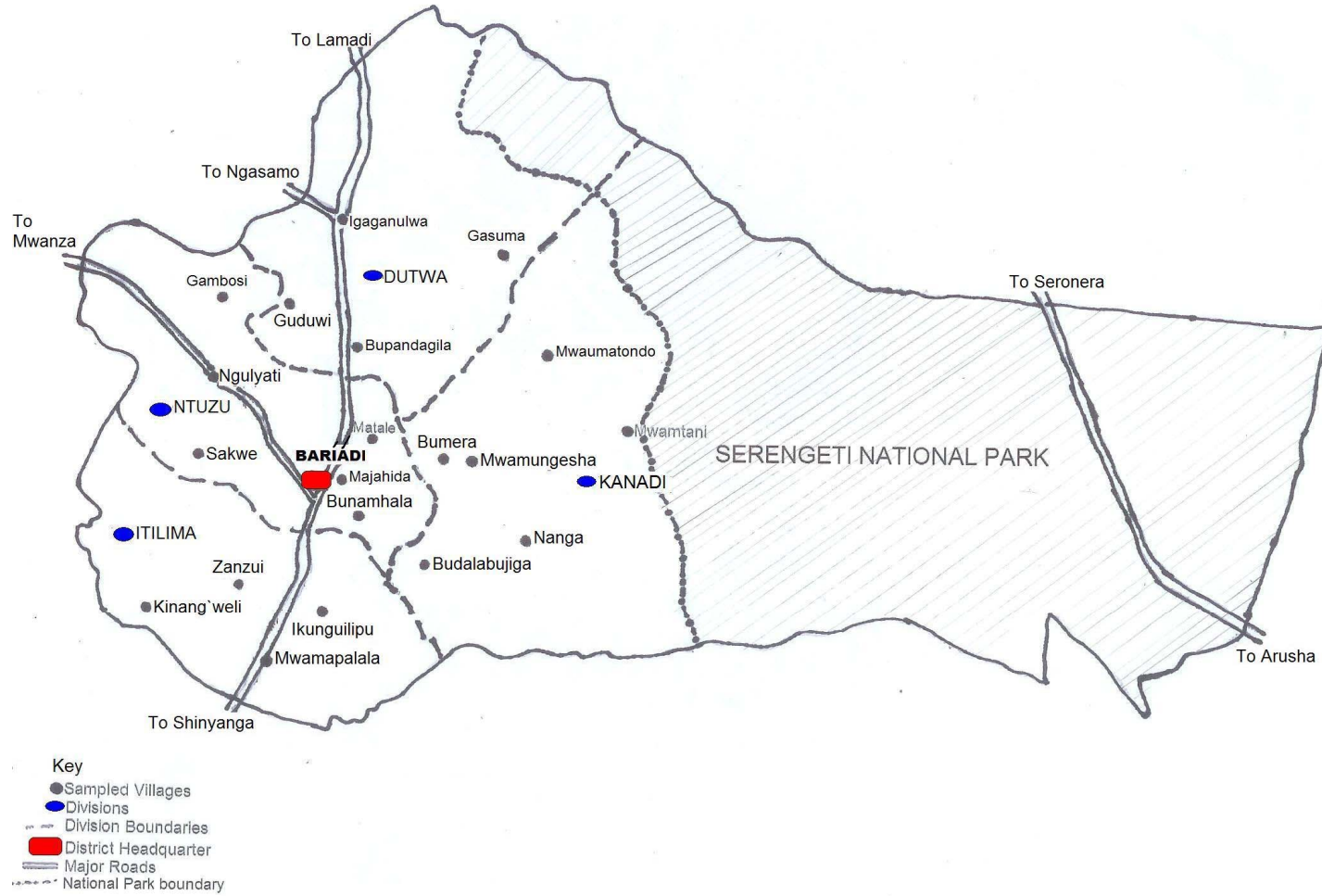
The survey gathered data on household characteristics (demographic, socio-economic, and cultural information), household participation in different programs and organizations, sources of water for different uses, water management laws and enactment, enforcement and compliance with water laws, gender roles, strengths and weaknesses of customary and statutory institutions, irrigation, distance to water sources, and household health. For details on household survey, see appendix A. Table 4.1 presents the basic statistics about the surveyed villages, and figure 4.2 shows the spatial distribution of the villages selected in Bariadi district.

Table 4. 1: Basic Statistics about Surveyed Villages

Division name	Village name	Total population	Number of households	Number of shallow wells	Cattle population
Ntuzu	Majahida	2354	343	5	1067
	Matale ¹⁷	3908	495	5	2921
	Ngulyati	8046	1240	24	3803
	Sakwe ¹⁷	6413	885	19	3408
	Bunamhala	6772	959	22	3318
	Gambosi	3860	500	10	2322
Dutwa	Igaganulwa	6376	1044	9	2998
	Bupandagila	3647	487	4	4115
	Gasuma	7842	1018	5	5866
	Guduwi ¹⁷	5425	690	12	3135
Kanadi	Mwaumatondo	5652	774	10	7405
	Bumera	3146	426	13	2161
	Mwamugesha	2450	371	13	1934
	Mwamtani	8010	1185	4	6856
	Nanga	7424	991	16	5588
	Budalabujiga	5651	751	17	2016
Itilima	Ikunguilipu	6910	976	19	3190
	Mwamapalala	4909	823	8	3391
	Zanzui	4651	662	2	2817
	Kinang'weli ¹⁷	4145	623	14	1833

¹⁷ The village was sampled for focus group discussions only. A household survey was not conducted in this village.

Figure 4. 2: The Map of Bariadi District Showing Surveyed Villages



The questionnaire was divided in to three parts and covers different aspects of water management in Tanzania. These parts included:

1. Part one is about household characteristics. This part gathers household information on the age, sex, ethnicity, religion, education, source of income, type of roof for the main house and household size. It also identifies when the household was established in the district plus those who migrated in to the district from other places.
2. Part two in the first section examines household participation in various programs and organizations, including water management institutions. Specific information gathered in part two includes information on the type of organization that the household belong to, its focus, and household contribution to the organizations. Other information includes sources of water for different uses, such as domestic, livestock watering and irrigation, number of ruminants and watering points, the location of crop plots in relation to water sources, and soil conservation and pollution prevention practices. The second section of part two includes three categories of water regulations for domestic, irrigation, and livestock watering from both private and public water sources. This section also includes respondents' opinions on the major strengths and weaknesses of statutory and customary institutions.
3. Part three is about water management systems. It includes information on land, irrigation, livestock watering, land ownership, and their relationship with gender. It also collects information on water scarcity and household health.

Table 4.2 shows that the majority of respondents (91 percent) are *Sukuma* from the Bariadi district. The inference from this sample is that the sample is representative of all the *Sukuma* people of Bariadi district. Female respondents are 62 (28 percent of all the respondents). I chose this number because female-headed households are approximately 28 percent of all households in Tanzania. Most respondents (66 percent) ranged from age 35 to 64, and the average age of respondents is 51 years. The majority of respondents who are 80 years and above were females compared to younger respondents (age 22-34) who were mostly men. More than 50 percent of the respondents are non-Christian, with 0.5 percent Moslems, 36.9 percent atheists, and 16.8 percent worship ancestors. There are more males (21.4 percent) than females (4.5 percent) in ancestral worship, while the distribution of males and females in atheistic religion is more or less the same. This indicates a strong allegiance to customary laws and traditional beliefs among the *Sukuma*.

The highest level of education is secondary school education. Respondents with no formal education are about 40 percent, while the majorities (63 percent) are females. Most respondents (56 percent) have primary school education, only a few (4.3 percent) have secondary education, the majority of them being males. The table reports that women's level of education is low compared to men. The major source of income among the respondents (92 percent) is agricultural production of both food and cash crops. Livestock production is an exclusively male activity because no females depend on livestock as their major source of income. About 6 percent of respondents depend on non-farm activities as their major source of income. This includes formal employment (such as teachers, nurses and doctors), and business (such as pot making, grocery shop, bicycle and shoe repairs, traditional healers, and rain makers).

Table 4. 2: Demographic and Socio-Economic Characteristics of Household Survey Respondents (Percentages)

	Females N=62	Males N=161	Total N=223
Percent distribution			
<u>Age of respondents</u>			
22-34	4.8	14.0	11.5
35-49	30.6	36.3	34.7
50-64	38.4	28.7	31.3
65-79	23.0	18.8	20.0
80+	3.2	2.2	2.5
Total	100	100	100
<u>Ethnic background</u>			
<i>Sukuma</i> from Bariadi	93.2	90.3	91.1
<i>Sukuma</i> from outside Bariadi	5.0	6.7	6.3
Non- <i>Sukuma</i>	1.8	3.0	2.6
Total	100	100	100
<u>Religion</u>			
Christian	56.0	41.9	45.8
Moslem	1.8	0.0	0.5
Ancestor	4.7	21.4	16.8
Atheist	37.5	36.7	36.9
Total	100	100	100
<u>Level of education</u>			
No formal education	63.0	30.7	39.6
Primary education	33.5	64.7	56.2
Secondary education	3.5	4.6	4.3
Total	100	100	100
<u>Major source of income</u>			
Agriculture production	95.0	91.9	92.7
Livestock production	0.0	1.9	1.3
Non farm activities	5.0	6.3	5.9
Total	100	100	100
<u>Family size</u>			
1-10	83.0	71.8	74.8
11-20	17.0	23.6	21.8
More than 20	0.0	4.6	3.4
Total	100	100	100

Most of the respondents (75 percent) live in a household with up to ten people, the average family size among the respondents is nine people, which compares to a national average of five people per household (URT 2002). Large families are desired among the *Sukuma*. The cultural norm is for women to bear as many children as possible. This norm is promoted by lower education and early marriages among the *Sukuma* women.

4.3. Focus Group Discussions

A focus group is defined as a group of individuals selected and assembled in a non-threatening environment by a researcher to discuss and comment on the predetermined research topic (Bers 1989; Krueger 1994; Powell and Single 1996). Focus groups are also instruments for collecting qualitative data. Researchers have explained different advantages of the use of focus groups. These include: (i) the use of focus groups as a preliminary step to a large quantitative study with the aim of identifying the language used in order to frame the questionnaires and (ii) the use of focus group discussions as a stand alone method or together with quantitative data to provide a deeper understanding of the subject being researched (Bers 1989; Krueger 1994; Morgan 1993; Stewart and Shamdasani 1990).

Focus groups proved to be very useful in gathering information on sensitive issues. They were used in this study as a means of collecting in-depth qualitative information and deeper insights about community's beliefs, values, perceptions, attitudes, experiences, opinions and understanding of customary and statutory institutions for managing water resources in ways that would be less easily accessible in a one to one interview (Morgan 1996; Wilson 1997). The focus groups were drawn from the 16 villages that were sampled for household surveys. To increase the number of focus groups, four additional villages were sampled using the same criteria as the

one used for sampling household survey. Two focus groups were sampled in each village, making a total of 40 focus groups. I chose large number of focus groups because conducting multiple focus group discussions with similar groups of participants was very important to detect patterns and trends of perceptions across groups. “Solo focus groups are risky because occasionally moderators will encounter “cold” groups-groups in which participants are quiet or seemingly reluctant to participate” (Krueger 1994:17).

Focus group discussions were conducted with groups of five to fifteen people to allow for smooth flow of conversations. Although Krueger (1994:17) suggests that focus groups may be typically composed of six to ten people, the size can also range to as few as four people or as many as twelve people. However, Merton et al. (1990:137) suggests that "the size of the group should manifestly be governed by two considerations...it should not be so large as to be unwieldy or to preclude adequate participation by most members nor should it be so small that it fails to provide substantially greater coverage than that of an interview with one individual." The choice of focus groups was done with intention to gather information about institutions and management of water for different uses. Seven different categories of focus group were selected. These groups included domestic water-user groups (20 percent), irrigators (15 percent), women (15 percent), members of customary institutions (15 percent), livestock keepers (15 percent), local government officials (10 percent), and village elders (10 percent). This allowed for a comparison of differences based on characteristics of each group. Table 4.3 shows percent distribution of focus groups.

The decision about the number of focus groups in each category was determined by the information provided by key informants, whereby the domestic water-user groups were given the highest priority. The composition of each focus group was selected strategically, bearing in mind

the importance of homogeneity. “Some mixes of participants do not work well because of limited understanding of other lifestyles and situations” (Krueger 1994). Therefore, participants were invited based on common characteristics such as age, education, and social-economic status, experience, or expertise so that they would feel more comfortable to express their feelings and ideas.

Table 4. 3: Percent Distribution of Focus Groups

Focus groups	Total No.	Percent
Domestic water-user groups	8	20
Irrigators	6	15
Women	6	15
Customary institutions (<i>Dagashida and Sungusungu</i>)	6	15
Livestock keepers	6	15
Local government officials	4	10
Village elders/customary leaders	4	10
Total	40	100

The recruitment of focus group participants relied heavily on the information provided by Village Executive Officers (VEOs) and village chairpersons who constructed a list of "ideal" participants for each group. I provided the criteria for selection of each participant depending on the focus of the group. For the purposes of this study, I was interested in recruiting people who were capable of providing the highest quality information for this research, that is, adult persons who were likely to be knowledgeable about *Sukuma* culture, customary and statutory water institutions, and water management and development issues for different water uses. The names of persons who fit these categories were listed by VEOs and village chairpersons, and then I randomly selected up to fifteen people from the list just in case some people don't show up at the focus group discussion. Randomization was used to select focus group participants in order to

minimize selection bias. Those who were selected received an invitation from the VEOs to participate in the focus group discussions.

Women focus groups varied. There were women groups for widows only, married women, women who were involved in income-generating activities (in some villages, women have organized themselves into groups and established different income-generating activities), and all women regardless of marital status or participation in women groups. The different categories of women groups allowed for comparison of groups' reactions, perspectives, and feelings among different groups of women. Women were selected for focus group discussion in order to collect more information about gender and other "delicate" issues from women's perspective. Because of *Sukuma* culture, women may be reluctant to discuss some issues if mixed with men. Therefore, women groups provided information on "sensitive" issues which women did not discuss freely when mixed with men in other groups such as water user groups, local government officials, and irrigators.

Domestic water-user groups comprised of both men and women who were active members of domestic water-user groups. This group was chosen with the aim of getting specific information on the management of water for domestic use. Irrigators comprised of groups of men and women involved in irrigation activities. This included those who practiced dry-season irrigation such as vegetables, and those who practiced wet season irrigation such as rice growers, and those who practiced both dry and wet season irrigation. Livestock keepers were all men involved in livestock keeping because livestock keeping is dominated by men. Both irrigators and livestock keepers were selected in order to collect specific information on how rural communities manage water for irrigation and livestock watering respectively.

There were two groups of members of customary institutions. The first one was *Sungusungu* and the second one was *Dagashida*. All members of customary institutions were men who were either in *Dagashida* or *Sungusungu*. Members of customary institutions were selected because the focus of this research is to analyze the impact of customary institutions in rural water management. Members of customary institutions provided specific informations on enactment, and enforcement of water management laws, effectiveness of customary institutions and statutory institutions, the strength and weaknesses of statutory and customary institutions, property rights, and gender issues.

Local government officials comprised of both men and women who were members of local Village Councils, and who were more active in village welfare and development. Local government officials were selected in order to collect information on statutory laws for water management and possible conflicts with customary laws, and the role of local government in the development and management of rural water resources for different uses. This includes enactment and enforcement of statutory laws, effectiveness, and strengths and weaknesses of both statutory and customary institutions in water management. Village elders/customary leaders comprised of old members of community and customary leaders, such as chiefs who were more knowledgeable about *Sukuma* culture and customary laws. This group was selected in order to collect information about *Sukuma* customs, beliefs, traditions, values, and norms that affect the way people interact with each other and with their environment.

The focus group discussions were conducted with the goal of identifying patterns and comments across groups. The focus group discussions were very exciting because I could respond to questions and probe for more detailed responses, and participants were able to build

upon one another's comments. I was able to tap into the many different forms of communication such as jokes and proverbs that the *Sukuma* people use in their everyday interactions. Observing different forms of communication during focus group discussions provided information about group norms, culture, and values. In general, focus group discussions gathered data on background information, cultural information, enactment, enforcement, compliance with water management regulations, effectiveness, strengths and weaknesses of statutory and customary institutions, and gender roles.

Additionally, the focus group discussions provided suggestions or opinions about water management institutions and information about their view on women's role in rural water management. Most of the focus group discussions were conducted in the *Sukuma* language, the local language of Bariadi district. Because the majority of people were bilingual in *Sukuma* (local language) and *Swahili* (national language), and I speak both languages, I left language choices totally up to them. The use of the interview guide helped me to recognize those subjects that have a correlation with culture, gender roles, and water management institutions. It was not easy to limit the number of people in the focus groups because some of those who were selected to participate in focus groups brought their friends with them. They told me their friends wanted to be part of the discussion too. I had to politely turn them away to avoid the focus group being too large. On some few occasions, while conducting focus groups, I could see people nearby listening and observing what was going on though they did not approach me directly. I thought that everybody knew what we were talking about because some of them asked me questions wherever they found me.

4.4. Key Informants

Key informants were purposively sampled at district and regional levels, and at the Ministry of Water and Livestock Development based on the following criteria: gender, age, in-depth knowledge about water management institutions and customary laws of Bariadi district. The key informants comprised older members of the community (both men and women), those who are very active in community institutions like the *Sungusungu* commanders, *Dagashida* chairpersons (customary institutions), women, water-user group chairpersons or members, customary leaders (chiefs), Village Executive Officers, Village Chairmen, and District Water Engineers. At the ministry level, key informants included officials in the Department of Rural Water Supply, other water officers, and hydro-geologists.

Key informants gave general ideas about the institutional framework for water access and management, gender and water management, enactment and enforcement of water regulations, and historical trends in water availability. One of the drawbacks of key informants is inaccuracy of their memories about some past issues (Golden 1992; Kumar et al. 1993). This drawback was overcome by the using multiple informants to increase the reliability and validity of information (Phillips 1981; Shwenk 1985).

4.5. Participant Observation

Participant observation is a method that can be used to study relationships among people, processes, and truths about human life (Jorgensen 1989). Participant observation was used in this study with the aim of gaining intimate familiarity, and some insights concerning the *Sukuma* people, their perceptions about water management and customary institutions, their involvement in water management, and their social settings and relationships. This was carried through informal interviews, direct observation, and participation in the social life of the people,

collective discussions, and life-histories. I attended church gatherings, participated in funerals, weddings, village meetings, was invited to a family meeting by a friend, watched people and participated in fetching water, and firewood, watched people water livestock and irrigate their farms, and attended traditional festivals (*mbina*). By observing and participating in the social life of people, I was able to establish personal relationships that helped me learn about their culture, gender roles, water use and adherence to water management institutions.

Moreover, through personal relationships, I was able to talk or gossip with people and, in the process, say or present an idea that encouraged an informal response.

Although participant observation was found to be very useful in this study, it is important to explain its weaknesses. Researchers have pointed out that it is difficult for a participant observer to “go native” and be fully intergrated into the community being researched (Cheater 1986; Nemarundwe 2003). There are social factors like class, race, education, culture, language and power that are very difficult to bridge. At the same time, there is a danger of losing objectivity if a researcher attempts to be fully a part of the community (Cheater 1986; Nemarundwe 2003). In my case, I tried to address this problem by speaking the local language (*Sukuma*) and wearing traditional outfits which helps to close the cultural barrier. I was also able to talk with people and tried to blend with them by associating myself with different social-cultural activities like funerals, weddings, and traditional festivals (*mbina*).

4.6. Secondary Data

Secondary data were obtained from Village Executive Officers, the Bariadi District Council Office, the Bariadi District and Shinyanga Regional Water Offices, and the Ministry of Water and Livestock Development. The data obtained included population size, growth, and population composition, physical conditions, water resources, and the degree of water scarcity,

different water uses, irrigation, and livestock keeping in each division, ward and village. Other data included statutory water laws, national policy for environmental conservation, and available water management institutions. I also obtained secondary data from literature and past studies done in the district and the country in general.

4.7. Photographing

Photographs are used in qualitative research, particularly in the fields of visual anthropology (Banks and Morphy 1997; Hockings 1995) and visual sociology (Harper 1994). Taking photos with a digital camera proved to be a useful tool in providing visual documentation of important customary elements related to water management and life in general. Understanding customary laws and practices of the *Sukuma* people means taking a closer look at what people actually do. It is worth saying that "a picture is worth a thousand words." This is very true since some observations are best recorded as photographs than as words. The collection of visual data was used to create a deeper understanding of the community and illustrate information gathered from other data collection tools. Photographic illustration helps readers to understand what is being described and communicates information more effectively, especially with those who are not familiar with the subject matter (Donaldson 2001).

4.8. Data Analysis

4.8.1. Qualitative Data Analysis

I personally collected the qualitative data from participant observation, focus group discussions, and key informant interviews to ensure that I synthesized them properly during the

course of discussions with groups and key informants. I facilitated group discussion and listened to all speakers as they discussed my research questions. As far as possible, I also cross-checked the information that I obtained from groups and informants to validate the reported information.

Qualitative data were analyzed using two steps. The first was to transcribe the data in order to have complete records of all qualitative information. Second was the analysis of the content of qualitative data. Content analysis is a systematic technique for drawing valid inferences from existing records or documents (or other meaningful matter) to the circumstance of their use. This entails reading and compressing many bodies of text or images into fewer content categories (Krippendorff 1980; Weber 1990). The aim of content analysis was to look for trends and patterns that reappear within either a single body of text, image or among various texts or images. Qualitative information was synthesized and, where possible, quotes and photos that represent key points were used as illustrations. Qualitative analysis of data obtained from focus group discussions, key informant interviews, photographs, and participant observation was used to complement the quantitative analysis described below.

4.8.2. Quantitative Data Analysis

To assess the role of customary and statutory institutions for water management, quantitative analysis of household level data was done using STATA statistical software. Other analysis consisted of descriptive univariate statistics that provided information on the descriptive statistics of water management variables. To find out about the determinants of compliance with statutory and customary institutions, a logistic regression analysis using the household level data was done. Comparisons were made across sub-samples by the use of appropriate test statistics.

For example, I compared compliance with customary and statutory institutions across gender of household head, and across different measures of heterogeneity of community members.

4.8.3. Measurement of Study Variables

(i) *Determinants of compliance with customary and statutory institutions*

The term “compliance” refers to all behavior of rural communities that conform to the requirements of customary or statutory institutions. These institutions give rise to efforts to structure the incentives of rural communities with respect to their choices concerning compliance. This can be done through the use of enforcement mechanisms like punishment or rewards, monitoring systems to reduce the probability of undetected violations, publicizing data on non-compliance or involvement in cooperative socialization schemes designed to foster habits of obedience (Young 1979).

The objective of the quantitative analysis was to investigate the determinants of existence and compliance with customary and statutory water management institutions. Using data from household survey, I analyzed the existence of customary and statutory institutions related to water management using cross tabulations only. Econometric analysis was not possible because I did not expect significant variation of enactment of customary and statutory institutions given that my study area was small with the same ethnic group (the *Sukuma*). However, I expected the determinants of compliance with these institutions to vary significantly due to the potential socio-economic heterogeneity of the communities and households. Hence I used logistic regression model to analyze the determinants of compliance with customary and statutory institutions using household level data.

4.8.3.1. Dependent Variables¹⁸

The major problem encountered in asking and collecting information about compliance with customary and statutory laws was the sensitivity of these questions. If asked directly, respondents were not likely to tell the truth especially if they didn't comply with the laws. To address this problem, enumerators were trained to ask indirect questions or to make observations. For example, enumerators established whether a household had a toilet structure by requesting to go to the toilet. Households without a toilet always requested the enumerators to just go behind a bush. On the distance from farm plots to water sources, focus groups discussion revealed that the law wasn't enforced by statutory institutions, so respondents responded freely to this question without any fear.

Three regression models were run in this research, one for each dependent variable. The first regression model assessed the determinants of compliance with customary laws. The customary law used in the model was "no washing clothes or bathing at the drinking water source." Respondents were asked to report the major source of water for washing or bathing (river, spring, shallow well, deep well, a pond, or a dam). Both customary and statutory laws require people not to pollute water sources. Hence respondents were asked where they bathe or wash their clothes (whether at the source of water, at home or other place away from the water source). Therefore, compliance =1 when the household reported not to wash or bathe at the drinking water source and compliance=0 when the household washed clothes or bathed at the

¹⁸ For dependent variable, a value of "0" indicated non-compliance, and "1" indicated compliance with the law.

drinking water sources (did not comply with customary law that prohibit washing clothes or bathing near or at the drinking water sources).

The second and third regression analysis assessed compliance with two statutory laws:

A). Each household must have a toilet facility.

Compliance =1 if a household had a toilet and compliance=0 if the household didn't have a toilet. Even though this law was not recognized and reported as a statutory regulation by respondents, enumerators made an observation at the household whether there is a toilet facility or not. In a situation where a toilet facility was not visible, enumerators asked for a place to release themselves. Respondents having no latrine normally referred the enumerators to visit a neighbor's place or stated that they did not have such a structure. However, this is one of the few laws that was well known and observed but was not addressed directly during the interview due to its sensitive nature.

B). No agricultural activities by water sources. Agriculture should be practiced at a distance not less than 30 meters from water source.

Compliance =1 if crop plots were located more than 30 meters from water sources; and compliance= 0 if crop plots were located less than 30 meters from water sources.

4.8.3.2. Independent Variables

Compliance with customary and statutory institutions was affected by a number of socio-economic factors that are important to understand in order to design policies and strategies for better water management. In addition to enforcement mechanisms used by institutions, factors that affected an individual's decision to comply with water management laws included human capital, natural capital, financial capital, physical capital, market access, livelihood strategies and

group size (Agrawal and Yadama 1997; Chomitz and Gray 1996; Hayami 1998; Ostrom 1990; Poteete and Ostrom 2004).¹⁹

Human capital (HC) refers to knowledge, skills, experiences and ability to work that helps people to pursue different livelihood activities (Carney 1998:7; Ostrom 1994: 528). Human capital variables used in this research included the level of education, age, gender, human health, and size of family labor. The level of education was measured as the number of years in schools. Education was expected to have a negative relationship with compliance to customary laws and ambiguous impact on compliance with statutory laws. Highly educated people were more informed than less educated people who may not have been aware of the existence of the statutory laws. Also a higher level of education may have increased people's awareness of future benefits of complying with natural resource management. But education may increase the value of labor, which would reduce the probability to comply with water management regulations that are labor-intensive. Education may also increase non-farm opportunities, which would then compete for labor with labor intensive activities (Scherr and Hazell 1994) and give people more "exit options," thus a tendency to undermine collective action (Bardhan 1993).

Human health was measured as number of lost labor days in the past three months due to sickness in the family. Human health was expected to have a positive relationship with compliance with both statutory and customary laws, because water management activities require a healthy person to perform them effectively (Bloom et al. 2004). Hence it was expected that human health contributed positively to the adoption of water resource management

¹⁹ In this research, cultural heterogeneity is not likely to differ significantly since the study was confined to only one ethnic group, the *Sukuma* of Bariadi district. Hence the cultural variable was not analyzed in this study.

strategies, both formal and informal. It was expected that human health will contribute to better management of water resources. This implies that healthy families had more family labor, and hence it was expected they will comply with regulations because they had greater opportunities.

Age of the household was expected to have a positive relationship with compliance with customary laws and negative relationship with statutory laws. This was because older people have strong allegiance to customs and may not care much about statutory laws. Gender was an important determinant of compliance with water management laws because the burden of fetching safe water from distant sources falls on women (Ramaswamy 2003:265). The gender of household head was coded as “0” or “1”; with “0” representing female and “1” representing males. It was expected that females were less likely to comply with water management laws than males because they had limited access to resources and information that would enable them to comply. Family size was drawn from the question that asked the number of household members, both children and adults. Family size was measured as the total number of people who reside in each household. It reflected household economies of scale for participation in water management projects. Family size was expected to have a positive association with compliance with water management laws because larger families were expected to have more labor than smaller families. Hence they were more able to comply with regulations that were labor intensive.

Natural capital (NC) refers to natural resources that the household owns (Carney 1998). Natural capital increases the endowment that the household holds. Hence, NC represented wealth of the household. In this research, farm size was used as an indicator of natural capital. People with natural capital have greater capacities because they have access to better opportunities that would enable them to comply with water management laws. NC can be a source of income that

can be used to pay for labor and other expenses required to comply with water management laws.

An abundance of natural capital in high potential areas or places that have not been severely degraded may reduce the incentive for community members to practice water resource conservation (Ostrom 1999). High natural capital is also likely to create more productive activities that may increase the opportunity cost of labor for water resource management (Ostrom 1999). This in turn could have a negative impact on the likelihood to comply with water management regulations, both statutory and customary, that require substantial labor input. But people with low natural capital may have to practice extensive agricultural production in order to meet their subsistence needs. As a result, people with low natural capital may not be willing to invest in water management activities or restrain themselves from unsustainable use of water resources even if doing so will improve their health and livelihood in general. They may be forced even to engage in unsustainable agricultural practices that do not follow statutory or customary laws, or cultivate on fragile lands that may trigger severe land and water degradation.

Physical capital (PC) is the tangible assets that the household has accumulated and uses in production to improve flows of future incomes (Lachmann 1978; Soubbotina et al. 2000). Physical capital was represented by ownership of livestock and the roof type of the main house. Livestock included cattle, sheep, and goats. They were converted to a common number called tropical livestock unit (TLU). TLU is a scale used to sum all livestock to a single number, and is defined according to the weight of the animal. The standard weight is 125 kg. Hence the weight for each livestock type included is as follows: cattle = 1, sheep = 0.3 and goat = 0.3 (Kaliba et al. 1997). It was expected the TLU to have a positive impact on the compliance with water management laws. Households that had more livestock were more likely to comply with water

laws because the demand for water for livestock makes livestock keepers comply. The roof type for the main house was represented by a dummy variable where the roof type is “0” if the roof was corrugated iron sheets and “1” if the roof was non-corrugated iron (grass or mud). It was expected that the type of roof would have a positive relationship with compliance with water management laws.

Financial capital (FC) refers to the financial resources that provide people with different livelihood options (Carney 1998:7). In this research, membership in the informal financial institutions (credit association) that offer group lending schemes is an indicator of financial capital. The codes are “0” if respondent doesn’t belong to credit association and “1” if belong to credit association. It was expected that there would be a positive association between financial capital and compliance with both customary and statutory laws.

Social capital (SC) refers to productive assets embodied in social relationships, membership of groups and networks that can improve the efficiency of a society and coordinate actions (Carney 1998:7; Coleman 1988; Putnam 1993). It facilitates interaction and helps people connect with other people through information and resource sharing and other benefits that may not be available to those outside the social network. Resnick (2004) points out that social capital can help communities overcome the problem of free-riders and the overuse of resources that may lead to a “tragedy of the commons.” Social capital variables used in this research included membership in mutual support and water management associations, and security and religious groups. The codes for each variable were “0” if the respondent didn’t belong to mutual support, water management, security group and whether the respondent was non-Christian; and “1” if the respondent belonged to mutual support, water management, security group and whether the respondent was a Christian. It was expected that membership in associations would have a

positive relationship with compliance with water management laws because in the associations, people share knowledge that influence their decision-making process, and create a sense of well being and household welfare.

Livelihood strategies refer to activities required for a means of living (Ellis 2000). This includes the primary sources of income and livelihood in general. In this research, a livelihood strategy was measured as the primary source of income for the household. The codes were “1” if the major source of income for the household was livestock keeping and agriculture (excluding cash crop) and “0” if the major source of household income was non-farming activities.

Livelihood strategies (LS) have an effect on the way community members participate in collective action to manage their resources (Ostrom 1999). It was expected that there would be a positive relationship between farmers and compliance with customary laws and a negative relationship with compliance with statutory laws. The compliance of respondents whose major source of income was non-farm was expected to be negative for customary laws and positive for statutory laws. This was because people who engage in non-farm activities are likely to travel more and blend with people of different backgrounds, so they will tend to be oriented more towards statutory laws.

Market access (MKT) was represented by distance to the district headquarters town in kilometers. Access of the village to markets, infrastructure, and services affects the value of agricultural products by affecting local prices or access to information (e.g., access to roads, transportation, harvesting technology, and extension services). Better market access decreases the incentive of people to comply with customary laws because it provides greater exit options to people who fail to comply with customary regulations and restrictions (Bardhan 1993; Baland and Platteau 1996; Poteete and Ostrom 2003). On the other hand, better market access increases

compliance with statutory laws because people who live closer to the market have more access to information and interaction with the statutory laws than those who live far from markets. Those who live far are expected to comply with customary laws because enforcement of statutory laws in remote areas is very weak and because law enforcement agents also use the same means of transportation and communication, which is limited in remote areas (Nkonya et al. 2005).

The group size (POP) was represented by the population in the village sampled. It was expected that smaller groups would have a positive association with compliance with both customary and statutory laws. This is because smaller groups have more opportunities to interact, which facilitates mutual monitoring, and helps to reduce free-riders and non-compliance (Poteete and Ostrom 2004). Table 4.4 shows a summary of the expected relationship between the independent and dependent variables explained above.

Multivariate logistic regression models were used to test the hypotheses using STATA program. This model was chosen because the dependent variables are categorical, with two mutually exclusive and exhaustive categories, that is “1” if the respondent complied and “0” if the respondent did not comply (Janzen and Stern 1998; Long 1997). It is important to highlight some of the advantages of logistic regression over Ordinary Least Square (OLS) regression for categorical dependent variables. The logistic regression is much more relaxed and flexible in its assumptions than the OLS analysis. Unlike OLS analysis, the logistic regression does not have the requirements of the dependent variables to be normally distributed, linearly related to the independent variables, or have equal variance within each group (Tabachnick and Fidell 1996). Table 4.5 presents a summary of the definitions of all the variables (both dependent and independent) used in the empirical model for analyzing the determinants of compliance with customary and statutory water management laws.

Table 4. 4: A Summary Table Showing the Expected Relationship between Independent and Dependent Variables

Independent Variables	Expected Relationship with Dependent Variables	
	Customary Law	Statutory Laws
Market access	Negative	Positive
Religion	Positive	Positive
Roof type	Positive	Positive
Income from livestock and food production	Positive	Negative
Family size	Positive	Positive
Security association	Positive	Positive
Support association	Positive	Positive
Credit association	Positive	Positive
Water association	Positive	Positive
Age	Positive	Negative
Gender	Positive	Positive
Education	Negative	Ambiguous
Farm size	Negative	Negative
Tropical livestock unit	Positive	Positive
Sick days	Positive	Positive
Group size	Negative	Negative

Table 4. 5: Definition of Variables included in the Empirical Model for Compliance with Water Management Laws

Variables	Definition
Dependent Variables	
Household washes clothes or bathes at the drinking water source ²⁰	0=No, 1=Yes
Household has a toilet	0=No, 1=Yes
Crop plots located > 30m from water sources	0=No, 1=Yes
Independent Variables	
Human Capital (HC)	
Education (years)	Continuous variable
Family size	Continuous variable
Age	Continuous variable
Gender	0= Female,1=Male
Sick days	Continuous variable
Natural Capital (NC): Farm size	
	Continuous variable
Physical Capital (PC)	
Roof type for the main house	0= Non-corrugated iron sheets, 1= Corrugated iron sheets
Number of livestock units owned	Continuous variable
Financial Capital (FC)	
Belong to credit association	0=No, 1=Yes
Social Capital(SC)	
Belong to mutual support association	0=No, 1=Yes
Belong to water management association	0=No, 1=Yes
Belong to security association	0=No, 1=Yes
Religion	0= Non-Christian, 1=Christian
Livelihood Strategies(LS)	
Livestock keeping and food production the major source of income?	0=No, 1=Yes
Market Access (MKT)	
Distance from district headquarters (km)	Continuous variable
Group Size (POP)	
Village population	Continuous variable

²⁰ This is the only customary law analysed in the regression models. The rest are statutory laws.

In the logistic regression model, the dependent variable is a *logit*, which is the natural log of the odds. Thus, the model to estimate the determinants of the probability of compliance with customary and statutory institutions can be defined as follows:

$$\text{Logit}(P) = \log \frac{P}{1-P} = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + \dots b_k X_k$$

Where:

P= the probability of complying to water management laws

X₀, X₁, X₂, X₃ X_k = attributes of the household head

b₀, b₁, b₂, b₃ b_k = the estimated parameters

The multivariate logistic regression is defined thus:

$$P(Y=1) = \frac{e^{(\alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots \beta_8 x_8)}}{(1 + e^{(\alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots \beta_8 x_8)})}$$

Where:

P(Y=1) = the probability of compliance to customary or statutory institution

e = the antilogarithm of the fitted value of the dependent variable

α=constant

β₁, β₂, β₃..... β₈ = the estimated parameters.

X₀, X₁, X₂, X₃ X₈ = the attributes of the household head

The attributes of the household head are:

X₁ = Human capital (HC), X₂ = Physical capital (PC), X₃ = Financial capital (FC)

X₄ = Natural capital (NC), X₅ = Group size (POP), X₆ = Social capital(SC),

X₇ = Market access (MKT) and X₈ = Livelihood strategies (LS)

(ii) Role of gender in water management and how institutions affect such role

In many African countries, water for domestic use is the main responsibility of women. Women are responsible for collecting and storing water, caring for children, cooking, cleaning, and maintaining sanitation. An average household in developing countries uses 40-60 liters of water per day for drinking, cleaning, and personal hygiene. In rural areas, where water supplies are very poor, women and children have to make several trips to collect water. Some of the trips are long and take hours to make (Rathgeber 1996). With growing water scarcity, women and girls must travel longer distances to obtain water, a chore that often occupies several hours of the day. For example in rural Africa, women walk five miles or more everyday to collect water, involving a total of ten miles for one trip (Water Aid 2000). The starting point is to reflect on the fact that customary laws of many African societies are generally unfavorable for women. Although statutory institutions try to promote gender concerns in water management, it was not clear that they do.

The perception of gender roles are strongly rooted in society's customs and traditions. In many African customs, women are perceived as helpers of their husbands (with the exceptions of female-headed households), and men tend to dominate decision-making with regard to water management. As for irrigation, it is generally assumed that irrigation is practiced only by men (Meinzen-Dick and Zwarteveen 1998). But the reality is that using water is not confined to men only, women do use water for domestic and productive purposes. Women also provide labor in production activities like agriculture (Zwarteveen 1994). So the role of gender and the potential opportunities for participation by women decision-making in management of water resources must be understood in a broader context of culture and the social construction of gender roles. This research also explored how statutory and customary institutions reflect gender equality and

provide opportunities for equal gender participation in decision-making on water resource management. I expected that customary laws have greater influence on gender relations and property rights. This influence affects how men and women perceive themselves, and how they participate in local decision-making processes.

(iii) Effectiveness of customary and statutory institutions

The effectiveness of institutions was judged using the following criteria:

(a) Conflict resolution of resource use and access

Effective conflict resolution occurs when there is no delay on resolving the conflict and when each side's needs, and interests are adequately addressed, so that everyone is satisfied with the outcome. This research identified two major types of conflicts over resources in Bariadi district: water-related and land-related conflicts. I expected that customary institutions are preferred over statutory institutions by rural people in solving local water and land conflicts because the government lacks sufficient resources to enforce its laws efficiently.

(b) The extent of community participation in decision-making

This included whether water institutions create opportunities for all community members to actively contribute to, and influence water development and management processes in their communities, and to receive equal benefits of the fruits of their participation. I expected that customary institutions provide a better opportunity for community participation in decision-making than statutory institutions because community members enact their own laws that suit their local needs, but community members are not involved in making statutory laws.

(c) How effective institutions were in achieving gender sensitive goals.

This included whether or not customary and statutory institutions reflect gender needs and priorities of water users. Gender concerns in water management are very crucial in achieving efficiency, effectiveness and equity in water sector. The major concern was whether water management planning considered gender differences in terms of power, needs, opportunities and interests (Matiza 1994; UNDP 2003; Woroniuk et al. 1996). Although I expected customary institutions to provide better opportunities for community participation, I also expected that statutory institutions are more gender sensitive than customary institutions because most African customary laws tend to discriminate against women. Therefore, I expected men to make most of the decisions about local water management.

(iv) Strengths and weaknesses of customary and statutory institutions

This research investigated the strengths and weaknesses of customary and statutory institutions with a goal of determining how their strengths complemented each other and how their weaknesses might be strengthened. For example, some studies have suggested that statutory land rights have disadvantaged women's property rights (e.g. Khadiagala 2002), while other studies have shown that some customary laws work against women's access to productive resources (Fall 1997; Gray and Kevane 1999; Mwangi 1998). The question of the cost of enforcing statutory and customary institutions also showed the strengths and weaknesses of these institutions. Under these criteria, I investigated whether statutory institutions enhanced or damaged the cooperative behavior promoted by customary institutions. I expected both institutions to interact and co-exist because Tanzania is a country of legal pluralism.

The weaknesses of statutory institutions may be complemented by the strengths of customary institutions and vice versa.

(v) Roles of customary and statutory institutions in water access for different water use

As noted in the second objective, water for domestic use is typically the responsibility of women. On the other hand, *Sukuma* traditions dictate that livestock grazing and watering is typically done by men. At the same time, the irrigation of paddy rice, the most common irrigated crop in the *Sukuma* area, is jointly managed by men, who prepare the flood basins, and women, who do the more delicate but back-bending job of seeding. I asked whether water management institutions, which are strongly gendered, have different roles in the different uses of water. This question will help to draw implications on whether or not there is need of clearly recognizing the need for different institutions for each type of water use since the current institutions appear not to recognize such potential difference. This objective was also answered by investigating how different groups in a community obtain access to water. The groups include female versus males, irrigators versus non irrigators, livestock keepers versus non-livestock keepers, those with main house roofed with corrugated iron sheets versus those without them, and those who own farm land versus those who don't.

Access to water was measured by the quantity of water extracted by each group. Access was also measured by the quality of water for domestic use. The quality of water was determined by collecting data on the incidence of water-borne diseases in the community at each sampled household. Water-borne diseases are those diseases caused by water that has been contaminated by human, animal, or chemical wastes (Hinrichsen et al. 1997). Holding other factors constant, I expected that the lower the incidence of water-borne diseases in a community, the higher the quality of water for domestic use.

I also expected that customary laws are more used than statutory laws to regulate access to water for different use and for different groups of people. This expectation is supported by the moral economy theory which argues that most people in rural areas behave according to social norms and traditions, and have more awareness and strong allegiance to customary laws.

CHAPTER FIVE

5. CUSTOMARY INSTITUTIONS AND WATER RESOURCES IN BARIADI DISTRICT

5.1. Introduction

This chapter provides an in-depth analysis of customary institutions and water resources in Bariadi district. The chapter examines how *Sukuma* traditional beliefs affect the way people interact with natural resources. The chapter also provides an analysis of institutional arrangements that affect access to different types of water resources, namely private and communal water sources. A detailed analysis of customary institutions affecting water management, together with an explanation of their hierarchy of authority and decision-making process is also provided.

5.2. The *Sukuma* Traditional Belief

The *Sukuma* people believe that the world was created by a supreme being, referred as the Creator God (*Liwelelo or Seba*). The Creator God shines on the earth, provides life, and watches people through ancestral spirits. In an interview with a chief, he said that the *Sukuma* believe that the living and the dead are a continuous line, so that when people die, their spirits continue to live in another world. The ancestral spirits usually referred to as “*batale*” or elders, have no tangible characteristics, and cannot be seen except on a few occasions soon after their death (Tanner 1958). The spirits are believed to be very close to the Creator God and continue to watch their descendants to make sure that they abide by the traditions. The *Sukuma* try to practice good conduct to avoid the consequences of offending their ancestral spirits (Cory 1970).

The *Sukuma* believe that ancestral spirits punish those who fail to follow their customs and traditions. All forms of misfortunes (e.g. death, illness, drought, famine, infertility, poverty, etc) are the results of sinful acts that occur when people turn away from customary norms (Drangert 1993; Tanner 1958). In focus group discussions, villagers said that most people consult magicians when they experience misfortunes. The magicians, popularly known as witch-doctors (*bafumu*), are believed to have divine power from ancestors. They can communicate directly with ancestral spirits and know what is happening.

The witch-doctors have to constantly pay attention to the ancestors or else they lose their power (Tanner 1958). One witch-doctor said in an interview that witch-doctors are supposed to respect, worship, and offer sacrifices to the ancestral spirits. They also have to make sure they sweep and clean the dwelling place for the spirits (Figure 5.1). Each spirit has preferences and some rules that have to be followed. This includes wearing certain kind of outfits with special designs and colors, making certain kinds of sacrifices, or bringing certain items when consulting them. Figure 5.2 shows a witch-doctor getting ready to consult one of her spirits. This particular spirits requires the witch-doctor to dress in red. The spirit is believed to be of *Maasai* descent. The *Maasai* consider red as a sacred color. In some cases, a witch-doctor may dress in a particular kind of animal skin, such as lion or leopard, and wear shell necklaces and bangles. On the head, the witch-doctor may wear a long hat made of colored beads and hold rattles (Figure 5.2). The rattle consist of gourd that are filled with small stones and sand (Tanner 1958). When consulting the spirits, the witch-doctor shakes the rattles to provide a noise that will awaken the spirits. When the spirits are awakened, they will start speaking to the witch-doctor, each with a different voice.

Figure 5. 1: The witch-doctor posing between two of her many spirits.

Each pile of stone in the photo is a residence for one spirit.



Figure 5. 2: The witch-doctor ready to consult her ancestral spirits



The following is a story from a key informant about a man who was punished by the spirits for not abiding to customary laws:

He was one of the richest men in our village. He had a lot of cattle and three wives. All of a sudden his cattle were affected by a disease which no one could explain. He tried every medicine but nothing worked. Then his cattle stopped reproducing, the male cattle wouldn't even come close to females. Later on, the cattle started dying one after another. As time went by, one of his wives passed away during childbirth. The man decided to consult the magician to find out what was happening. He was told that the spirits are angry at him because he has left the correct path. He had to apologize and offer sacrifice to the ancestral spirits. Since then, his cattle have continued to reproduce and the disease was cured.

The above story illustrates that it is very important for the *Sukuma* people to follow their customs. It is believed that the man was punished because he didn't protect his cattle. He gave them dirty water and didn't care much about them. Maintaining a good relationship with the ancestral spirit is very important for the *Sukuma* because it frees them from misfortunes. Once an individual recognizes his or her wrong doings, then he or she has to apologize to the spirits by offering sacrifices and stopping undesirable behaviors. In focus group discussions, livestock keepers explained how they offer sacrifices to the ancestral spirits:

You take milk, butter and cow dung. Then you go to the grave where your ancestors are buried. Once you reach there, you take a sip of milk and spit to all direction, north, south,

east, west and lastly you spit on the stone that is on the grave (lisigo).²¹ While spitting on the grave, you ask for forgiveness, you tell the ancestor that you are sorry for what you did and promise to follow the norms. Then you put butter, milk and cow dung on the grave stone. You spread the cow dung on the side of the stone, and oil on top of the stone. The milk is also poured on the stone. Immediately after all these actions, the stone will shine indicating that the spirit is pleased and you have been forgiven.

In some instances, ancestral spirits may punish livestock keepers for placing the cowshed gate (*mita*) in a wrong direction. Each clan has a specific direction for facing the cowshed gate (north, east, south or west), depending on what has been passed down from their ancestors (Figure 5.3). The livestock keeper who has placed the gate in the wrong direction may experience a series of misfortunes affecting both their family and their cattle. After consulting the witch-doctor, livestock keepers will be told the cause of misfortunes. He or she may be required to change the direction of the cowshed gate. A ceremony to change the direction of a cowshed requires the affected individual to invite ten senior elders, two junior elders, and two young men to his house. The senior elders are the witnesses, the junior elders will perform the ritual, and the young men will bring five poles for making the new cowshed gate.

The ritual for opening a new cowshed gate requires the sacrifice of a special sheep. This is a male sheep with two colors, black and white (*ng'holo ya matema abelei*), long horns, and long ears. The sheep to be sacrificed is not supposed to be slaughtered. Instead, one of the junior elders covers the sheep's nose until it suffocates and dies. When the sheep dies, a small cut is made on its nose using a knife which is sharp in both sides. The dead sheep is placed upside

²¹ The *Sukuma* normally put a stone on top of the grave.

down so the blood can flow from the nose to a small pot. This blood is later cooked together with the intestines and the liver. The meat is supposed to be cooked by one of the junior elders. Women are not allowed to cook this meat. The meat will be eaten together with stiff porridge (*ugali*), which is cooked by a woman who is a neighbor. The mother of the house is not supposed to cook. Then the food is eaten at the door, not inside the house. Everybody will gather at the door to eat, and move to the cowshed area after eating. One of the son-in laws in that particular clan will go to the bush and cut a branch from a thorn tree. This branch should come from a specific thorn tree called “*nyougouyou*.” Then the poles are placed and the thorn branches are used to close the new gate. The left over meat is then distributed among the men who were invited for the ceremony. The sheep’s skin is sliced in to small pieces for each one to take home and hang it at their door.²² After this ritual is completed, it is believed that all the misfortunes will vanish and that the spirits will bless the family with more wealth, health, children, and cattle.

Figure 5. 3: A cowshed with a gate facing east



²² Hanging the skins at the door is believed to bring the family closer to their ancestors.

Traditionally, the *Sukuma* conceive land as a spiritual entity, which cannot be owned by an individual. Land is regarded as the property of their ancestors, who exert power over the land and over the community after their death. People get land rights through inheritance and can establish their land rights by tracing their descent to an ancestor known to have farmed the land before them. Their right to farm in a particular place is conferred by their kinship with their ancestors. Once an individual secures the land, it remains in his family as long as they cultivate it. Among the *Sukuma*, the land tenure principle is that a man will own land as long as he occupies it effectively. They believe that land belongs to the whole family, so it cannot be sold, or pledged (Cory 1970). Instead, land is passed from one generation to another through inheritance.

The *Sukuma* people are patrilinear, so they trace their descent through a male line. A study conducted by Cory (1970) provides a good picture of a patrilinear system of inheritance in *Sukumaland*. According to Cory (1970:153-156), the *Sukuma* regard the oldest son (*nkuluwabo*) as a living link between the previous generation (the ancestors who have become spirits), and his generation, or the siblings who are still living. It is believed that the oldest son cannot be deprived of his position in the family because doing so will destroy the connection between the family and the ancestral spirits. In a polygamous family, the oldest son of the first wife is regarded as *nkuluwabo* regardless of his age. If the first wife has no sons, then it will be the eldest son of a second wife. In a situation where there are no sons, then the oldest daughter will be *nkuluwabo*. If there are no children, then the husband's eldest brother will be the first heir. In a situation where *nkuluwabo* dies before his father, *nkuluwabo*'s children are not entitled to inherit the share of their grandfather's property which would have been inherited by their father.

Instead, they will be entitled to inherit some properties as minor heirs after all their paternal uncles and aunts (Cory 1970:156).

Newcomers in a village need to ask traditional village elders for permission to obtain a piece of land. Once the elders agree, then the newcomer will approach the village chief for a land allocation. Newcomers are granted rights to land if the village elders regard them as people of good character. Before the newcomer is granted land rights, the village elders make inquiries about the reason for newcomer's immigration and his or her character in his or her former village (Cory 1970:118). Discussion with members of customary institutions revealed that they sometimes send spies to the village to find out about the newcomer's character. With regard to water rights, when a newcomer is allocated a piece of land with a water source already in public use, they cannot deny other people access to the water, and they cannot close a path leading to a water source and keep the water source only for the use of their own cattle. Newcomer's cattle must have a path to the water source, so there is no excuse for closing the path on the grounds of crop damage (Cory 1970:133).

With regard to grazing land, village elders said in an interview that everyone has right to all uncultivated land, including fields that have been harvested. People have free access regardless of whether they are *Sukuma* or non-*Sukuma*, or whether they are from this village or another. Because of the shortage of pastures during dry season, the *Sukuma* developed a traditional natural resource management system called *Ngitili*, a *Sukuma* term meaning "enclosure." *Ngitili* is an area within the village that is closed off at the beginning of the rainy season and opened during the dry season for grazing cattle. In focus group discussions, livestock keepers said that there are two types of enclosures. First, there are enclosures owned by individuals or families, and second, there are communal enclosures owned and managed by the

community. The two types of enclosures were developed in response to severe shortages of animal feed due to drought, the loss of grazing land to crops, and declining land productivity. Private *ngitili* can cover an area up to 12 acres, and communal *ngitili* can cover up to 124 acres (Barrow and Mlenge 2003; Maro 1995).

Members of customary institutions said in focus group discussions that every community member has a right to graze common enclosures. Private enclosures are developed on private lands by individuals or families. Non-family members have no rights to graze their animals on private enclosures. Customary institutions enact and enforce rules to protect the *ngitili*, and impose sanctions on individuals caught breaking *ngitili* management rules, such as grazing livestock on land set aside for regeneration (Monela et al. 2004:98-99).

5.3. Water Resources in the Bariadi District

Water sources in the Bariadi district can be grouped into two: community and private water sources. I observed that community water sources include deep wells, springs, rivers, dams, and ponds. Private water sources include sources developed by individuals and water-user groups. Shallow wells are the only major private water source in Bariadi district. Water rights can be achieved by inheritance of land or water sources from a family member or by developing a water sources (in the case of private water sources), or by being a member of the community (in the case of communal water sources). Moreover, one may obtain water from neighbors who have a private water source.

Table 5.1 shows that more than one third of the sampled households extracted drinking water from developed sources, which are mainly shallow wells. The main sources of domestic water supply for rural households in Bariadi district are developed wells (71 percent), streams and rivers (6 percent), springs (13 percent), and ponds (10 percent). Bariadi district is semi-arid

so most of households rely on developed wells mostly shallow wells and a few depend on deep wells. This is because most natural water sources are seasonal. They dry up during dry season.

Table 5. 1: Sources of Domestic Water Supply in the Bariadi District

Source of water	Percentage of households
Developed wells	71.0
Springs	13.0
Rivers	6.3
Ponds	9.7
Total	100.0

Table 5.2 shows that more than 50 percent of rural populations in Tanzania have to walk more than one kilometer to get drinking water in the dry season. In the Bariadi district, about 19 percent of household live within one kilometer to drinking water sources in the dry season, compared to 49 percent of other rural areas. This suggests that the Bariadi district is one of the water-deficit areas in Tanzania. Table 5.2 shows that 36 percent of people in the Bariadi district walk from two to three kilometers to get drinking water in the dry season, though in most rural areas, only 9 percent walk this distance.

Table 5. 2: Distance to Drinking Water Sources in Dry Season in Tanzania

Distance to drinking water sources (km)	Percentage of Population		
	Tanzania mainland	Rural Tanzania	Bariadi district sample
Less than 1 kilometer	54.9	48.9	18.5
1-1.9	18.8	22.8	23.2
2-2.9	8.5	9.4	36.6
3-3.9	7.8	8.8	9.7
4-5.9	3.2	3.6	11.1
6+	6.9	8.2	0.93

Source: URT 2002 and Household Survey in Bariadi.

Water resources in Bariadi district have multiple uses with different management systems that allow or deny people access to water. Water access and use in Bariadi depends on the following factors: individual's ability to pay membership fees and contributions to water-user groups; ability to pay for the extraction of water; participation in water development; and membership in a village. Restrictions regarding access and use of water are regulated by customary and statutory institutions.

5.3.1. Community-Owned Water Sources

5.3.1.1. Deep Wells

Of the 20 villages sampled, only one village (Zanzui village) had a deep well. The deep well is 62.5 meters deep and was built in 1995 with a help of donors from Holland, and is now protected by the village water committee. Water is pumped, using a generator that creates electricity for the pump to lift water into water tanks, and then fed into a tap, where people collect water. Villagers use the water from the deep well for domestic needs and livestock watering.

There are two water collection points. One point is for domestic water and the other is for livestock watering. Water from the deep well is not free. Villagers have to pay 20 Tanzania shillings (about US\$ 0.02) per bucket from a domestic watering point. The same applies to livestock, users are charged per animal, 20 Tanzania shillings per cow (about US\$ 0.02), and 10 Tanzania shillings per sheep or goat (about US\$ 0.01). The deep well has plenty of water during both dry and wet season. The money is used to meet maintenance costs and to buy fuel for the generator that pumps the water.

Zanzui village depends on one deep well for most of its water needs. The few shallow wells that exist in the village are dry for most part of the year because the water table in Zanzui is very low. The situation is better during the wet season because villagers buy water from the deep well for drinking purposes only. They obtain water for other domestic needs and livestock from streams, springs, and ponds. Those who have bigger family sizes and many livestock suffer more because it is expensive to buy enough water if you have many livestock or a large family. In focus group discussions, women explained the difference the deep well has made in their lives:

We thank the donors for the deep well. Before we got the deep well, the situation was terrible. We used to bathe once per month in dry season because water was so scarce. Some people could even stay for months without bathing. Household sanitation was very poor because we had to keep the water we use for washing hands before we eat and reuse it as many times as possible. The water table in Zanzui is very low, even those who have private well, had to dig from 70 to 100 feet down and still these wells are seasonal. In the dry season, all the nearby springs and wells dried out. Before we got the deep well, we used to wake up at 5.00 am to fetch water in another village, a distance of eight hours for a return trip. Imagine you walk for that long and bring only one bucket home!

The women in this village can tell you better about water than the men. Having a deep well in our village has changed our life a lot. In the past, there used to be no reliable water supply in this village. We used to get diarrhea and worms most of the time because of water scarcity. We also had to walk for hours with our babies on our backs to fetch water in other villages. Even if you are sick, you still have to walk and look for water. It was a horrible situation one can ever imagine.

Although the deep well has water throughout the year, water is still a problem because people have to buy water. The livestock keepers have to water their livestock from 11 am to 5.00 pm, a time when the water is pumped in to the watering point. Livestock keepers explained how difficult it is to have only one watering point for all the livestock in the village.

We water our livestock at the deep well. We have constructed a watering point and built a basin for watering cattle. Watering cattle is a lot of hassle. You have to line up your livestock and wait for your turn. At the same time you have to watch your livestock so they don't mix up or fight with other people's livestock. Few livestock are watered at a time and you have to pay for each livestock. Sometimes you stay in a queue for a long time, a factor that shortens grazing time for the livestock since you will still need to walk for a long distance to search for grazing land.

The deep well is managed and controlled by the village council. The village council has enacted laws to manage the deep well. Moreover, every villager is responsible for maintaining the water source because it is the “eye” of the village. Anyone caught spilling, polluting or fighting at the water source is severely punished. Punishment can range from a fine to exclusion from drawing water. The village council has elected a water committee that is in charge of the smooth running of the deep well. There are always two guards on duty at both the domestic and animal watering point. The first guard on duty runs the generator and the second one collects the fees and makes sure that no one gets water without paying. The guards on duty are paid some allowance for each day they are on duty. The amount of allowance varies each day, depending on that day's water sales. If water sales are low on that day, then the guard receives no allowance.

I visited the deep well and the water guard on duty that day said:

You must get enough money for the fuel you use to pump water. The amount set by the village council is 1,600 Tanzania shillings per liter of petrol. One liter of petrol can pump up to 1,600 liters of water. You have to use 200 liters for cleaning the water sources. If the water sale is low on that day, you can guard the whole day and you don't get paid even a cent for your lunch. You stay hungry.

5.3.1.2. Rivers

Rivers are mainly used for livestock watering, though some few rivers are also used for irrigation and domestic use. In *Sukumaland*, livestock are traditionally watered in small pools of rainwater, rivers, and dug ponds (Drangert 1993). Water from rivers is free for community members. The choice to use a particular river is generally a factor of distance and land ownership. Those who own or rent land by the river can establish small gardens and irrigate them using the water from the river. Other community members can only use the river for livestock watering. If an individual builds a water source like a well, they obtain exclusive rights to the water. Other people who need to use a private water source to water their cattle must get permission from the well owner (Cory 1970; Huggins 2000).

Most of the rivers in Bariadi district are seasonal. They dry out during dry season. In focus groups discussions, livestock keepers said that they are forced to walk long distances in search for water for their animals, or have to dig-up wells along the river valleys to get water for their livestock. These wells are traditionally called *longobesi* (Figure 5.4).

Figure 5. 4: A well dug on the river bed (*longobesi*)



A *longobesi* is regarded as a private water source even if it has been dug on public land. I observed that livestock watering using *longobesi* is a difficult task. An individual is supposed to lift the water from the well by hand and pour it into a small basin when livestock drink the water (Figure 5.5). I also tried to water livestock at the *longobesi*, and I felt tired just after lifting few buckets. I was afraid that cattle were going to knock me because they were thirsty and scrambling for water as I poured the water in a little basin as shown in figure 5.6. I learnt that cattle watering using *longobesi* take a lot of energy and time, especially if an individual has a lot of livestock.

Figure 5. 5: Livestock watering in dry season is a difficult task. One must hand lift water from a well and water livestock one by one



Figure 5. 6: The author watering cattle at the *longobesi*



5.3.1.3. Springs

Springs represent a unique natural supply of water in Bariadi district. They are generally believed to have excellent-quality water and have been used to supply potable water from time immemorial. Traditionally, most springs are sacred because they are thought to be the dwelling place of supernatural beings (ancestral spirits). Key informants and members of focus groups said that in most cases, the spring has acquired sacredness through connection with ancestral spirits, who will be identified through a significant or miraculous event that occurs at the spring. Spring water is mainly used for domestic use like drinking, cooking, cleaning, bathing, laundry, and washing dishes. In focus group discussions with village elders, they explained that springs are owned by ancestral spirits. Sometimes springs can hide in rocks, caves, or under big trees. Springs talk to people and provide water anytime and anywhere the spirits want. As one village elder explained:

Springs used to have “owners” who were ancestral spirits. When I was a young boy, my major job was to take care of livestock. One day I took the cattle for grazing where I met with an old man who was also grazing his livestock. As we walked with our cattle, we came across a big rock. Then a voice greeted us and asked “can you please come and help uncover me so I can give my kids some water to drink?” I did not understand but the old man understood. He went by the rock with a stick and dips a stick down. I was shocked to see a big pool of water flowing from underground. Then the voice told us to water our livestock there, and we did, we could hear voices of people from the water. When I went back home, I told my mom about what happened that day, my mom told me to go and show her the place. When we reached there, the water greeted my mom; we

could hear happy sounds and drums from the water. Then we came back home. The water from that place never dried.

Springs are natural water sources, and hence are regarded as public property. I observed that some of the springs are seasonal, with little water flow in the dry season. Village elders said that in the past, most springs had water throughout the year. They attributed the seasonality of springs to the improper management of springs which has made the ancestral spirits angry. They believe that the ancestral spirits are making some of the springs dry out, hide in caves or move to other villages.

I visited one spring which has just “come back” from the cave. The village chairman and the chief said that the spring ceased to provide water few years ago. They said it moved to the nearby cave because people polluted it. The chief said leaders of customary institutions had to consult a witch-doctor. The witch-doctor said the spring hid in the nearby cave, and the ancestral spirits demanded villagers to sacrifice a black fat cow, which they did. After the sacrifice, the spring came back. Since then, customary institutions have been strict on those who fail to follow customary laws. I observed people removing their shoes before they enter the spring to draw water. One girl who was drawing water at the spring said she was told by her mom that the spring will “swallow” her if she pollutes the water. Other women said that it happened in the past where people who polluted the water were swallowed by the spring.

5.3.1.4. Charco-Dams

Charco-dams refer to dug out ponds in flat areas for harvesting and storing water. In the Bariadi district, charco-dams are built to water livestock and they are communally owned. After independence in 1961, the central government developed charco-dams in some villages in

Bariadi as a better alternative for livestock water. Of the 20 sampled villages, only 7 of them had a charco-dam. But most of these dams have been heavily polluted and some have silted up completely because of poor operation and maintenance (Mahoo et al. 2003). This decreased the volume of water for livestock watering.

Currently, the government has been promoting and supporting the construction of charco-dams in Bariadi district. One district water engineer said that villagers are supposed to share the cost (20 percent of the total cost) of de-silting the existing dam or building a new one. Some villagers have contributed some money for the construction of new dams, and in some places, the construction of new dams have begun. Figure 5.7 shows a group of livestock keepers that I observed getting together to discuss the possibility of building a new charco-dam.

Figure 5. 7: Livestock keepers discussing the construction of a charco-dam



5.3.1.5. Ponds

A pond is a small body of water. In the Bariadi district, ponds provide water for domestic use and irrigation. Some bigger ponds can include livestock watering. Because water from ponds is used for all kinds of activities, it is normally not suitable for human drinking.

In focus group discussions, villagers said that there is no private ownership of dams, springs, ponds, and rivers. Riparian ownership is not allowed. Those who own land by these water sources do not own the water source adjacent to their land. Instead, the water source belongs to the whole community and each community member has access to these water sources. The management of these water sources is guided by customary laws and each community member is responsible for preventing pollution. There is no water committee for these water sources, so enforcement of rules for managing common water sources is done by customary institutions. Villagers acknowledged that most people follow these rules because of three major reasons. First, most people understand it is important to protect the water source and maintain a continued supply of reliable and clean water. Second, most people have a fear that the ancestral spirits would punish them if they fail to manage their water properly, and finally, customary institutions impose severe sanctions such as ostracism which discourages non-compliance with customary laws.

5.3.2. Private-Owned Water Sources

5.3.2.1. Shallow Wells

Private water sources are those developed by individual households or groups of people who use their own labor, hire someone to dig the well for them, or mobilize neighbors or

relatives to help dig a well. These water sources are used for irrigation, livestock watering, and domestic water uses. Most private-owned water sources in Bariadi are shallow wells, which can be individual-owned or group-owned. Group-owned private wells are dug by groups of people. Group-owned wells can range from those owned by two individuals to those owned by water-user groups. In Bariadi, water-user groups have been established in each village. Villagers were required by the district water office to organize themselves into groups of 25-50 households. Each domestic water-user group has a water committee which comprised of a chairperson, treasurer, secretary, and members. The water-user groups are required to be registered at the district water office and open a bank account of not less than Tanzania shillings 60,000 (about US\$60). After the account is opened, each water-user group is required to dig a shallow well and inform the water officer once they reach the water table. The district water office provides and installs the water pump.

Shallow wells managed by water-user groups are used only for domestic purposes. No irrigation or livestock watering is allowed in these shallow wells. Other group-owned wells are developed for irrigation and livestock purposes. These wells are also used for other domestic needs like bathing, washing clothes, and cleaning, but not drinking. Normally people will organize themselves in to a group of 2 to 5 individuals and develop a well (*longobesi*) for their own use. I observed that these groups do not use pumps.

In some cases individuals dig their own wells for irrigation, livestock watering, and domestic purposes. Most of individual private wells for domestic uses are located close to the households, while most of wells for livestock watering are located in the river bed. These wells are normally dug during dry season when the river dries up. In the wet season, these wells are

washed away by the river. Wells for irrigation purposes are normally located on crop field and vegetable gardens. I observed that wells for irrigation purposes were rarely used for livestock watering because livestock could feed or destroy the nearby irrigated crops. But people used these wells to draw water for domestic use (except drinking). Wells that were located close to the households were mainly used for domestic water needs. In rare cases, I observed livestock watering on wells close to households. But this was mainly done by well-owners who drew water and water their livestock at a distance from their wells. Villagers who drew water from their neighbor's wells were only allowed to draw water for domestic use.

5.4. Customary Water Management Laws among the *Sukuma*

Discussion with customary leaders revealed that water is a gift from God. The *Sukuma* customary law regards water as a common pool resource. No one can be excluded from using a water source for domestic use, regardless of the water source. It doesn't matter whether the water is from a natural or developed source, or whether the water source is situated in a private or public land. Due to this custom, water vending among the *Sukuma* is not a common practice (Cory 1970; Drangert 1993). Table 5.3 presents the different types of water rights found in Bariadi district. These types of water rights were obtained from focus group discussions with villagers. Every community member has access to natural water sources such as rivers, streams and ponds. Water sources that are developed either by individuals or groups are privately owned. Dams are also owned in common by all community members.

Although the statutory law stipulates that the state owns all the water sources in the country, it does not mean that people are not allowed to access water freely. The customary law in Bariadi district allows free access to all natural water sources by all community members. Developed water sources are owned by the developers whether individuals or groups. This

tradition applies to all water sources for different water uses. The connection of water rights to land rights applies to developed water sources only. Community members will have right to natural water sources even if the water source falls on someone’s private land. The owner of the land cannot claim rights to natural water source on his/her land. Livestock keepers and irrigators said that the idea is “natural water comes from God, and it belongs to us all.”

Table 5. 3: Categories of Water Rights in Bariadi District

Water source	Property holder	Water rights
Rivers, streams and ponds	Community members	Common ownership
Springs	Community members	Common ownership
Shallow/ deep wells	Water-user groups/association	Private ownership
	Individuals	Private ownership
Dams	Community members	Common ownership

Although in theory it is understood that developed water sources are owned by the developers, in practice the developers have the obligation to share their water with other community members. For example, water-user groups have the obligation to share water with poor members of the community who cannot afford the membership fee, but live in close proximity with the water sources. Likewise, individual private well owners have the obligation to share their water with other members of the social network. A social network refers to a set of individuals who are linked by specific social relations or ties. Members of social networks include neighbors, friends and relatives.

The *Sukuma* people live in corporate groups. Fischer (1977:12) defines a corporate group as a group in which the needs and interests of individuals are subordinate to the needs and interests of the collective. Individuals in a corporate group feel a strong sense of loyalty and obligation to

the group (Gusfield 1975). Because community members are dependent on one another, their full participation in the corporate group is a rational choice. It is the custom of *Sukuma* people to share water with members of social network. The way that an individual relates to other people has a big impact on their livelihood. Individuals always count on members of social networks for help in times of need. Although reciprocal obligation ensures people that they can access private water, free water access to private sources by this social network is normally limited to water for human consumption. If members of social network need additional water for animals, building, irrigation, or other uses, they are expected to pay for the water or go to public sources. Water shortage is among the reasons that have made this requirement which somehow goes against the *Sukuma* belief that water is “free” for everyone. There are some rules that limit access to private water sources.

The owner of the land has private rights to the land, but not to natural water source that is found on the land. It is the custom of the *Sukuma* people to share water so even those who have private wells are expected to share water with their neighbors, friends, and relatives. Land owners cannot prevent anybody from using a water source for human consumption, regardless of whether the water source is private or public (Huggins 2000). As a woman key informant explained:

How can you deny your neighbors water? You got it from God and you need to share. If you are selfish, who will help you in times of need? Will your water help you?

Although neighbors, friends and relatives are granted access to water most of the time, they are also required to abide by customary laws regarding access to private water sources. They always have to ask for permission from the owner before they can draw water. Some private well

owners will grant access to water for “essential” domestic needs like cooking, drinking, and washing. Water owners may also require people to pay if they need water for non-domestic water use or for domestic use that are not “essential.” Other villagers who are not neighbors or relatives may be asked to pay for water. Occasionally, they may be allowed to draw free water if they ask and explain that they don’t have money on that day and are in need of water. However, free water is limited only to drinking water. No free water is given for other uses.

The rule of hospitality is a sensitive issue among the *Sukuma*. Any deviation from community norms is met with negative social sanctions. Any crisis affecting a neighbor is thought to affect the entire neighborhood or social network. This is similar to moral economist’s idea that people behave according to their norms. People have a moral obligation to help each other in times of need. In focus group discussions, villagers said that everyone is expected to help other members of social network in times of water shortage, weddings, sickness, disease, or death. People who don’t help are sanctioned. For example, private water owners who fail to render water assistance to members of social network are regarded as selfish, and will be “disowned” by other members of the social network. It is also believed that the ancestral spirits will punish the “selfish” well owners who deny water access to others. Punishment may take the form of “bad luck” (*mikosi*) such as disease, sickness, infertility, miscarriage, death, reduction of water flow, or the collapse of the well walls. The neighborhood or social network council (*Nzenzo*) has the power to invoke negative sanctions, ranging from fine, to exclusion from being helped by members of the network.

Private well owners have developed rules for accessing their water sources. The following customary laws of the *Sukuma* were identified:

1. No one is allowed to access private water without permission of the owner/owners;

2. Neighbors and relatives can get free water only if the water is for drinking, cooking and washing. If water is needed for other uses, the people need to pay for it. Free water is limited to no more than 5 buckets only;
3. No dirty containers are allowed at the water source;
4. No washing clothes, face, hands, or watering animals at the drinking water sources
5. Those that belong to Seventh Day Adventist Church (SDA) religion do no work on the Sabbath (from Friday when the sun goes down to Saturday when the sun goes down). At this time, no one is allowed to draw water because it is a day to rest for SDA people.

With regard to private wells for irrigation and animal watering, the rule of asking for permission does apply. Those who ask for water for animals or irrigation are required to wait until the owner/owners have finished watering their livestock or irrigating their fields then he/she can be given permission to use the water. Individuals will identify a private well to draw water depending on the distance from house to draw water as compared to the distance to public water source, relationship with the well owner. Normally people prefer to go to a person with whom they have a close relationship, and who is approachable and friendly. For the case of private wells owned by domestic water-user groups, individual membership to the group grants access to water. Thus, strong ties and interpersonal relationships are important factors for accessing private water sources.

Networks that originate from blood relationships are the strongest and most important social networks. Those who live with extended family members in the same village have greater social networks and a more complex form of network. Blood relatives may have their friends or neighbors who will also be included in the network to access private water sources. This makes

the network more dense and complex because even distant relationships are highly respected and valued among the *Sukuma*. Private well owners who live away from blood relatives may have few members of social networks since most of the members of social networks will be close neighbors. Moreover, people who live in isolated villages may have a simple network because of fewer close friends or neighbors compared to those who live in closely built villages who may have a lot of close friends and neighbors around. Similar results were observed by Anderton and Emigh (1989) who found out that the density and centralization of social network determine the type of network. The higher the average number of ties in the network, the larger and more complex the network is.

A simple social network is presented in figure 5.8.²³ Figure 5.8 show that Mr. Mayanzi, who is the private well owner, moved to the village from another area.²⁴ He lives in an isolated village with no blood relatives near him, but he has a network of neighbors who uses his well. Figure 5.9 explains a more complicated social network. Mr. Shagembe, who is a private well owner, was born in the village where he resides. He has a network of blood relatives such as a sister and other members of extended family who live in the same village and use his private well. In the *Sukuma* culture, even distant relatives like *Holo* who is a sister to well-owner's uncle, are highly valued.

²³ The idea on how to draw social networks was obtained from Nemarundwe (2003).

²⁴ Common *Sukuma* names were used.

Figure 5. 8: Simple Social Network for Accessing Private Water Sources

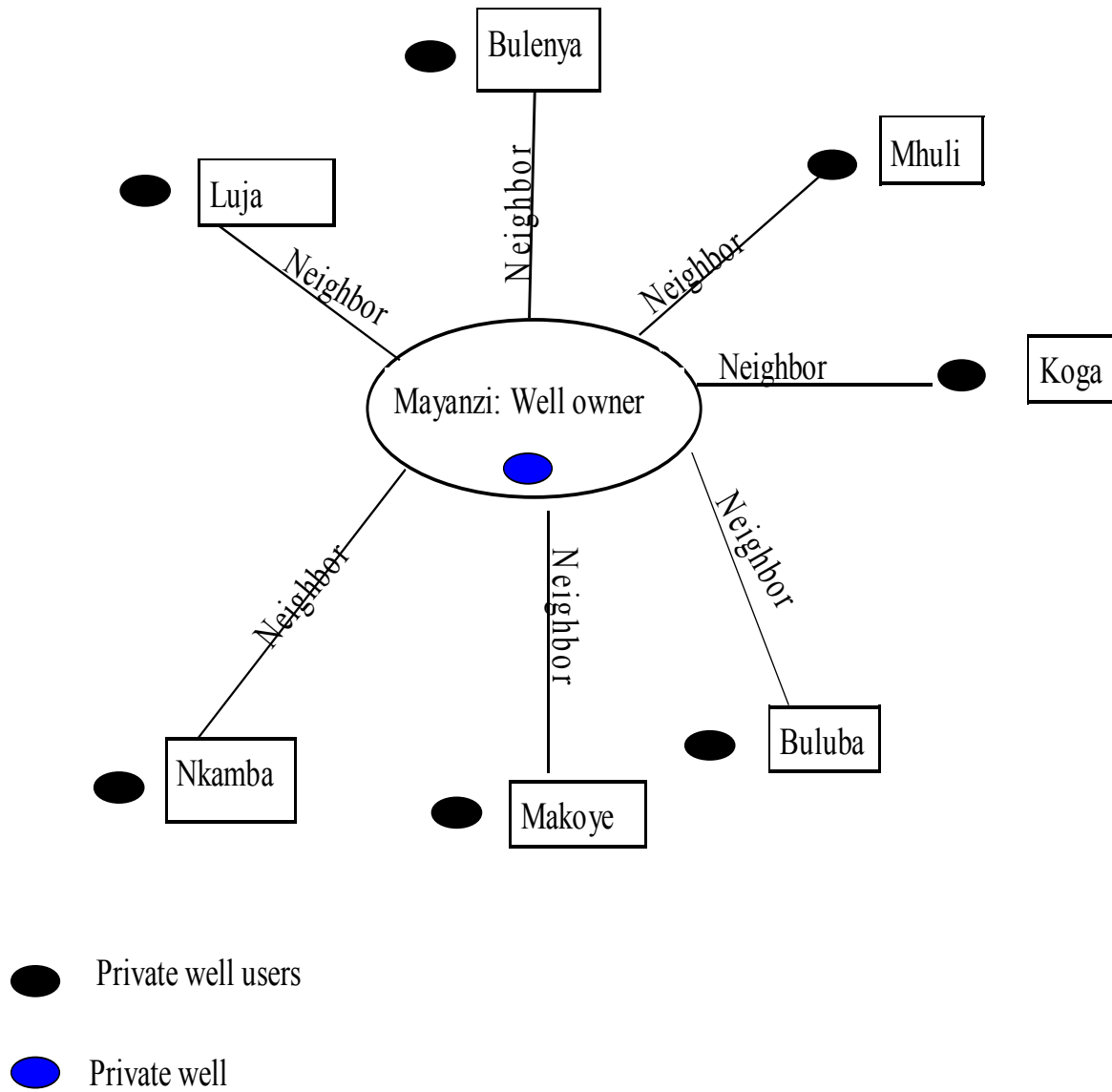
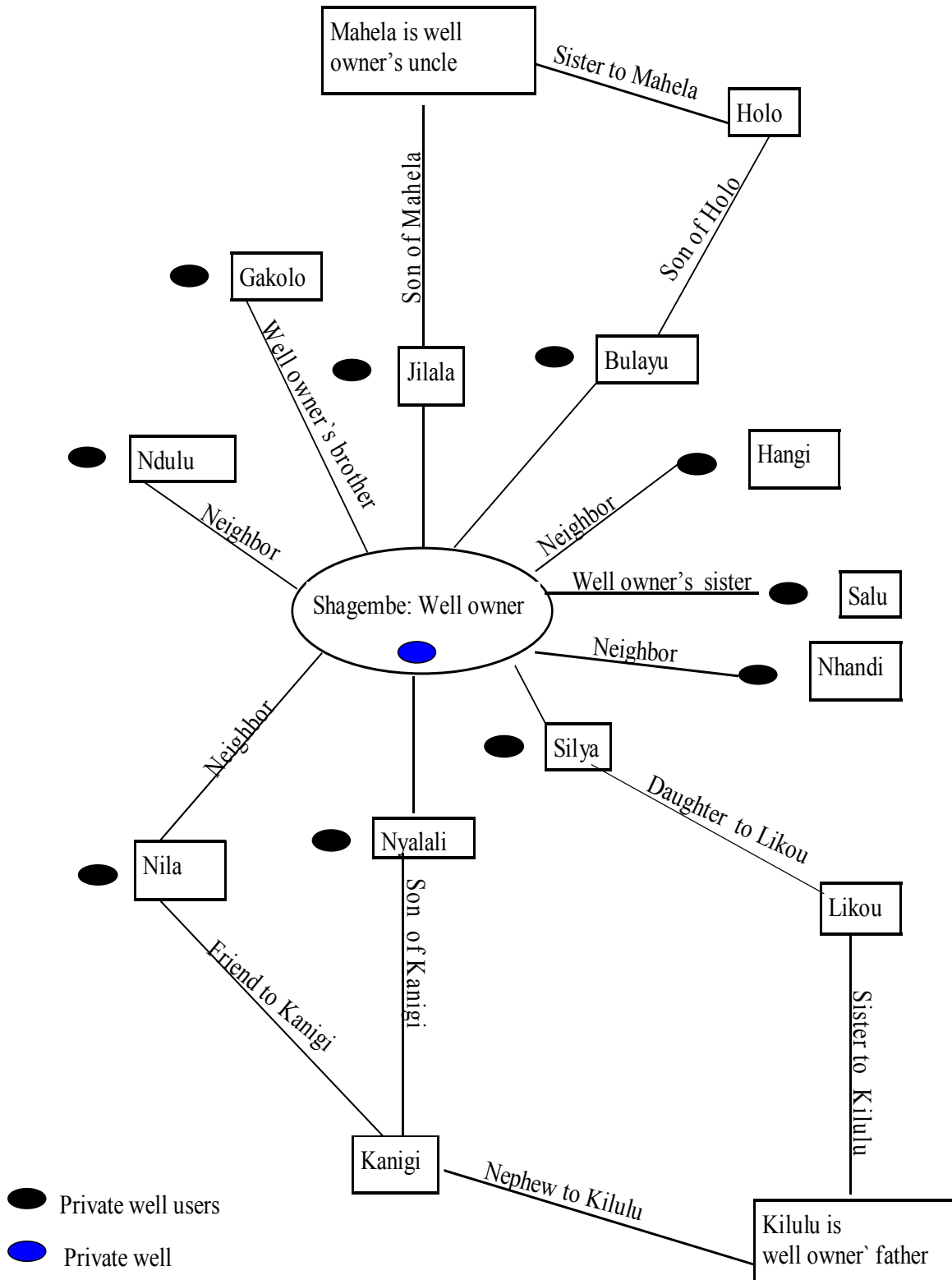


Figure 5. 9: Complex Social Network for Accessing Private Water Sources



Private well owners in the study area have a reciprocal obligation to share their water with others. By sharing their water, private well owners in return expect to receive some benefits from water users. First, a private well owner is assured that the water will be “safe” because they believe that if private well owners share water, other people will have no motive to pollute, put poison in the well, or bewitch the private well owner. One key informant pointed out that if private well owners are “selfish,” other people may try to make sure the “selfish” well owner doesn’t enjoy his/ her water. They may put poison or trash in the well, or use witchcraft to punish him or her. One example was given by the key informant that a “selfish” well owner found a dead cat by his well. The next day the well owner got very sick. It was believed that he was possessed by demons. He had to go to the witch-doctor to get the demons removed. The witch-doctor told him he would die if he continued to be “selfish” because his neighbors were not happy with him, and they had planned to send very tough demons to strangle him. From that day, the key informant said, the well owner stopped being “selfish,” and he shared his water with his neighbors. The principle of reciprocity and the fear of being harmed through poison or witchcraft, forces private well owners to share their water. This ensures equitable access to water, but may discourage the development of private water sources because it assures access of private water to those in a social network.

Secondly, a private well owner who shares his/her water is assured of help in times of need. They may be assisted by those who draw water in times of weeding, harvest, funerals, and wedding ceremonies (Figure 5.10). Those who own wells for livestock watering may be assisted by members of social network to water or graze their cattle when they are sick or have other emergencies. Sharing water with other livestock keepers creates a strong tie with other livestock

keepers who may share information about cattle prices in the market, available grazing land, and traditional medicines for treating cattle diseases and infertility.

Figure 5. 10: Women helping their neighbor cooking food for the wedding



Moreover, private well owners who share their water may be assisted through a traditional mutual help system called *lubili*. *Lubili* is a term used to refer to a group of people who exchange their labor to help each other when more labor is needed. A person or household that needs more labor for plowing their land, weeding, or harvesting their crops will ask other members of a social network to come in and help on a specific day. It was observed that a household that needs help has to prepare a special meal for the *lubili* team on the day when labor is being offered. No payment is made for the labor offered by *lubili* team.

Thirdly, irrigators who share their water with others may get information about a better market, traditional medicines for treating pests and diseases, medicine to increase productivity, attract customers, and prevent bad people from bewitching well owners' crops. This is consistent with Kohler et al. (2001), who observed that a social network provides opportunity for exchange of information that can help people get the knowledge they need to engage in a variety of innovations and livelihood strategies. It is also consistent with the social capital objective and benefits of reciprocity. Although the well owner may not ask for these benefits, water users understand that they have a reciprocal obligation "to pay back" for the favors they receive from the well owner (Nemarundwe 2003).

The fact that water is a common pool resource encourages communities to manage their water sources. As explained earlier, the *Sukuma* believe that if they don't manage their water correctly, the ancestral spirits will punish them. Punishment can take the form of disasters such as drought or destructive storms (Drangert 1993), infertility, death, famine, disease, and miscarriage. A key informant explained:

Last year, we had watched it rain at different times in various villages around us but nothing in our own village. We started asking ourselves why this is happening to us. Who is the cause of all these? Then we remembered that there were three women who died in childbirth and nothing was done about it. The rains skirt around our village because our ancestors are disappointed with us for not doing what we were supposed to do: remove the curse and throw it in to the lake. So we had to organize ourselves and run a "pumbulu." After the "pumbulu," we had plenty of rains and we got plenty of food.

The “*pumbulu*” is a local traditional practice done by the *Sukuma* to remove a curse or bad luck in the community. If a woman dies in childbirth, some of the older women may call for a “*pumbulu*.” They pick up some of the dirty or broken articles from the woman’s house (the one who died during child birth) and then, as a mob, take them to the next village and dump them there. When the next village finds them, they will, in turn, take them on to another village, and so on until they reach Lake Victoria where they throw the dirty junk into the lake. All women in the *pumbulu* must carry sticks and if any men get in their way they hit them with their sticks. Most men know that they are supposed to give a *pumbulu* a wide berth when they encounter them. It is against the *Sukuma* tradition for men to fight or interfere with the women in the *pumbulu*, and they can be fined a cow for doing so. All women in the village are expected to participate in the *pumbulu*. Those who don’t are sanctioned by customary institutions. One villager explained:

We don't mind the unusually hot weather but the lack of rain is depressing and scary. This part of Sukumaland has always been the first to get rains, but not this year. I can only remember the past 45 years, but during that time I have never experienced the year coming to an end without enough rain to cultivate. There are areas where they have corn growing but it is drying up. I told you about "pumbulu" when 100's of women from a village try to cleanse their village of the evil of a woman dying in childbirth along with the child. It is still continuing due to the lack of rain. The people with traditional religion are trying to find who the cause of the drought is. We now have 3 villages where the "dagashida" consisting of all of the men in the village, have decreed that all households where people have refused to join with them in the "pumbulu" are to be shunned.

No one can go to their home nor can they go to other homes nor can they receive help of any kind. They pay "rainmakers" but haven't found the right one yet.

Sometimes villagers through customary institutions need to consult with witch-doctors (*bafumu*) to be able to find out what made the water source to dry out or what made the rain stay away. In focus group discussion with members of customary institutions, they said that every year, customary leaders get together and try to determine whether the year will be good or bad. If they see signs of drought or other calamity, they ask villagers to contribute money for a witch-doctor. The witch-doctor will consult with the ancestral spirits (*batale*) to find out what has brought bad luck to the village. The *batale* have special connection with God (*Liwelelo*) and are regarded as guardians of this World. The *batale* will tell the witch-doctor through a dream what is wrong and what needs to be done. If a water source is drying out, villagers might be asked to go to the water source and “apologize” to the ancestral spirits. They must bring a dark-colored cow and sacrifice it at the water source.

If the witch-doctor finds out that the upcoming year will be full of misfortunes such as infertility, famine, or droughts, he/she may communicate with the spirits and ask for their protection. Villagers will be assured of protection if a miraculous sign such as a miraculous animal or human being appears in the village (*ndagou*). If the sign is a human being, then he or she will look like a mentally retarded person. If this person appears in the village, and goes to one of the households in the village, villagers will be required to bring food to that household. If the (*ndagou*) is an animal, a wild animal will appear in the village. Villagers are not supposed to kill it, but let it go.

In focus group discussions with customary leaders they explained:

In 2003, we predicted to have a bad year. So we had to turn to our traditional practices.

Everyone in the village had to give millet or money for our customary leaders to consult a witchdoctor. Those who didn't contribute faced a heavy fine, ostracism, or both. The witchdoctor told us that our village had bad luck and were given a lady as "ndagou."

The witch-doctor had told us that once we see this lady, we should give her black clothes, and we did. The lady stayed in our village for three days and after that she disappeared.

That year was a blessed year. We had plenty of food, lots of babies were born, and fewer diseases.

5.5. Customary Institutions for Water Management

5.5.1. Sungusungu

Sungusungu emerged among the *Sukuma* in 1982 as a local level institution, with the major aim of protecting property and enforcing customary laws. The major factor that contributed to the formation of the *Sungusungu* was the increase in number of cattle rustlers in *Sukumaland*. The war with neighboring Uganda in 1979 had caused an increase in lawlessness and crime in Tanzania. At the same time, the justice system was seen as "too corrupt" and unable to control crime and protect the communities (Abrahams 1987; Bukurura 1994:5). After the war with Uganda ended, there were an influx of young and unemployed males, and a lot of guns around. By the early 1980s, there were frequent cattle raids in *Sukumaland* (the most prized possession among the *Sukuma*). Armed cattle theft had caused a lot of fear and anxiety that

prompted the *Sukuma* to design a justice institution to protect their cattle, and other property (Abraham 1987; Bukurura 1994).

Sungusungu is a Swahili²⁵ word for a species of an aggressive, large black biting ant. Just like the black aunt, when established, *Sungusungu* were very aggressive in controlling cattle rustlers. They used poison arrows with swift and severe punishments (Paciotti and Hadley 2004). Among the *Sukuma*, the word *Sungusungu* relates to *Sukuma* word “*busungu*” which means poison or labor pain.²⁶ The use of word *Sungusungu* has been associated with poison-tipped arrows that are used by the *Sungusungu* soldiers (Bukurura 1996). In *Sukuma* language, *Sungusungu* groups are often referred to as *basalama*, meaning “the people of peace” who represent “the army of ancestors.”

Although *Sungusungu* was initially a security institutions targeted on combating cattle rustling, it was eventually adapted to deal with enforcement of customary laws, and to handle all kinds of disputes including marriage and divorce, witch trials, debts, land and water disputes, and mediate other kinds of disputes. In the case of water management, *Sungusungu* members said in focus group discussions that they punish those who break the rules adopted to develop and manage water resources. They also work hand in hand with the existing customary institution (such as *Dagashida*) to enact and enforce customary laws. *Sungusungu* was able to spread rapidly throughout the country, and within a year of its establishment, *Sungusungu* had transformed into a large-scale system, and was an ethnic duty among the *Sukuma* (Paciotti and Hadley 2004:119).

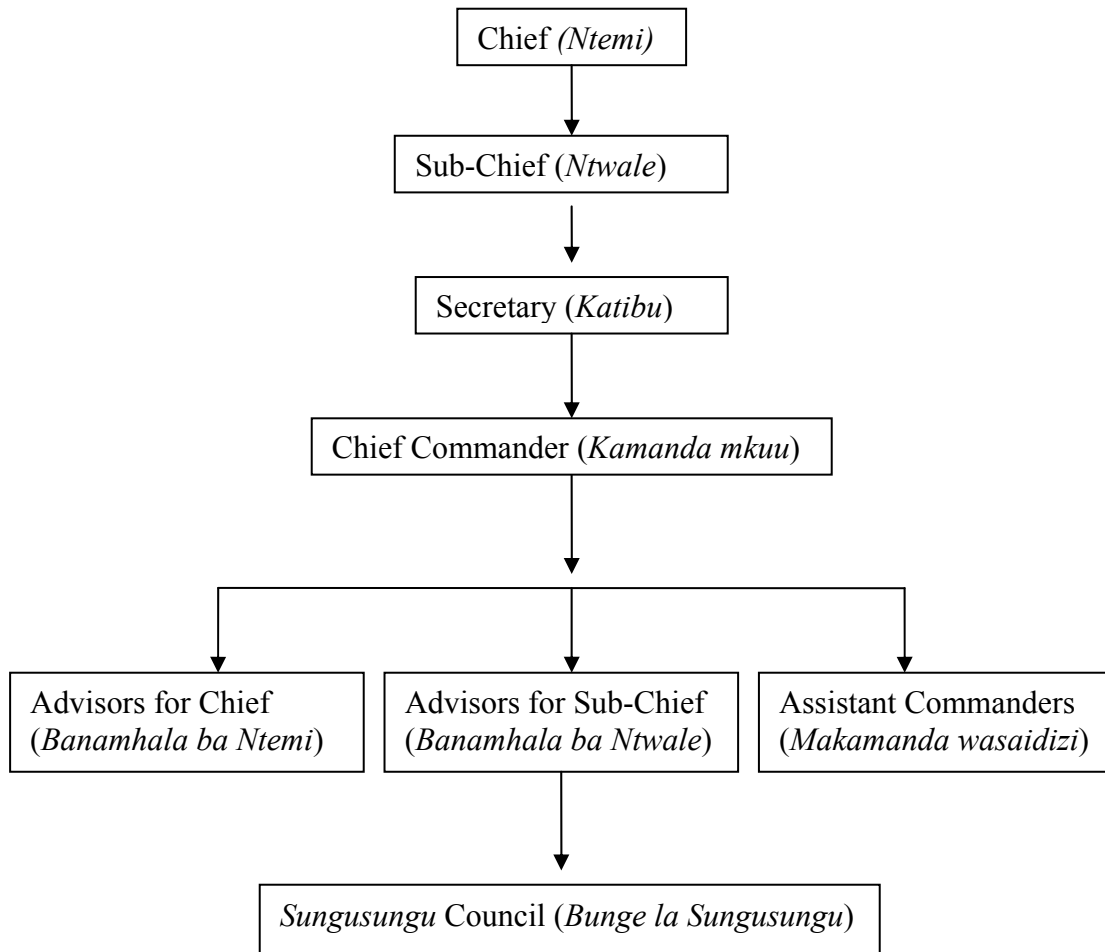
²⁵ Swahili is Tanzania’s national language.

²⁶ Other studies observed that it is possible that the “biting power” of the *Sungusungu* is combined with a reference to black clothes which are sometimes won by pastoralists in *Sukumaland* (Abrahams 1987).

The *Sungusungu* have hierarchy of leadership starting with the chief (*Ntemi*), who is a chairman of the *Sungusungu*. The *Sungusungu* chairman is usually a charismatic leader who is in charge of all *Sungusungu* activities, leads meetings, and makes final decisions based on the views of majority. He is also the first person to be notified whenever there is a problem in the village. The assistant chief (*Ntwale*), works hand in hand with a chief and presides when the chief is absent. The secretary (*Katibu*) is in charge of documenting and keeping records of all *Sungusungu* activities, including writing names of those who attend the meeting, taking minutes, and documenting the details of the cases discussed and the punishment given.

The chief commander (*Kamanda mkuu*) is responsible for organizing the secret policing operation of *Sungusungu*. He arrests offenders in the village, prosecutes them, and leads trials at the *Sungusungu* meetings. There are also assistant commanders (*Makamanda wasaidizi*), advisors of the chief (*Banamhala ba Ntemi*), advisors of the sub-chief (*Banamhala ba Ntwale*) and the *Sungusungu* council itself (*Bunge la Sungusungu*). The council comprises of ordinary members of *Sungusungu*. The ordinary members of the *Sungusungu*, especially those who are younger, are often referred to as *askari*, a Swahili word for soldiers (Abraham 1987). The *askari* are in charge with the responsibility of tracking down those who break customary laws, patrolling the community, investigating offences, and finding witnesses for ongoing cases. Figure 5.11 presents *Sungusungu*'s hierarchy of leadership as explained above. All members of *Sungusungu* are to take an oath not to reveal the secrets of *Sungusungu* to anyone. And the leaders of *Sungusungu* are "immunized" by traditional medicines to make them strong, fearless, and to protect them (Heald 2002).

Figure 5. 11: Sungusungu Hierarchy of Leadership



Traditionally, the *Sungusungu* chief has the divine power to stop calamities in the community by communicating with ancestral spirits. For example, in a situations where public water sources cease to produce water, or if there is a reduction in the flow of water, *Sungusungu*, with instructions from the chief (after consulting with the ancestral spirits), may put traditional medicine into the water source. As they use the medicine, they are supposed to say “we have locked all the bad winds that pushes away water and clouds, and we are asking for water” (*eleloyaga elyaboubi dolilugalaga, dolelomba dopandeki minzei*).

After doing this, the water source should produce more water. But *Sungusungu* members said that they never put traditional medicines in private wells because it was against state law. They said “you may be sent to jail for doing so.” If the chief and *Sungusungu*’s efforts doesn’t solve the problem, then *Sungusungu* may decide to consult witch-doctors for “expert” help. One *Sungusungu* chief said “*it works like a referral hospital, if one hospital cannot treat your disease, then you may be referred to another hospital.*”

Punishments imposed by *Sungusungu* range from fines to ostracism, and to eviction from the village. Offenders, who are brought to *Sungusungu*, plead guilty, and confess their wrong doings, are fined. Those who refuse to confess or pay the fine face ostracism. *Sungusungu* uses ostracism for two major reasons: first to punish the offender and second to make the offender confess and change his or her behavior to conform to customary norms. Once *Sungusungu* decides to ostracize an individual, they have to write a letter to the Village Executive Officer (VEO) to ask for his/her permission. The VEO will then discuss the issue with the village council and decide whether to grant *Sungusungu*’s request. If they approve the decision to ostracize an individual, the *Sungusungu* commanders will blow a gourd-stem whistle (*kalulu*) early in the morning so everyone in the community can hear. Then the Chief Commander will announce the name of the individual to be ostracized. From that moment, all community members are forbidden to interact or cooperate with the offender or his/her family. Those who continue to interact with the offender are reported to *Sungusungu* and they too may become ostracized. As one water-user group member explained in focus group discussion:

A drunken man was seen by one of the villagers urinating by the drinking water source on his way from drinking local beer. The man was reported to Sungusungu. He denied

the charges and refused to pay the fine. The next day the man and his family were ostracized. No one in the village would talk to him, visit his house, or offer any help to him. He was completely isolated. He had to beg for forgiveness and pay the fine.

The story of a drunken man indicates that ostracism is a powerful sanction. I observed that most of people in the Bariadi district depend on mutual service for their livelihood, so it is almost impossible for them to live in isolation. Moreover, ostracism is effective because most of villagers cooperate with *Sungusungu*, a factor that persuades many ostracized individuals to confess and pay their fine. *Sungusungu* group members explained that they try to protect people from false accusation by checking the validity of accusations. This is done through spying and gathering information from different community members who had witnessed the accused breaking the law. As one *Sungusungu* member explained in focus group discussion:

We live in small communities where almost everybody knows each other. In most cases, whatever an individual does, is seen by other people around him or her. Once we receive an accusation about a particular individual, we check to make sure that an individual is not falsely accused of committing an offence. We gather information from witnesses and investigate the case. It is not possible for ten or twenty people in the village to wrongly accuse the same person for the same wrong doing.

A *Sungusungu* commander said in an interview that *Sungusungu* protect the anonymity of people who report the offender, and those who make judgments about the offence. They do so because the offender cannot single out who is the accuser or judge, therefore it is not possible for the accused to revenge or take action against anybody.

Normally, *Sungusungu* use the phrase “the world has seen you” (*obonagwa se*) meaning that “everybody saw you breaking the rule” (without mentioning the name of the accuser). In this way, everyone is protected from revenge.

The members of *Sungusungu* pointed out that the most important thing to them is not the fine paid by offenders, it is the offenders’ personal confession that they have done something wrong. If the offender doesn’t want to confess, but wants to pay the fine, *Sungusungu* will not accept this payment but will ostracize them until they confess. Once the ostracized individual confesses and agrees to pay the fine, the commanders blows the gourd-stem whistle (*kalulu*) again to notify community members that the ostracized individual has now become “a man of peace” (*nsalama*).

Enactment of new laws by *Sungusungu* can occur if there is a new problem that cannot be addressed by existing laws. After *Sungusungu* have proposed a new law, they send it to the Village Executive Officer (VEO) for approval. One VEO said in an interview that it is against state law for the *Sungusungu* to make and implement laws without permission from local government officials.²⁷ After the law is approved by the VEO, *Sungusungu* can call a general village meeting and announce the new law and its penalty.

5.5.2. *Dagashida*

While *Sungusungu* is often referred to as a community army or “the army of ancestors,” *Dagashida* is a local village assembly or “a village parliament.” It is a powerful customary

²⁷ Although *Sungusungu* is legally recognized by the government, most of its activities must be approved by the local the government.

institution that regulates access to and control of natural resources. As a very important and respected village assembly (*Ibanza lya jadi*), it is in charge of enacting and enforcing customary laws including those addressing environmental protection, adultery, gossip, and behavioral norms. The following is a list of some of *Dagashida*'s responsibilities as explained by *Dagashida* members in focus group discussions:

1. Mobilizing development activities in the villages, such as digging wells and cleaning up dams;
2. Supervising environmental protection activities such as planting trees;
3. Working with *Sungusungu* to provide security in the village;
4. Punishing those who go against traditional norms;
5. Solving different types of conflicts e.g. marriage, water, land, etc.
6. Enacting and enforcing customary laws.

One *Dagashida* chairman said in an interview that *Dagashida* is open to all men in the village. As with *Sungusungu*, women are not allowed to join *Dagashida*. *Dagashida*'s hierarchy of authority is organized according to the age-set of village men (Figure 5.12). The *Gedabouka*, is held by the oldest man, 80 years and older. He is regarded as a man of wisdom because he has lots of experience. The *Gedabouka* does not always attend *Dagashida* meeting because of his age, but he is consulted for advice by other members of *Dagashida* whenever there is a problem or issue they can't resolve. The advice given by the *Gedabouka* is taken to be the right one and is always followed. The chairman (*Nyangogo*), is usually between the ages of 70 to 80 years.²⁸

²⁸ This is approximate ages of members of each age-set as reported by *Dagashida* members. The average age in each age-set depends on the availability of people in that particular age set. In some cases, one age set may need to get members from a lower age set.

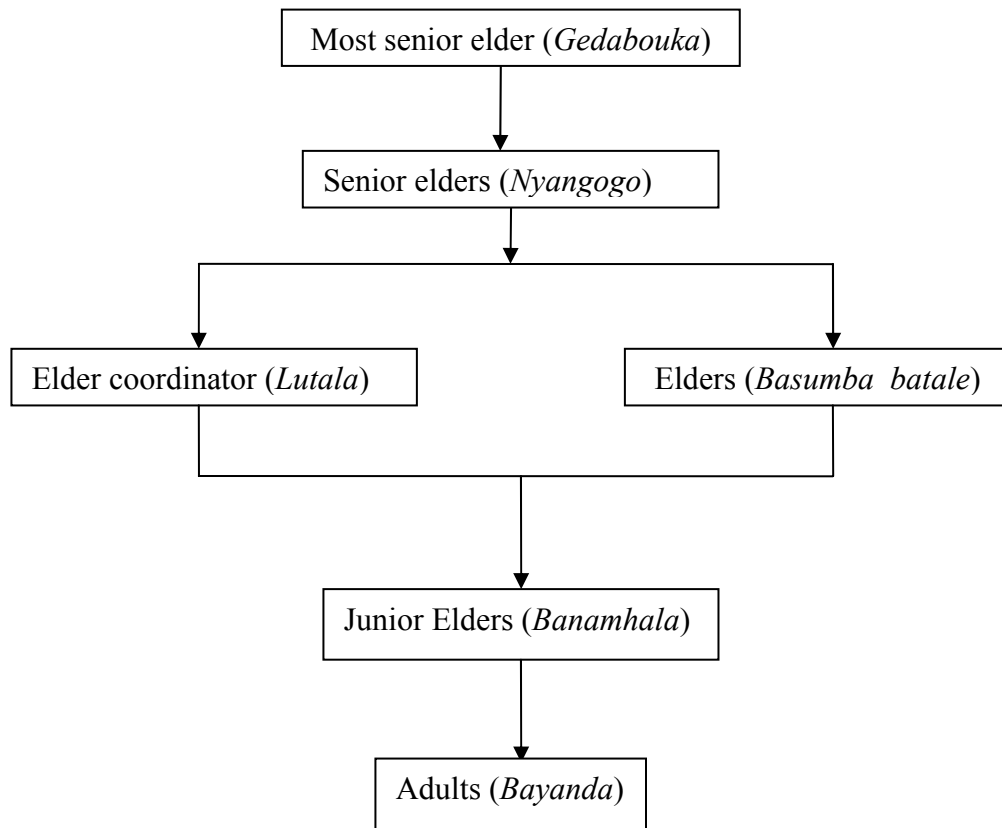
His primary function is to make democratic decisions, chair *Dagashida* meetings and supervise all *Dagashida* activities in the village.

The position of *Basumba batale* and *Lutala* are held by men ranging from 60 to 70 years old. The *Lutala* is chosen from *Basumba batale*, and he is a facilitator during *Dagashida* meetings. He starts the meeting by announcing the agenda to *Dagashida* members. Then discussion starts where each member is free to contribute to discussions so long as he follows the rules. The *Lutala* makes sure that meeting rules are followed by all the members. For example, every member is required to focus on the subject of the meeting for that day, and deviations from the subjects are not allowed. *Basumba batale* are regarded as the police of the whole group. They are the one who read cases and work with the *Lutala* to make sure that the meeting goes on smoothly and everyone has a chance to contribute. They take lead in the implementation of *Dagashida* resolutions and decisions. The group of junior elders (*Banamhala*) range in age from 50 to 60 years old. Junior elders act as consultants on what and when to meet, and they give directions to the youngest age-set, adult (*Bayanda*) with ages ranging from 18 to 50 years old. The youngest age set implements *Dagashida* resolutions and enforces customary laws because they are younger and energetic.

Dagashida meetings are normally conducted in an open area or in a partially enclosed area. The village elder or chief calls the *Dagashida* meeting (Mlinge 2002). Members of *Dagashida* said that all male village members are allowed to attend and discuss important village affairs. Everyone is allowed to speak and give his views before a final decision is made by the senior elder based on the views of the majority. This is an opportunity for villagers to express their views and formulate rules for managing their water resource such as banning people from

doing laundry by the boreholes. During a time of water scarcity, communities reinvigorate rules that regulate the amount of water collected and people are not allowed to use the water for their gardens.

Figure 5. 12: *Dagashida* Hierarchy of Leadership



Decision making within *Dagashida* starts with the youngest age-set (*Bayanda*) who discuss an issue until they reach a consensus about what to do and give their joint recommendation to junior elders. Junior elders then discuss the issue and pass their recommendation to the upper age-set. The same procedure continues to elders. Then the elder coordinator will pass the issue to senior elders to who will analyze the different views and

recommendations from different age sets and give their final conclusion based on the view of the majority. If the decision is about a new law, then the elders (*Basumba batale*) are responsible for informing villagers about the new law. They can do so through a village meeting where all villagers are required to attend, or they can blow a gourd-stem whistle (*kalulu*) early in the morning so everyone in the village can hear about the new law.

Villagers said that most people in the community cooperate with their elders to monitor those who break the rules. The *Dagashida* is also responsible for enforcing customary laws and ruling the cases for offenders. Moreover, the *Dagashida* plays a crucial role in organizing communal work for water management. One example is cleaning of the water source, an obligation for all the water users. Each user is expected to take help clean once or several times a year, depending on the number of users per water source. Those who don't take part are fined. In some villages, the village council appoints a person to look after peoples' behavior at the water source and report any wrong doing (Drangert 1993).

Dagashida members said in focus group discussions that they have enacted a number of laws to protect the environment. For example, *Dagashida* forbids people from cutting down trees near water sources, prohibits agricultural activities close to sources of water, and prohibits burning. Offenders pay a fine of one cow for breaking these rules. *Dagashida* allocates specific areas to be used for grazing and watering livestock.

Laws for managing common water sources are made by both *Sungusungu* and *Dagashida*. These laws ban people from bathing or washing clothes by a water source, having sexual activities near water sources, or send the livestock to drink water in the water source used for home consumption (Dungumaro and Madulu 2002). These laws are closely monitored. Violations are regarded as serious offences that are severely punished by a beating or a fine. In

the dry season, when water is scarce, communities practice water rationing for each household. *Dagashida* make the decisions regarding water management rules and then the villagers or the owners of private wells are in charged with monitoring the water source and making sure that the applicable rules are followed. *Dagashida* may restrict the hours when drawing water from common sources is permitted. The rules for managing private water sources are made by private water owners. But these rules are supposed to be in line with customary laws. Private well owners report people to customary institutions for punishment if they fail to follow their rules.

5.5.3. Clan (*Bakaya*)

In *Sukumaland*, as in many other regions in Tanzania, the clan is made up of members of extended family, including cousins, aunts, uncles, sisters, brothers, grandparents and in-laws. Each clan (*bakaya*) is responsible for ensuring that its members follow the customs. This is because an individual's non-compliance with customary laws may affect the whole family or clan. For example, if an individual is fined a cow for his wrong doings in the community, it means the individual uses the family's wealth to pay the fine. If an individual is ostracized, the whole household is also ostracized. Therefore, each clan has devised ways to punish those who bring 'bad luck' or embarrassment to the clan. In addition to customary laws, the clan set their own laws that are specific to the needs of the clan.

A clan meeting is led by clan elders who are in charge of all matters affecting the clan. Clan elders are normally the oldest members of the clan. If they call a meeting, each member of the clan is supposed to attend. Those who fail to attend without permission are fined. Clan members work together to resolve disputes that arise in the clan. They also share different life experiences, and work together to enforce customary laws. Wrong doers are punished at the clan

meeting. During the meeting, clan elders will stand up, say the names of the offending member, and explain their case (Figure 5.13 and 5.14). The rest of the clan members decide the appropriate punishment to give. The common forms of punishment include fines (money, cow, or goat), strokes,²⁹ or ostracism.

The decision about the kind of punishment to be given depends on the type of offence, the age of the offender, whether it is a repeated offence, and whether an offender confesses his or her wrong doings. Younger offenders who don't have the means to pay fines normally get strokes. Repeat offenders get both strokes and fines. Strokes are administered by strong men chosen by clan elders. These men are supposed to give very strong strokes because every one will be watching to see whether they are being sympathetic by not beating offenders hard. If the beaters are too sympathetic and not beating hard enough, clan elders may order other men in the clan to "teach the beaters" how to beat by beating them first. Figure 5.15 and 5.16 shows wrong doers being publicly beaten at the clan meeting in front of other clan members. Offenders who deny the charges or decline the punishment are ostracized by the clan. They will not be allowed to visit, or seek help from other clan members. An ostracized individual will be excluded from the clan until he or she pays a heavy fine and apologizes to the clan. But ostracism from the clan does not mean ostracism from the community. An individual who is ostracized by the clan is still free to interact with non-clan members.

²⁹ Strokes in this context refer to beating with a cane.

Figure 5. 13: A clan elder presiding at the clan meeting



Figure 5. 14: A clan elder confronting wrong doers



Figure 5. 15: A clan meeting discussing cases of wrong doers. The two wrong doers are lying down on the floor when their cases are being discussed by the clan.



Figure 5. 16: Wrong doers punished (receiving strokes) at the clan meeting



Unlike *Sungusungu* and *Dagashida*, *Bakaya* allow women to attend clan meeting and participate in clan activities. However, most of the decisions in the clan meetings are made by men. In most cases, women sit and listen while men speak and confront offenders. This was also observed by Agarwal (2001), who found that women in India hesitate to oppose males in public, or speak up in meetings especially when senior family males are present.

Although ostracism is widely used by customary institutions, it is worth noting some of its shortcomings. Ostracizing an individual hurts not just the outcast, but also his or her family, and other community members who interact with him or her. The fact that people live together in community and are dependent on each other, indicate some advantage to grouping, which would be reduced by ostracizing a community member. Community members gain from each other through social interaction, networking and mutual support externalities, trade, as well as productive technology (Hirshleifer and Rasmusen 1989). Moreover, research on ostracism has found significant emotional distress among ostracized individuals (Williams et al. 2000). Those who are excluded from social groups might experience anxiety, or other forms of emotional distress that could cause a short-term impairment of cognitive functioning (Baumeister et al. 2002). This research observed that ostracism has been very effective to enforce desired social behavior. The advantages of using ostracism compensate for its weaknesses explained above. Moreover, this research observed that although *Dagashida*, *Sungusungu* and *Bakaya* are separate institutions, they are interconnected, and complement each other. As explained earlier, *Dagashida* is made up of all men in the village while *Sungusungu* is made up of only a few men in the village. Likewise *Bakaya* is made up of clan members whose men may be in the *Sungusungu* and *Dagashida*. Members of *Sungusungu* are also members of *Dagashida*. *Sungusungu* is more into security, policing, patrolling, and guarding to make sure community

members are safe, and customary laws are followed. *Dagashida* is more into monitoring and enforcing expected cultural patterns of behavior. *Bakaya* is more focused on issues within the clan only as opposed to *Sungusungu* and *Dagashida* which are focused on issues in the whole community. The three institutions have one goal in common: ensuring customary laws are followed by all community members.

CHAPTER SIX

6. WATER MANAGEMENT INSTITUTIONS: COMPLIANCE AND ROLE IN WATER ACCESS AND MANAGEMENT

6.1. Introduction

The water management laws found in Bariadi district can be divided into three main categories: equitable water access laws, prevention of water pollution and abuse laws, and water source development laws. This chapter discusses each category of water management laws in detail, and presents some statistics about enactment, awareness, compliance with water management laws, and the role of statutory and customary institution in water access for different types of water use. As discussed in chapter five, laws for managing water resources in Bariadi district can be enacted by customary institutions, statutory institutions, and water-user groups. Each of these institutions is likely to have strong orientation to some types of laws which will be interesting to analyze.

6. 2. Equitable Water Access Laws

According to Fisher (1989), the concept of equity involves getting a “fair share,” not necessarily an “equal share.” What is regarded as a “fair share” varies according to different situations (and different cultures). This definition has two implications. First, the concept of equity in resource access entails differences in the benefits received from the resources by different groups of people. This difference can be due to differences in people’s contribution and efforts in the development and management of the resource. If the distribution of benefits from the resource is perceived to be “fair,” then it may be regarded as equitable access. Second, this

definition suggests that measuring equity should incorporate the society's customs, norms, and values. However, some values, customs, and norms tend to discriminate against some groups in the society. Therefore, although this research will draw on this definition, it will depart from it in different ways as explained below.

In this research, equitable water access refers to fair and just water access among the population. Equitable water access is achieved when there is non-discriminatory access to water for all, though water users assume certain responsibility as a condition of use. Through equitable water access, community members are not restricted to access water on the basis of gender, race, ethnicity, or socio-economic status. Important to the issue of equity in resource allocation is the representation of marginal groups in resource management and access, as well as opportunities for these groups to actually influence decision making (Agarwal 2001; Sarin 1998). This research found that both customary and statutory institutions are concerned with the need of every community member to have access to water. In the case of developed water sources, water-user groups reported that each member who participated in the development of the water sources was entitled to an equal share of the benefits from the water source.

6. 2.1. Equitable Access to Domestic Water

Developed water sources managed by water-user groups allow every member of water-user group to have access to water. Each member of water-user groups is required to pay a one-time membership fee, plus an annual maintenance fee. The amount of membership and annual fees varies from one water-user groups to another, depending on the number of households in the water-user group and the maintenance needs of the water source. The average membership fee is 5,000 Tanzania shillings (about US\$5) and the annual maintenance fee is about Tanzania

shillings 200(US\$ 0.2) per household. These fees are deposited in a bank account and the money is used for repairing the water pump and treating the water whenever need arises. In some instances, households are required to contribute additional money if a major repair is needed and the money in the bank account is insufficient.

The only local government by-law related to the equitable access of water require members of water-user groups to grant access to water for marginalized individuals who live close to the well. Punishment for those who don't follow this rule is up to 5,000 Tanzania shillings (US\$5), or up to six months of jail time or both. Many water-user groups reported granting "free" access to household that are the poorest, disabled, and elderly who cant afford the membership and annual fee, or non-financial contributions to the water-user group. Likewise, customary law provides for those who are unable to participate in the development of water sources because of age, disability, or sicknesses. Individuals like these are put through a critical scrutiny before they are granted free access to developed water sources. The water-user group will call a meeting and discuss whether an individual qualifies for free water or not. In some situations, those who are unable to give financial contributions because of severe poverty are asked to give contributions in kind, such as sweeping the area by the water source.³⁰

In the dry season, there is a significant reduction in water flow from most of the wells. At this time of the year, water-user groups can decide that each household will receive an equal number of buckets³¹ regardless of the household size, status, gender, or income. The water guard on duty is charged with ensuring that every household gets water. Those who have bigger

³⁰ This is consistent with Thoms et al. (2003) who observed that successful resource management requires the capacity for effective exclusion, otherwise a resource can become open access with little or no control on rates of resource extraction.

³¹ A bucket is a twenty liter container.

household size are advised to join more than one water-user group. The number of buckets depends on the amount of water a well can produce each day and the number of households in that water-user group.

In focus group discussions, water-user group members said that during severe water shortages, the average number of buckets entitled to each household in dry season ranged from two to five buckets per household, equivalent to 40 to 100 liters per day per household. One of the drawbacks of the equal distribution of domestic water is large household get equal share with those with small household size. On the other hand, having an equal amount of water for every household ensures that every one will reap the fruits of their labor regardless of gender, income, household size or status because they all contribute equally in terms of financial contribution, time, and energy. They all dug the well, they all pay the same amount of membership and maintenance fee, and they all work together to manage their water sources. So they are all entitled to equal share of the benefits.

Moreover, everyone is required to stand in queue and wait for their turn to draw water or water their livestock if the water source is public. Standing in queue creates order and prevents a scramble for water, which may lead to spilling. Figure 6.1 shows women and girls standing in queue waiting for other members of water-user group to come so they can distribute water equally among member households. I observed women queue their buckets at the well depending on who came first. Discussion with water-user groups, customary institutions, local government officials, ministry of water officials, and village elders revealed that laws made by water-user groups are also customary laws, because water-user groups use their customs and norms to enact their laws. These laws are also consistent with customary laws enacted by customary institutions.

Figure 6. 1: Women standing in queue waiting for other members of water-user group to come so they can distribute water equally



Table 6.1 reports equitable water access laws that are specific for domestic water use obtained from the household survey. The table shows that customary laws related to equitable water access are mainly for natural and undeveloped sources of water. This research expected to find this because the development of water sources came after natural water sources. Key informants reported that most water sources were developed after independence in 1961. Before that, most people relied on natural water sources for their water needs. The increase of human and livestock population pressure stressed natural water sources, a factor that necessitated community members developing water sources.

Table 6. 1: Equitable Access to Domestic Water Laws

Regulations	Who enacted regulation (percent)		
	Statutory institutions	Customary institutions	Water-user groups
Every member of water-user group has access to water. Non-members are excluded	0.0	25.1	74.9
Every one need to stand in queue and wait for their turn to draw water	0.0	35.8	64.2
Equal number of 20 liter buckets for each household	0.0	17.0	83.0
Equal access to natural water sources for all community members	0.0	90.7	9.3
Household that are so poor, sick or old and can't afford money contribution to water-user group are granted free water access by the water-user group	0.0	92.0	8.0
Equal access to private water source as long as you ask for permission from well owner	0.0	100.0	0.0

In an interview with a district water engineer, he said that the establishment of water-user groups and the development of shallow wells by water-user groups in Bariadi district started in the 1990's. Before that, community members relied on a few shallow wells that were developed by the central government after independence. In focus groups, women said that most of these shallow wells were not properly managed and maintained, so most of them ceased to work. Local government officials explained that after independence, the government was responsible for developing and managing water resources in the country. But due to the Structural Adjustment Programs (SAPs) of 1980s, the government was forced to reduce its expenditure on water infrastructure. At the same time, community members continued thinking that provision of water was the responsibility of the central government. Hence most shallow wells ceased to work because of lack of proper maintenance and money to manage them. Moreover, table 6.1 shows that most laws are enacted by customary institutions and water-user groups. Respondents were

not aware of any equitable domestic water access law enacted by statutory institutions.

Six major equitable water access laws for domestic water uses were identified from household survey as shown in table 6.1. First, is the law that requires water-user group members to have equal access to water. About 25 percent of respondents said this law was enacted by customary institutions, and 75 percent said the law was enacted by water-user groups. Second, is the law that requires every one to stand in queue and wait for their turn to draw water. About 36 percent of respondents said this law was enacted by customary institutions, and 64 percent said the law was enacted by water-user groups. Third, is the law that requires each household to extract equal number buckets per day. About 17 percent of respondents said this law was enacted by customary institutions, and 83 percent said the law was enacted by water-user groups. This was expected because discussion with water-user groups revealed that they make most of laws about how water is distributed. Fourth, is the law that allows community members equal access to natural water sources like rivers, springs, and ponds. The majority of respondents (90.7 percent) said this law was enacted by customary institutions, and only 9.3 percent said the law was enacted by water-user groups. This result is consistent with information from focus group discussion, participant observations, and key informants. Fifth, is the law that requires water-user groups to grant “free” water access to households that are very poor, sick, or old, and can’t afford financial contribution to water-user groups. The majority of respondents (92 percent) said this law was enacted by customary institutions. Only 8 percent said the law was enacted by water-user groups. Discussion with local government officials, district water engineers, and secondary data about by-laws obtained from the district water offices shows that this law was also enacted by the local government to ensure that every community member have access to safe drinking water. However, this research observed that this by-law exist on paper only because none of the

respondents said that this law was enacted by the local government as table 6.1 shows. Local government officials acknowledged that it is hard for them to create awareness and enforce most of the by-laws they enact because of lack of financial and human resources.

Six, is the law that require private well- owners to share their water with other community members, if community members ask for permission. All the respondents said that this law was enacted by customary institutions. This research expected to find this because similar information was revealed from focus groups discussions, key informant interviews, and participant observations. Also during field work, I was able to draw water occasionally from a private well owned by one of my church members. I asked for permission, and the well owner allowed me to draw two buckets because the well didn't produce much water. Details on why private well owners were expected to share their water were provided in chapter five.

This result implies customary institutions are strong in laws related to water access from natural sources, while water-user groups are strong on ensuring equitable access to water from developed sources. The result also shows that local government has weak laws relating to the equitable water allocation in rural areas. Access to private water sources for domestic use is mediated by customary law where private well owners are expected to share their water to community members, and where community members are also required to ask for permission before drawing water.

6.2.1.1. Quantity of Drinking Water Extracted by Households

Access to safe water for domestic use (both quality and quantity) is essential for human health. This section investigates how different groups of people obtain access to water in dry season.

These groups include female versus males, irrigators versus non irrigators, livestock keepers versus non-livestock keepers, those with main house roofed with corrugated iron sheets versus those without, and those who own farm land versus those who don't. Access to water was measured by the quantity and quality of water extracted by each group in dry season. This section deals with the quantity of water. The quality of water is analyzed in section 6.1.1.2.

Rural communities in Bariadi district often struggle to gain access to water for domestic use in dry season because there is a reduction of water flow in most of water sources. Table 6.2 presents data from household survey which shows the quantity of water extracted in the dry season for domestic use per day, from all water sources, and by different groups of people. The table indicates that customary institutions have been successful in allocating water among different groups of people. Access to domestic water among households is fairly equal.

The majority of households in all categories extract 6 to 10 buckets of water per day in the dry season. This includes male-headed households (42.2 percent) and female-headed households (44.7 percent), those who irrigate (46.1 percent) and those who don't (42.9 percent), those who own land (43 percent) and those who don't own land (44.8 percent), livestock keepers (47.5 percent) and non-livestock keepers (38.6 percent), those with corrugated iron sheets on their main house (46 percent) and those without (36 percent). In all the above categories, fewer households extract more than 15 buckets per day.

Table 6. 2: Quantity of Water Extracted in the Dry Season for Domestic Use per Day from All Water Sources by Different Groups of People

Characteristics	Number of buckets extracted per household per day in the dry season (percentages)						Total
	2 -5	6 -10	11 -15	16 -20	21 - 25	26 -30	
Gender							
Males	38.4	42.2	15.2	0.0	2.1	2.1	100.0
Females	26.5	44.7	20.2	2.3	3.7	3.0	100.0
Total	29.3	44.0	18.8	1.7	3.3	2.8	100.0
Do you irrigate?							
No	34.2	42.9	15.1	2.3	2.3	3.1	100.0
Yes	17.6	46.1	28.5	0.0	5.9	1.9	100.0
Total	29.4	43.8	18.9	1.7	3.4	2.8	100.0
Do you own farm land?							
No	50.0	44.8	5.2	0.0	0.0	0.0	100.0
Yes	29.7	43.4	18.4	2.1	3.4	3.0	100.0
Total	31.3	43.5	17.4	1.9	3.2	2.7	100.0
Do you own livestock?							
No	54.2	38.6	6.3	1.0	0.0	0.0	100.0
Yes	17.2	47.5	24.6	1.6	4.9	4.0	100.0
Total	33.5	43.5	16.5	1.4	2.8	2.3	100.0
Type of roof for the main house							
Grass or earth	46.6	36.2	12.1	1.7	1.7	1.7	100.0
Corrugated iron sheets	28.8	46.3	18.1	1.25	3.1	2.5	100.0
Total	33.5	43.6	16.5	1.48	2.8	2.3	100.0

6.2.1.2. Quality of Drinking Water Extracted by Households

The lack of safe drinking water poses a health risk to all societies. Many people in Tanzania have little water to use especially in the dry season and some use contaminated water. This contributes a lot to the increase in water-borne diseases.

It is estimated that 15 million out of 34.5 million Tanzanians currently lack access to safe drinking water (Malangalila 2003). Likewise, access of safe drinking water supply in the Bariadi district is still a major problem. For example, figure 6.2 and 6.3 shows women drawing water from polluted springs. One woman said in an interview that sometimes people are forced to use unsafe water for drinking because safe drinking water sources do not produce enough water in dry season. This section analyzes the quality of water accessed by rural households in Bariadi district. The quality of water was determined by collecting data on the incidence of water-borne diseases in the community at each sampled household. The secondary data obtained from the regional water office (Shinyanga region) shows that only 50.6 percent of the total population of Bariadi district has access to safe drinking water supply (Table 6.3).

Table 6. 3: Safe Drinking Water Supply Coverage in Bariadi District

Bariadi district	Population	Population served with water	Percent coverage
Rural	576,810	295,784	51.3
Urban	28,599	10,500	36.7
Total	605,409	306,284	50.6

Source: Shinyanga Regional Water Office 2005.

This research was conducted during the dry season when some safe drinking water sources supplied less supply due to reduction of water flow. I observed people waiting for hours at the shallow wells and springs just to extract one bucket of water. This forces many people to use unsafe water, or use less water than needed for sanitation. The household survey conducted by this research indicates that that 6 percent of all adult members of sampled households (15 years and above) have suffered from water-borne disease, such as cholera, diarrhea, and typhoid

during the previous three months. About 10 percent of other family members in the sampled households have suffered from water borne disease during the previous three months.

Figure 6. 2: A woman drawing water from a spring



Figure 6. 3: A woman drawing water from a spring



Thus, efforts also need to be directed at developing water supply in rural areas where people have less access to water. Efforts to develop more shallow wells, deep wells and boreholes to tap underground water are a pragmatic strategy that is likely to increase the availability of safe water in Bariadi district. To achieve this grand task, the government needs to have more effective governance processes, improved capacity and adequate financing (Malangalila 2003). Additionally, greater attention to the rural water supply is needed. Rural development policies should focus on reducing poverty and improving access to safe drinking water. At the village level, support for water-user groups and customary institutions can contribute to water security.

6.2.2. Equitable Access to Livestock Water

In focus group discussions villagers said that every community member has the right to use natural water sources for irrigation and livestock watering. If an individual or group develops the water source, then they will have the right to exclude others who did not participate in its development. But, the principle of reciprocity among the *Sukuma* forces private well owners to share water with their neighbors and relatives. Access to water for livestock is regulated either by customary institutions, or by rules made by livestock keepers. Table 6.4 shows that equal access to natural water sources is granted to all community members. About 69 percent of respondents reported that the laws were enacted by customary institutions and 31 percent by livestock keepers themselves. Respect for each livestock keeper is another important aspect of livestock watering, especially in the dry season when water supplies are limited. Livestock keepers are required to queue their animals and take turns watering them. This reduces the incidence of fighting among animals and mixing up of animals. Also about 77 percent of respondents reported that the laws regarding queuing were enacted by customary institutions, and 23 percent

by livestock keepers themselves. As is the case with domestic water use, access to private water sources for livestock watering is mediated by customary law where private well owners are expected to share their water with other livestock keepers so long as they ask for permission from well owners. The weakness of statutory law for livestock water allocation is seen here because no one was aware of them. This was also revealed through discussion with livestock keepers who reported that access and management of water for livestock watering is regulated by customary laws and rules made by livestock keepers themselves. Moreover, discussion with village executive officers revealed that villagers observe customary laws.

Table 6. 4: Equitable Access to Livestock Water Laws

Regulations	Who enacted regulation (percent)		
	Statutory institutions	Customary institutions	Water users
Every community member have equal access to natural water sources for animal watering	0.0	69.0	31.0
Livestock keepers need to queue their animals and take turns to water them	0.0	77.0	23.0
Equal access to private water source as long as you ask for permission from well owner	0.0	100.0	0.0

6.2.3. Equitable Access to Irrigation Water

Irrigation in the Bariadi district is mainly a small-scale traditional system. Surface irrigation is a predominant type of irrigation where the majority of irrigators use flood irrigation or rainwater harvesting especially for paddy rice. Rainwater harvesting is defined as methods of collecting, storing, and conserving rainwater and local surface runoff for agriculture or domestic use (Boers and Ben-Asher 1982; Kunze 2000). This research observed that a few small-scale irrigators use river diversion, and some use mechanized/treadle pumps that can pump water from a depth of eight meters (Figure 6.4). I also observed that the majority of small-scale irrigators

who grow fruits and vegetables use hand-lifted buckets as shown in (Figure 6.5) because mechanized pumps are expensive.

**Figure 6. 4: The author standing by a mechanized pump used to irrigate corn.
Water is pumped from a well by pedaling the pump.**



Figure 6. 5: Irrigation by the use of hand-lifted buckets



As is the case for all natural water sources, natural sources of irrigation water are free for everyone. In focus group discussions with irrigators, they said that rain water that falls on one's paddy belongs to the owner of that paddy, and other people are not allowed or "steal" water from one's own paddy. Rain water is supposed to flow naturally to the paddy, no one is allowed to block or re-direct the flow of water. Those whose paddy is located away from flowing water are required to seek permission from upstream paddy owners before they can redirect the flow of rain water. Household survey data in Table 6.5 shows that all the laws for equitable access to irrigation water were enacted by customary institutions. Those who have private shallow wells for irrigation have the exclusive right to the water. This indicates the strength of customary institutions in the management of irrigation water. Statutory laws may exist on paper, but local community members are not aware of them.

Table 6. 5: Equitable Access to Irrigation Water Laws

Regulations	Who enacted regulation (percent)	
	Statutory institutions	Customary institutions
Every community member have equal access to natural water sources used for irrigation	0.0	100.0
Rain water that enters in ones paddy belongs to the owner of that paddy, don't steal	0.0	100.0
Not to block the natural flow of water to other peoples paddy	0.0	100.0
Equal access to private water source as long as you ask for permission from well owner	0.0	100.0

6.2.4. Compliance with Equitable Water Access Laws

Table 6.6, 6.7, and 6.8 uses data from household survey to report the compliance with equitable water access laws for domestic, livestock and irrigation water respectively. Compliance with customary and water-user groups laws is high in all three water uses because respondents reported that the majority or all community members complied with these laws. This research observed through participant observation and photographing that most people comply with these laws. It is difficult for people not to comply because most shallow wells have a guard, and also community members watch each other.

I also observed that people knew that they were supposed to queue and wait until every member of water-user group come so they can distribute water equally. This suggests that when community members participate to enact the law, they are more likely to comply as observed by Ostrom (1990). The difference in the level of compliance between customary laws and those enacted by water-user groups is not significant. This suggests that water-user groups and customary laws are effective in ensuring equitable water access to community members. The results also show that water-user groups are prominent in the management of domestic water. They have a limited role in managing irrigation water as shown in table 6.8.

Table 6. 6: Compliance with Equitable Access to Domestic Water Laws

Water access law and legislature	Level of compliance (percent comply)			
	None	Some	Majority	All
Only members of water-user groups have access to water				
Customary institutions	0.0	0.0	0.0	100.0
Water-user groups	0.0	0.0	9.1	90.9
Every one needs to stand in the queue and wait for their turn to draw water				
Customary institutions	0.0	2.9	60.0	37.1
Water- user groups	0.0	0.0	60.7	39.3
Equal access to natural water sources for all community members				
Customary institutions	0.0	0.0	3.1	96.9
Water-user groups	0.0	0.0	0.0	100.0
Equal number of 20 liter buckets for each household				
Customary institutions	0.0	0.0	12.5	87.5
Water- user groups	0.0	9.4	15.1	75.5
Household that are so poor, sick or old and cant afford money contribution to water-user group should be granted free water access				
Customary institutions	0.0	0.0	0.0	100.0
Water-user groups	0.0	0.0	25.0	75.0

Table 6. 7: Compliance with Equitable Access to Livestock Water Laws

Water access law and legislature	Level of compliance (percent comply)			
	None	Some	Majority	All
Livestock keepers need to queue their animals and take turns to water them				
Customary institutions	0.0	18.2	60.0	24.9
Water-user groups	0.0	0.0	49.5	50.5
Every community member have equal access to natural water sources for animal watering				
Customary institutions	0.0	0.0	0.0	100.0
Water-user groups	0.0	0.0	0.0	100.0

Table 6. 8: Compliance with Equitable Access to Irrigation Water Laws

Water access law and legislature	Level of compliance (percent comply)			
	None	Some	Majority	All
Every community member has equal access to natural water sources used for irrigation Customary institutions	0.0	0.0	7.9	92.1
Rain water that enters in one's paddy belongs to the owner of that paddy, don't steal it Customary institutions	0.0	0.0	93.9	6.1
Not to block the natural flow of water to other peoples paddy farms Customary institutions	0.0	0.0	100.0	0.0

6.3. Prevention of Water Pollution and Abuse Laws

Water pollution refers to the degradation of water quality or its contamination by harmful wastes. The degradation of water has a big impact on public health. The causes of water pollution can be both direct and indirect. Direct water pollution occurs when people dump effluent into water sources. This includes effluent outfalls from factories, refineries, waste treatment plants, and domestic wastes that are dumped directly into water sources. Indirect water pollution occurs when waste from soils or groundwater systems and from the atmosphere (via rain water) finds its way into water sources. Soil and groundwater may be contaminated by agricultural practices (fertilizers, pesticides and herbicides), or by sewage and industrial waste. Emissions from automobiles or factories can also cause water contamination (Ng 1989). On the other hand, water abuse refers to the unlawful or wrongful use of water. Water abuse may

include unnecessary spilling of water, or the improper use of water, such as watering livestock at a drinking water source.

6.3.1. Prevention of Domestic Water Pollution and Abuse Laws

To prevent pollution, each person is required to remove their shoes at the entrance of the water source, which is always surrounded by a live fence (*linala*) with an entrance (Figure 6.6). Shoes are believed to be dirty because people may step on things that may contaminate the water. Although there are some few people in Bariadi who don't have shoes, people believe that bare feet are cleaner than shoes because people who walk bare footed clean their feet if they happen to step on a dirty substance. Table 6.9 shows that about 57 percent of households reported this law was enacted by water-user groups and 42 percent reported the law was enacted by customary institutions. No household reported that the law was enacted by statutory institutions. But, discussion with district water engineers, and secondary data obtained from the district water office shows that this is one of the local government by-laws. This shows that the local government by-laws are not well known by rural people. This is the same case for the other laws related to prevention of domestic water pollution and abuse reported in table 6.9.

Table 6. 9: Prevention of Domestic Water Pollution and Abuse

Regulations	Who enacted regulation (percent)		
	Statutory institutions	Customary institutions	Water-user groups
No shoes at the water source	0.0	42.9	57.1
No washing or bathing at the water source	0.0	32.4	67.6
No animal grazing or watering around the water source	0.0	23.5	76.5
No children less than 10 years at the water source	0.0	9.7	90.3

To avoid pump damage and pollution at the water source, no children under ten years of age are allowed at the water source, unless accompanied by adults. Data from the household survey, participant observation, and water-user groups shows that the water pump is too high for children. Children may also play, fight, spill water, or urinate or defecate at the water source. In the household survey, respondents explained that while this law helps to extend the life of the water pump, it has some drawbacks:

“Children will grow up lazy without knowing how to fetch water, it is bad for girls”

“It is a burden to women who need the help from children”

“It reduces household labor to fetch water and affects household sanitation”

“If you are sick, you have to ask a neighbor to accompany your children to the well”

This is consistent with information obtained from focus group discussion with women. Women said that this law has put more work on them. They have to either have to find an adult to accompany their children to the water sources, go with their children to draw water, or draw water by themselves. Table 6.9 shows that about a third of respondents reported the existence of this law. The majority (90 percent) reported that the law was enacted by water-user group members, and only 10 percent reported that the law was enacted by a customary institution. No respondent reported that the law was enacted by statutory institutions.

Animal watering, washing or bathing at the water source is also prohibited. Animal watering is supposed to be done at rivers (figure 6.7), ponds, dams, or private wells. This law aims at preventing the pollution of water by livestock faeces and the potential damage that can be done to water pumps and live fences by animals.

Likewise, washing and bathing at the water source is prohibited because it attracts flies, and soapy water can kill the live fences surrounding the water source. In the household survey, respondents reported that this law had some disadvantages:

“It is tiresome to fetch water that will be enough for washing clothes at home, some people live far from water source;”

“You waste a lot of time and energy to fetch water for washing clothes at home because you need a lot of water;”

“Large families find it difficult to get enough water for everyone to shower at home and get enough water for washing clothes.”

In focus group discussions, women said that they have to draw water and wash at home, a factor that increases their work. But, women agree that their huge burden for domestic water supply is less important than water pollution issues. They said it is worth for them to work more and provide clean water for their families, than to work less and get unclean water that may cause diseases and even deaths to their children. As in the case for other laws, data from the household survey in table 6.9 shows that laws related to water pollution and abuse were enacted predominantly by water-user groups who manage group-developed water sources. Customary institutions have also enacted laws prohibiting washing, bathing and watering animals at wells for drinking.

Figure 6. 6: No shoes are allowed at the drinking water source.

Everyone have to remove their shoes when entering the water source area



Figure 6. 7: Cattle drinking water in a river



6.3.2. Prevention of Livestock Water Pollution and Abuse Laws

Household survey data in table 6.10 shows that most of the laws adopted to prevent pollution and abuse of livestock water sources were enacted by customary institutions.

Discussion with livestock keepers revealed that the major sources for livestock water are public water sources, which are regulated by customary institutions. Other sources such as private wells are mainly used during the dry season when water from public sources is not enough. Data from the household survey shows that customary laws prohibit dumping trash, bathing, or washing clothes, urinating, and defecating by the water source. All these activities could contaminate the water and affect the health of livestock. Table 6.10 shows that respondents were not aware of any regulation from statutory institutions.

Table 6. 10: Prevention of Livestock Water Pollution and Abuse Laws

Regulations	Who enacted regulation (percent)		
	Statutory institutions	Customary institutions	Water users
Don't urinate or defecate by the water source	0.0	92.0	8.0
No dumping trash at the animal drinking water source	0.0	100.0	0.0
No bathing or washing at the animal water source	0.0	43.0	57.0

6.3.3. Prevention of Irrigation Water Pollution and Abuse Laws

Data from the household survey show that most irrigators in the Bariadi district (72 percent) are rice growers who use rainwater. The remaining 28 percent use water from rivers, ponds and shallow wells. Those who use rain water reported that there is no any law to prevent the pollution of rainwater. Data from household survey on table 6.11 shows that irrigators who

use water from surface or underground water reported two laws to prevent the pollution and abuse of irrigation water. First, customary laws require up-stream irrigators not to use chemicals because the chemicals may be washed downstream and affect other water users. The second law prohibits people from dumping trash in the water because it will pollute the water used to irrigate fruits and vegetables, which may affect the health of people who eat them. These laws were enacted by customary institutions. No respondent was aware of statutory law for prevention of pollution and abuse of irrigation water sources.

Table 6. 11: Prevention of Irrigation Water Pollution and Abuse Laws

Regulations	Statutory institutions	Customary institutions
No chemicals fertilizers, herbicides or pesticides in upstream lands	0.0	100.0
No dumping at the water source	0.0	100.0

6.3.4. Compliance with Prevention of Water Pollution and Abuse Laws

Household survey data in table 6.12 reports the level of compliance with the prevention of pollution and abuse of domestic water sources. Compliance with customary and water-user groups laws is high. The level of compliance with laws related to water pollution and abuse is similar with those for equitable water allocation. The high level of compliance may be due to the participation of the local communities in enacting and enforcing customary laws.

Table 6. 12: Compliance with Prevention of Domestic Water Pollution and Abuse

Prevention of domestic water pollution and abuse law and legislature	Level of compliance (percent comply)			
	None	Some	Majority	All
No shoes at the water source				
Customary institutions	2.0	6.0	45.0	47.0
Water-user groups	0.0	8.0	44.0	48.0
No washing or bathing at the water source				
Customary institutions	0.0	2.0	48.0	50.0
Water-user groups	0.0	5.0	50.0	45.0
No animal grazing or watering around the water source				
Customary institutions	0.0	2.0	58.0	37.0
Water-user groups	0.0	5.0	48.0	50.0
No children less than 10 years old at the water source				
Customary institutions	0.0	0.0	50.0	50.0
Water-user groups	0.0	1.8	41.1	57.1

Compliance with laws related to the prevention of livestock water pollution and abuse was obtained from household survey data as reported in table 6.13. Compliance with livestock water law is generally high because table 6.13 shows that majority of people complied with these laws. Although customary laws forbids the use of chemicals by water sources, irrigators said in focus group discussion that high compliance with this law is due to the fact most of them use manures and traditional herbicides rather than chemicals because chemicals are expensive and also pollute water. Table 6.14 shows that the majority of people complied with prevention of pollution and abuse of irrigation water.

Table 6. 13: Compliance with Prevention of Livestock Water Pollution and Abuse Laws

Prevention of livestock water pollution and abuse law and legislature	Level of compliance (percent comply)			
	None	Some	Majority	All
No urinating or defecating by the water source Customary institutions	0.0	15.4	69.2	15.4
No dumping trash at the animal drinking water source Customary institutions	0.0	4.8	76.2	19.1
No bathing or washing at the animal water source Customary institutions	0.0	16.7	50.0	33.3
Water users	0.0	0.0	42.9	57.1

Table 6. 14: Compliance with Prevention of Irrigation Water Pollution and Abuse Laws

Prevention of irrigation water pollution and abuse law and legislature	Level of compliance (percent comply)			
	None	Some	Majority	All
No chemicals fertilizers, herbicides or pesticides in upstream lands Customary institutions	0.0	20.0	80.0	0.0
No dumping at the water source Customary institutions	0.0	0.0	100.0	0.0

6.4. Development of Water Sources

The development of water sources refers to the act of establishing, improving or maintaining the water source by expanding, enlarging, or refining in order to ensure a continuous supply of quality water. Examples of water development activities include digging a new well, repairing a broken water pump, and treating the water source.

6.4.1. Development of Domestic Water Sources

Water for domestic use can be obtained from natural and developed water sources. Water sources developed by water-user groups have rules to ensure a continuous supply of water. Data from the household survey and participant observation shows that each household member belonging to water-user group is supposed to participate in the rotational guarding of the water source. The major responsibility of the guard is to make sure that non-members do not get access to water, that the water source is kept clean, that the water pump is used properly, that water is not abused, and that all the rules are followed. In times of water shortage, the guard is responsible to make sure that each household gets an equal number of buckets.

In focus group discussions, water-user group members said that the decision about how much water to be extracted by each household is made by the water-user group. The guard counts the number of buckets extracted by each household to make sure that no one exceeds the number of buckets set by the water-user group. I also observed that most shallow well have locks and need to be locked and unlocked at specific times. In focus group discussion, water-user groups said that the guard on duty unlocks the pump from 7.00 am to 12.00 pm, and from 3.00 pm to 6.00 pm. The rest of the time the water source is locked and no one can draw water. This was consistent with the information obtained from participant observation. There was no one at the well drawing water from 12.00 pm to 3.00 pm and after 6.00 pm. Most shallow wells observed at this time were locked. Only guards were present at the well during 12.00 pm to 3.00 pm, after they had taken their lunch. Water-user groups, village executive officers, district water engineers, and household survey respondents said that the major reason for this law is to let the water pump to rest, so it is not over used, to allow the guard time to get lunch and rest, and so the well can accumulate more water. Water-user groups said that the key for the water sources

circulates among member household. When a household gets the key, they keep it for three days, while guarding, cleaning, and unlocking the water source at the time specified by the water-user group. After three days, the key is passed to another household, and the circle continues. The guard reports any offender to the water committee.

Data from the household survey in table 6.15 shows different laws for development of drinking water sources. The table indicates that 94 percent of respondents reported that the law that require water-user group members to participate in rotational guarding of water sources was enacted by water-user groups, and 6 percent said it was enacted by customary institutions. This shows the strength of water-user groups in protecting their water sources. Data from the district water office shows that the local government bylaw requires water-user groups to take steps to protect their water source from theft and damage. The water-user groups decide what laws to enact and how to protect and develop their water sources. In focus group discussions, villagers said that they were not aware of this local government by-law. However, household survey data shows that 95.8 percent of respondents reported that water-user group has enacted a law that requires each member household to contribute some money for maintenance and treatment of the water source. In focus group discussion, water-user groups reported that those who don't contribute are prohibited to draw water and risk to lose their membership.

To ensure that the water-user groups always has money for maintenance of the water source, household survey respondents reported that each water-user group is required by the local government to open a bank account with an initial deposit of no less than Tanzania shillings 60,000 (about US\$ 60) and maintain the bank account with monthly deposit. In focus group discussion, most of water-user groups reported that they contributed 100 to 200 Tanzanian shillings (about US\$ 0.1 to 0.2) per month per member household. In addition to this monthly

contribution, members of water-user groups are required to contribute some money whenever a major repair or water treatment is needed, and the amount of money in bank is not sufficient. Water-user groups members decide how much money to deposit in the bank account every month. They also decide how much money each household needs to contribute, depending on the cost of water treatment or maintenance. Data from household survey on table 6.15 shows that 100 percent of respondents reported that the law that require water-user groups to open a bank account was enacted by the local government. Similar reports were obtained from discussion with key informants, from water-user groups, village executive officers, and district water engineers

Table 6. 15: Development of Domestic Water Source Laws

Regulations	Who enacted regulation (percent)		
	Statutory institutions	Customary institutions	Water-user groups
Every household must participate to guard the water source by a system of rotation	0.0	5.8	94.2
Every household must contribute some money for maintenance or treatment of the water source	1.7	2.5	95.8
Every water-user group must open a bank account and maintain it	100.0	0.0	0.0
Every water source must be fenced with live fence	100.0	0.0	0.0
Every water-user group must have a land right to the water source area	100.0	0.0	0.0

Other water development laws reported by household survey respondents include the law that required water-user group to plant a live fence around the water source. All the respondents (100 percent) reported that this law was enacted by the local government in Bariadi district. This research observed shallow wells managed by water-user groups were surrounded by live fence as shown in figure 6.8 and 6.9.

Figure 6. 8: A water pump with a live fence around it



Figure 6. 9: Women pumping water from a shallow well. Note the live fence



Water-user groups and village executive officers said the live fence protects the water source from strong winds and animals that may destroy the pump, and creates a boundary and a land tenure mark for the area owned by water-user group. They also said that they would lose the water pump if the district water officers find out that there is no live fence surrounding the shallow well. Moreover, household survey data show that every water-user group is required to obtain a land right to the area around the water source. In focus group discussions with water-user groups, and in interviews with a district water engineers, they said that once a formal land right has been obtained, water-user groups become legal owners of the water source and the area surrounding the water source from 6 to 10 meters from the water source. Water-user groups acknowledged the importance of having a formal right to the area around the water source because most of the wells were dug on the land donated by villagers. In a focus group discussion, one member of a water-user group explained:

Once we identify a suitable place to dig a well. We ask the owner of the land to donate his land to us.³² Once we get the land then we dig up a well. But without formal right, we will always be worried what if the land owner changes his mind and decides that he want his land back? With a land title, the land owner signs and surrenders his land to us, it becomes our property. There is no way he can change his mind.

The above explanation shows that land rights provide formal ownership and security of tenure to water-user groups. Secure tenure refers to assurance that a person's rights to land or water resources will be recognized and protected against challenges from individuals or the state.

³² Respondents used “his” without “her” because most of the land is owned by men. Traditionally women cannot own land.

This assurance provides an incentive to make long-term investments in maintaining or enhancing the productivity of the resource. Insecure tenure discourages people from engaging in costly or long-term investment because they are uncertain as to whether they will benefit from their investments (Bruce 1998). But, water-user groups reported that acquiring a land title was a long and costly process. This remains one of the problems facing statutory institutions. Household survey data on table 6.15 indicates the strength of local government by-laws in water development. It also signifies the importance of local government in the development of domestic water sources. Customary institutions are weak in the development of water sources because most of the laws were enacted by statutory institutions (local government).

The *Sukuma* people use their indigenous knowledge which they have accumulated over the years to identify suitable places where underground water can be found. Village elders and customary leaders said one indicator of underground aquifer is the presence of *ficus* trees. This common sense knowledge works well among the *Sukuma*. Its success rate to locate underground aquifers is higher than using modern survey equipments (Drangert 1993).

6.4.2. Development of Irrigation Water Sources

As indicated in section 6.2.3, 72 percent of irrigation in the Bariadi district is rain fed. The remaining 28 percent of irrigators use natural and developed water sources. Household survey data show that respondents were not aware of any law for development of irrigation water from common water sources. In focus group discussion, irrigators who use private wells reported that they made their own laws of de-silting their wells at least once every two weeks. This shows that both customary and statutory institutions are weak in developing water sources for irrigation in rural areas.

6.4.3. Development of Livestock Water Sources

The household survey data on table 6.16 show laws for the development of livestock water sources. First, community members are prohibited from cutting trees near water sources. The table shows that 100 percent of respondents said this law was enacted by customary institutions. In focus group discussion, *Dagashida* and *Sungusungu* members said they enacted this law to protect the soil from erosion, and to prevent silting of livestock water sources. The major sources of water for livestock in Bariadi district are charco-dams, ponds, rivers and shallow wells. Some of these water sources are seasonal, so livestock keepers are forced to walk long distances to get water for their livestock or use underground water like shallow wells (*longobesi*).

I observed that few villages in Bariadi district had charco-dams. Most of these dams were constructed by the government after independence, and had silted up because of poor management. The silting up of charco-dams has caused shortage of water for livestock. District water engineers said that the current government policy to rehabilitate old charco-dams and to construct new ones requires a financial contribution from villagers to cover 20 percent of the total cost. This research observed that old charco-dams were de-silted in some villages, and construction was still going on in a few others. Customary institutions members in these villages said they are putting more effort to making sure the charco-dams are well managed. They said:

The government constructed the charo-dams for us, and we thought it would manage them too, but it didn't. Now we have realized that it is our responsibility. When the charco- dam is polluted and silted, we suffer getting water for our livestock.

In focus group discussions with livestock keepers, it was revealed that some villagers were not aware of the current arrangements for de-silting or constructing a new charco-dam. But, they said they are willing to make their financial contribution to get a new charco-dam or rehabilitate the old one. The district water engineers said that the government efforts to rehabilitate and construct charco-dams has been slow due to inadequate awareness about this arrangement by most people, lack of expertise and dam construction equipment, and high cost of dam rehabilitation and construction.

Table 6. 16: Development of Livestock Water Source Laws

Regulations	Who enacted regulation (percent)		
	Statutory institutions	Customary institutions	Water-user groups
No cutting trees by the water source	0.0	100.0	0.0
Every community member is responsible for making sure that livestock water sources are not polluted	0.0	79.0	21.1
Each household needs to contribute some money whenever there is a need to maintain the water source	0.0	16.7	83.3

The second law for livestock water development shown in table 6.16 states that every community member is responsible for making sure that water sources for livestock watering are not polluted. The majority of household survey respondents (79 percent) reported this law was enacted by customary institutions, and 21 percent said the law was enacted by water-user groups. Livestock keepers reported that one of the causes of livestock water shortage is the mismanagement of charco-dams. Currently community members watch each other, and report water polluters to customary institutions.

Third, is the law that requires each household to contribute some money whenever there is a need to develop or rehabilitate livestock water source. Table 6.16 shows that 83.3 percent

respondents said this law was enacted by livestock water users and 16.7 said it was enacted by customary institutions. This research expected this because most livestock keepers are men who are also members of customary institutions. Although the Ministry of Water Development requires financial contributions from villagers, table 6.16 shows that none of the respondents mentioned this. Key informants said the reason is that the government does not force villagers to rehabilitate or get a new charco-dam. Once villagers decide that they need a charco-dam rehabilitated or constructed, the requirement of financial contribution does apply. But, the force to contribute and how much to be contributed by each household comes from customary law or livestock water users. In focus group discussions with livestock keepers in a village that had a charco-dam construction in process, they said that every household was required to give financial contributions. Livestock keepers said every household in the village contributed some money, otherwise they were going to be fined or ostracized. Livestock keepers explained in a focus group discussion:

Every household has to contribute money for the construction of a new dam. It didn't matter whether a household have livestock or not. Household without livestock today may have livestock in the future. Their daughters may get married, so they will get livestock from the bride price. Their sons may grow up and be livestock keepers.

6.4.4. Compliance with Water Development Laws

Table 6.17 and 6.18 show the household survey data that reports the level of compliance with the laws for development of domestic and livestock water respectively. The two tables show that compliance with these laws is generally high. Respondents did not report any law for development of irrigation water. But, data from discussion with irrigators indicate that some of them use private wells to irrigate their farms.

Table 6.17 shows that most of the laws for development of domestic water were enacted by statutory institution (local government in Bariadi district). The table also shows that 50 percent of respondents who mentioned that the law that require every household to contribute some money for maintenance or treatment of the water source as enacted by statutory institutions, said villagers do not comply with this law. Those who said this law was enacted by water-user groups did not provide the level of compliance. Discussion with domestic water-user groups showed that most water-user group members comply with this law.

Table 6. 17: Compliance with Development of Domestic Water Source Laws

Water development law and legislature	Level of compliance (percent comply)			
	None	Some	Majority	All
Every household must participate to guard the water source by a system of rotation				
Customary institutions	0.0	0.0	0.0	100.0
Water-user groups	0.0	0.0	22.2	77.8
Every household must contribute some money for maintenance or treatment of the water source				
Statutory institutions	50.0	0.0	0.0	50.0
Water-user groups	0.0	0.0	0.0	0.0
Customary institutions	0.0	0.0	66.7	33.3
Every water-user group must open a bank account and maintain it				
Statutory institutions	0.0	0.0	49.1	50.9
Every water source must be fenced with a live fence				
Statutory institutions	0.0	0.0	50.0	50.0
Every water-user group must have a land right to the water source area ³³				
Statutory institutions	0.0	0.0	89.5	10.5

³³ Although respondents said it is very hard to have a formal land title, water-user group members said that the majority of water-user group members complied with this law because their groups will not be registered by the district water office, and they will run at a risk of losing water rights and water pump. Moreover, because the development of water source was a costly investment, water-user groups needed to have secure land and water rights (which are usually formal rights).

In focus group discussion, water-user groups said that community members who fail to comply with water management laws are punished. In the case of water-user groups, punishment of the offenders is done by the water committee. Punishment can be in form of a fine or removal of the offender from the water-user group. Each water-user group allows one membership for each household. The removal of an offender from the water-user group means that the whole household is removed from the water-user group.

Table 6. 18: Compliance with Development of Livestock Water Source Laws

Water development law and legislature	Level of compliance (percent comply)				
	None	Some	Majority	All	
No cutting trees by the water source Customary institutions	0.0	0.0	100.0	0.0	
Every community member is responsible for ensuring that livestock water sources are not polluted	Customary institutions	0.0	0.0	80.0	20.0
	Water-user groups	0.0	0.0	100.0	100.0
Each household needs to contribute some money whenever there is a need to maintain the water source	Customary institutions	0.0	0.0	0.0	100.0
	Water-user groups	0.0	0.0	20.0	80.0

The decision on the amount of fine or whether an individual should be removed from the group is done by the whole group. Fines can range from Tanzania shillings 500 (US\$ 0. 05) to a cow, depending on the type of offence. If the offender does not comply with the punishment, the water committee will refer him or her to customary institutions. If the offense is serious,

customary institutions requires severe punishments such as heavy fine or ostracism. The offender may also be punished by the clan (*bakaya*).

Generally, villagers said in focus group discussions that they prefer to use customary institutions and only refer complicated cases to local government officials like the Village Executive Officer (VEO) after exhausting customary institutions. Villagers reported that most cases are settled by water committees or customary institutions. Once caught, most offenders are willing to settle the case with the water committee because if they are taken to customary institutions, the fine doubles, and if a case is taken to the VEO, the fine triples. Moreover, in focus group discussion with customary institutions, and from an interview with key informants, people claim that sometimes they do not get satisfactory service from statutory institutions because of corruption. Some of the offenders can get away with their offences by bribing local government or court officials. Additionally, statutory institutions take a long time to punish the offender. Proceedings in the court can take years before a ruling is made. Therefore villagers prefer to punish the offenders and solve most problems by themselves.

Water-user groups and customary institution members said that monitoring of offenders is easy because in villages people know each other and everyone is responsible for watching each other. If one sees an offender in a different water-user group the person will report to that water-user group. Moreover, each well has a guard most of daytime and there are always people collecting water when the well is open. Although a free rider problem exists among the *Sukuma*. There are many organized sanctions to deal with them.

Thus, there is a difference between customary and statutory institutions in the management of water sources for different uses. For example, statutory institutions appear to be strong in regulations related to water development such as opening a bank account, planting a

live fence around the water source, securing formal land rights, and the maximum number of households in each water-user group. Customary laws appear to be strong in issues related to prevention of water pollution and equitable allocation of water. The research also shows that the participation of water-user groups is mainly with respect to domestic water sources and almost absent with respect to irrigation water. These results underscore the importance of analyzing water management issues for different water uses.

6.5. Determinants of Compliance with Water Management Laws

As explained in chapter four, information about whether or not a household complies with customary and statutory laws are very sensitive. Asking direct questions may not give true information since most people may not want to admit that they break the law. Therefore in this research, sensitive information was collected by asking indirect questions or through observation. I was able to collect data from the household survey as to whether or not a household complies with two statutory laws and one customary law. The customary law analyzed in this research is the law prohibiting bathing or washing clothes at the drinking water source. Statutory laws analyzed in this research included the law that requires each household to have a latrine, and the law that prohibits agricultural activities at a distance less than 30 meters from water sources. More details on how information about these laws was collected, was given in chapter four.

6.5.1. Descriptive Statistics

Before presenting the findings of hypothesis testing for compliance with both statutory and customary laws, it is better to start by presenting the descriptive statistics of the sampled

household heads. The descriptive statistics in table 6.19 provide an understanding of relationship between compliance with water management laws and the attributes of the household heads.

Table 6. 19: A Summary Table of Descriptive Statistics (for continuous variables)

Variable	Median	Mean	Minimum	Maximum
Education in years	4	4	0	14
Family size in numbers	7	8.9	1	34
Age in years	50	51.4	22	105
Sick days in numbers	7	14	0	90
Farm size in acres	5	7.2	0	60
Tropical livestock unit	4	9	0	107
Market access in km	33	36.7	10	61
Group size in numbers	6376	5975	2354	8046

(i) *Education*: the average education level is four years of formal education. The minimum level of education is zero years (no formal education) and the maximum level is 14 years of formal education. Education level is normally distributed among the respondents.

(ii) *Family size*: the average family size is seven people. The smallest household size is one person, these are the people who are single, don't have children, and don't live with any relatives. The largest household size is 34 people. Large family sizes are very common in the Bariadi district, where children are highly valued because they offer family labor and because they take care of their parents when they get old. People prefer to have many children. Another cause of the larger family size is polygamy. It was observed that the *Sukuma* culture allows for polygamy and in some cases, multiple wives reside in one household (each wife with separate rooms or house but in the same compound). Customary leaders said that one of the reasons that makes a husband get a second or more wives is to get more labor from wives and their children. Therefore most polygamous husbands prefer to keep their wives as close to each other as

possible. Also wives may need to reside together because they share the family land for farming, share cattle for milk (owned by their husband) or if the husband cannot afford to build a separate house for each wife.

(iii) *Age*: the average age of respondents is 51 years. The minimum age is 22 and the maximum age is 105 years old.

(iv) *Sick days*: the average number of days which the head of the household could not work in the past three months due to sickness in the family is 14 days. The minimum is 0 and the maximum is 90 days. This indicates that there are households where the head of the household did not lose any work days because of sickness, and there are some households where during the previous three months, the head of the household could not work because of illness in the family.

(v) *Farm size*: the average farm size is 7.2 acres. The minimum farm size is zero. This is because there are some people who don't own any land, but instead borrow or rent land for agriculture production. The maximum farm size is 60 acres.

(vi) *Tropical livestock unit (TLU)*: the average livestock unit in a household is nine animals. The minimum TLU is zero because there are those who don't own livestock and others own a lot of livestock amounting to as much as 107.

(vii) *Market access*: the mean distance to the district headquarters is 36.7 kilometers. The minimum distance is 10 and the maximum distance is 61 kilometers.

(viii) *Group size*: the average population in each sampled village is 5,975 people. The minimum population is 2,354 and the maximum is 8,046 people.

Table 6. 20 shows percent distribution of dummy variables obtained from household survey. About 18 percent of sampled household reported that they don't have a toilet in their households; they relieved themselves in the bush. Most of the respondents (97 percent) complied

with the customary law that forbids people to wash their clothes or bath by the drinking water source. However, about 3 percent of sampled households indicated that they do not comply with this law, reporting that they washed and bathed at the drinking water sources. About 41 percent of sampled households reported that they do not comply with the law that prohibits agricultural activities at a distance less than 30 meters from water sources. Only 59.2 percent of respondents said they complied with this law.

Table 6. 20: Percent Distribution of Dummy Variables

Variables	Definition	Percent reporting	
		0	1
Household have a toilet	0=No, 1=Yes	17.5	82.5
Household wash clothes or bath at the drinking water source	0=No, 1=Yes	3.0	97.0
Crop plots located > 30meters from water sources	0=No, 1=Yes	40.8	59.2
Gender	0= Female 1=Male	27.8	72.2
Roof type for the main house	0=Non-corrugated iron sheets 1= corrugated iron sheets	27.4	72.6
Belong to credit association	0=No, 1=Yes	73.9	26.1
Belong to mutual support association	0=No, 1=Yes	60.9	39.1
Belong to water management association	0=No, 1=Yes	18.8	81.2
Belong to security association	0=No, 1=Yes	81.2	18.8
Religion	0= Non-Christian 1=Christian	52.9	47.1
Livestock keeping and food production the major source of income?	0=No, 1=Yes	58.7	41.3

Female-headed household made up 28 percent of the total sample, and most households (73 percent) have corrugated iron sheets on the roof of their main house. Participation in credit, security and mutual support association is low, with only 26 percent in credit, 19 percent in security, and 39 percent in mutual support associations. But, the majority of villagers (81

percent) said they belonged to a water management association such as a water-user group. Over half of the sampled households (53 percent) are non- Christians. About 41 percent of sampled households reported that food crop production and livestock keeping are their major sources of income. The rest (59 percent) reported cash crop production (mainly cotton), and other non-farm activities, as their major source of income.

6.5.2. Multivariate Logistic Regression Results

Multivariate results of the determinants of compliance with water management laws are described in two sections, the first section deals with compliance with customary laws and the second section deals with compliance with statutory laws.

6.5.2.1. Determinants of Compliance with Customary Law

A. Law that Prohibit Bathing /Washing Clothes at the Drinking Water Source

Table 6.21 reports the determinants of compliance with customary law that prohibit bathing or washing clothes at the drinking water source. The F-statistic is statistically significant at $\text{Prob} > F = 0.028$. This implies that the regressors jointly have a statistically significant impact on the probability of a compliance with customary laws that prohibit washing of clothes or bathing at the drinking water source. Therefore, the null hypothesis is rejected with 95 percent confidence, which means that at least one independent variable has a non-zero effect on the probability of compliance with customary water management laws.

Contrary to expectations, market access has a significant, positive impact on compliance with the customary law that prohibits community members from taking a shower and wash clothes around the drinking water source. This could be due to the fact that households with high market access are more aware about the benefit of keeping the water sources safe from

pollutants. But, the results also indicate that households in remote areas are not likely to comply with customary laws. This may be due to a lack of knowledge about the harmful effects of pollution for households living in remote areas.

Controlling for market access and other variables, belonging to water association significantly increases the probability that a villager will comply with customary law that prohibits households from taking a shower and washing clothes near drinking water sources. This could be due to the fact that water-user groups have strict rules for members who belong to the group. For example in focus group discussions, members of water-user groups said that they expel or fine members who do not follow laws set for management of water resources. They also said that if a person has been expelled from another group, that person may have hard time finding another group to join because he or she will be required to provide a “recommendations” from the previous group. This supports Hayami (1998:2) theory that customary laws work better because they are enforced through social interactions where misconduct can easily be identified.

Older respondents were also more likely to comply with customary laws that prohibit households from taking a shower and washing clothes near drinking water sources. This was also revealed in an interview with village elders who said that members of younger generation tend to think that customary laws and practices are “outdated.” Therefore older members have more allegiance to customary laws than younger respondents.

Better-educated respondents were less likely to comply with customary laws prohibiting them from taking a shower or washing clothes near drinking water sources. This could be due to a lack of sensitivity to customary laws that better educated respondents seem to have. Formal education in Tanzania was introduced by colonialists. It neglected African culture and traditions as it “was geared to support, enhance, and perpetuate European colonial exploitation and

domination of African people” (Johnson 1987: 266). Even after independence, Tanzania adopted the colonial education system that was already in place. This system of education continue to exist today and continue to produce “elites” who are alienated from their customs and traditions. Therefore, a radical transformation in the system of education is needed to incorporate African culture and traditions which existed long before colonialism.

Table 6. 21: Logistic Regression Results for Determinants of Compliance with Customary Law Prohibit Bathing /Washing Clothes near Drinking Water Sources

Independent variables	Coefficients	Standard. Error	P>t
Market access	0.04391	0.01973	0.027**
Religion	0.24184	0.57547	0.675
Roof type	-0.31827	0.70267	0.651
Major income from livestock and food production	-0.95763	0.71187	0.18
Family size	-0.09438	0.04567	0.04**
Security association	-0.68337	0.65704	0.3
Support association	-0.40796	0.58528	0.487
Credit association	-0.26993	0.48178	0.576
Water association	0.79354	0.45019	0.079**
Age	0.10042	0.03506	0.005***
Gender	0.23606	0.75443	0.755
Education	-0.12823	0.06899	0.065**
Farm size	0.17818	0.06916	0.011**
Tropical livestock unit	-0.07768	0.02831	0.007***
Sick days	0.07624	0.03719	0.042**
Group size	-0.00102	0.00034	0.003***
Constant	4.11230	2.36075	0.083
Number of observation	= 209		
Number of strata	= 4		
Prob > F	= 0.028**		

Significance levels:

*P<0.10; **P<0.05; ***P<0.01

In focus group discussions, villagers said that getting away with customary laws is harder for uneducated people than it is for educated ones. Villagers also said that better educated members of the communities may have ways to get around the customary laws. This is because better educated people may have “connections” or social networks with corrupt people who can help them get away with customary laws. They may also have financial means to bribe and bargain power. But, the level of education does not appear to have a significant impact on the other regulations reported in this section. This is also supported by political economists who believe that individuals are rational economic actors. They would like to free-ride if they have ways to get away with their actions. But, members of customary institutions said that they enact laws that make the social cost of free-riding very high in order to discourage free-riding.

Contrary to expectations, the size of the farm owned by household had a significant, positive association to compliance with customary laws that prohibits households from taking a shower and washing clothes near drinking water sources. This suggests that households with a larger farm size are more likely to comply with customary laws than those with smaller farms. I observed that households with larger farm size have a tendency of having bigger family size. Moreover, larger farm size means that a household need more labor to work in the farm. A higher percent of farm labor are women, who are major collectors of water. Therefore, household with larger farm size may have more labor to collect water for domestic use. So they may not bathe or wash clothes near drinking water sources. In an interview with one *Dagashida* chairman, he said that he had four wives. He said one of the reasons is that he needs more labor for his farm. He said he has a big farm, and one wife could not handle it. He said “more wives mean more children, bigger family size, more family labor, and more prosperity.” But,

households with larger tropical livestock unit (TLU) are less likely to comply with this law. This was observed in focus group discussion with livestock keepers that livestock grazing and watering is mainly done by men. Households with larger TLU may have more men than women, hence less labor to draw water for washing and bathing at home.

Group size is also negatively associated with compliance with customary laws that prohibit households from taking a shower and washing clothes near drinking water sources. This is likely due to the fact that at very high population densities, there is a negative incentive to comply with customary laws due to the potential diversity problem that tend to undermine customary norms and rules. This result is consistent with Olson (1971) who observed that in small groups, people are more likely to engage in collective action to manage their resources than people in larger groups. This is because smaller groups reduce chances of free-riding. Similar findings are observed by Baland and Plateau (1999) and Tang (1992), who pointed out that smaller groups perform better than larger ones because they are more likely to engage in collective action than larger groups.

The number of sick days is positively related to compliance with customary laws that prohibits households from taking a shower and washing clothes near drinking water sources. A district water engineer said in an interview that households with poor health are also likely to be poor, and have a tendency to comply with customary laws. This view is supported by moral economists who argue that individuals in a community have strong ties, and rely on communal property and social networks for their subsistence. Therefore, compliance with customary laws is their best rational choice. The rest of the independent variables have no significant relationship with compliance with customary laws that prohibit people from taking a shower or washing clothes closer to drinking water sources.

6.5.2.2. Determinants of Compliance with Statutory Law

A. The Law Requiring Each Household to Have a Latrine

Tanzania has a law that requires every household to have a toilet facility. This requirement has a strong impact on health because human waste can pollute drinking water and cause disease. In addition to improved health, toilet facilities provide people with privacy. Those who release themselves in the fields or bushes may feel embarrassed and humiliated if caught in the process. It also reduces incidences of snake bites and being pricked by thorns in the bushes.

Table 6.22 reports the compliance with the statutory law requiring each household to have a latrine. The F-statistic is statistically significant at $\text{Prob} > F = 0.0271$. This implies that the regressors jointly have a statistically significant impact on the probability of a compliance with statutory laws that require each household to have a latrine or toilet facilities. Therefore, the null hypothesis is rejected with 95 percent confidence, concluding that at least one independent variable has a non-zero effect on the probability of compliance with statutory water management laws. As shown in table 6.20 most respondents have a pit latrine as required by the local government. But there are still 18 percent of households in the Bariadi district that don't have a toilet facility.

Christian households and those belonging to security organizations are more likely to comply with the requirement of having pit latrines. This is because some Christian denominations stress health teaching. For example, the Seventh Day Adventist church, which is one of the common denominations in Bariadi district, teaches church members about healthy living. Also those who belong to security organization such as *Sungusungu* members are supposed to be leaders and role models in the community. In focus group discussions,

Sungusungu members said that they are supposed to set an example to other villagers. They said “how can we enforce compliance to laws if we don’t comply ourselves?”

Table 6. 22: Logistic Regression Results for Determinants of Compliance with Statutory Law Requiring Each Household to Have a Latrine

Independent Variables	Coefficients	Standard. Error	P>t
Market access	-0.00754	0.01054	0.475
Religion	0.70314	0.26821	0.009***
Roof type	0.63693	0.23684	0.008***
Income from livestock and food production	-0.11916	0.21923	0.587
Family size	0.02663	0.02699	0.325
Security association	1.06192	0.38372	0.006***
Support association	-0.04689	0.24944	0.851
Credit association	-0.10788	0.27501	0.695
Water association	0.41933	0.26830	0.12
Age	-0.0044	0.00857	0.608
Gender	-0.25285	0.27398	0.357
Education	0.00144	0.03342	0.966
Farm size	-0.01369	0.02519	0.587
Tropical livestock unit	0.04103	0.01729	0.018**
Sick days	0.00123	0.00367	0.737
Group size	-0.00003	0.00008	0.74
Constant	0.27169	0.94906	0.775
Number of observation	= 223		
Number of strata	= 4		
Prob > F	= 0.0271**		

Significance levels:

*P<0.10; **P<0.05; ***P<0.01

Households having a roof made of corrugated iron sheets for their main house, and those having greater number of tropical livestock unit(TLU), are more likely to comply with the pit latrine requirement than those with other roof types and households that have fewer TLU.

This indicates that wealthy households are more likely to comply with the requirement of having toilet facilities. One village executive officer said in an interview that one of the reasons why people do not have toilet facility in their household is that they cannot afford the cost of constructing a new pit latrine, or constructing another one when the existing one is full.

B. The Law Prohibiting any Agricultural Activities at a Distance Less Than

30 Meters from Water Sources

Table 6.23 presents a second statutory law that requires households not to have any agricultural activities within a radius of 30 meters from a water source. The F-statistic is statistically significant at $\text{Prob} > F = 0.0190$. This implies that the regressors jointly have a statistically significant impact on the probability of a household not to practice any agricultural activities at a distance less than 30 meters from a water source. Thus, the null hypothesis is rejected with 95 percent confidence, concluding that at least one independent variable has a non-zero effect on the probability of compliance with this statutory water management law.

Table 6.23 indicates that Christians are more likely to comply with the statutory law prohibiting agricultural activities near water sources. This was expected because Christianity promotes compliance with laws in their teaching. One woman said in an interview that she believes that God ordained the government to rule human beings and to restrain evils. She said that human beings were created by a God of order, so they have the responsibility to seek order through statutory institutions. She also said that although Christians are supposed to serve, obey, and submit to civil authority, their first submission must be to God. There may be times when they may be forced to disobey the state if it is against God. This supports the moral economists' idea that human action is controlled by social norms and traditions.

The above story of a Christian woman indicates that she behaves according to Christian norms. This shows that Christians have the obligation to conduct their activities according to their beliefs of what is right and what is wrong. But in focus group discussions, as theorized by political economists, villagers indicated that free-riders (both Christians and non-Christians) do exist, and they are mainly sanctioned by customary institutions. The preference of using customary institutions to sanction free-riders is supported by the “evil-market” view that customary institutions works better than statutory institutions.

Households belonging to a security institution (*Sungusungu*) and those belonging to mutual support organizations are more likely to comply with the statutory law requiring them not to engage in agricultural production within a distance of 30 meters from a drinking water source. The reason is similar to section 6.4.2.2(A) above that *Sungusungu* members are expected to show an example to other villagers.

Contrary to expectations, households belonging to water-user groups are less likely to comply with the requirement of not having agricultural activities within 30 meters from a drinking water source. Also older heads of households are less likely to comply with this law. This is because older respondents are every much into customary laws than younger people. This was also the case with customary laws that prohibit households from taking a shower and washing clothes near drinking water sources where older people were more likely to comply than younger people. In an interview, customary leaders said that they farm on the land that they inherited from their ancestors. Some of the land is located close to water sources. They would have no where else to farm if they don't farm on their land. As they explained:

They tell us not to farm by the water sources. But they don't give us new land to farm. If our land is close to water sources where should we farm? How will we irrigate our crops if we farm away from water sources?

Table 6. 23: Logistic Regression Results for Determinants of Compliance with Statutory Law that Prohibits Agricultural Activities Close to Water Sources

Independent variables	Coefficients	Standard. Error	P>t
Market access	-0.01169	0.00803	0.147
Religion	0.42972	0.21787	0.050**
Roof type	-0.06223	0.21046	0.768
Income from livestock and food production	0.10301	0.21152	0.627
Family size	0.01420	0.01923	0.461
Security association	0.58294	0.26576	0.029**
Support association	0.41704	0.20546	0.044**
Credit association	0.03344	0.22059	0.880
Water association	-0.83278	0.24122	0.001***
Age	-0.01796	0.00767	0.020**
Gender	-0.02303	0.22763	0.920
Education	-0.01848	0.02992	0.537
Farm size	-0.01780	0.01474	0.229
Tropical livestock unit	0.00739	0.00905	0.415
Sick days	-0.00392	0.00238	0.100*
Group size	-0.00003	0.00006	0.595
Constant	2.06911	0.75854	0.007
Number of observations	= 223		
Number of strata	= 4		
Prob > F	= 0.0190**		

Significance levels:

*P<0.10; **P<0.05; ***P<0.01

The number of sick days is negatively related to compliance with the statutory requirement of not having agricultural activities within 30 meters from a drinking water source. This means that household with poor health are less likely to comply with this statutory requirement. This support the above findings in the customary laws that prohibit households from taking a shower and washing clothes near drinking water sources, where people with poor health have a tendency to comply with customary laws. One chief said in an interview that poor people are desperate. They may have a short term perspective as they struggle to survive and make their ends meet. Their major goal is today's subsistence, and not tomorrow. So prohibiting them to farm near a water source may limit their means of subsistence because they may have no where else to farm.

CHAPTER SEVEN

7. GENDER, INSTITUTIONS, AND WATER MANAGEMENT

The truth is that in the villages women work very hard. At times they work for twelve or fourteen hours. They work even on Sundays and public holidays. Women who live in the villages work harder than everybody else in Tanzania. But men who live in the village are on leave for half of their lives (Late Julius K. Nyerere, President of Tanzania in 1961-1985).³⁴

Women play a central role in the use, management and protection of water resources and thus should be involved fully in the decision making process (URT 2002a:22).

7.1. Introduction

Chapter six indicated that most laws for equitable water access and prevention of water pollution and abuse were enacted by customary institutions and water-user groups. Statutory institutions were stronger in water development laws, but weak in water access and prevention of water pollution and abuse laws. Although customary laws are important in the management of water resources, they are also problematic as they tend to discriminate against women. This chapter analyses the relationship between gender and water management institutions, and show how this relationship affects men and women's participation in the management of water resources.

³⁴ Julius K. Nyerere. 1968. *Freedom and Socialism/Uhuru na Ujamaa: A Selection from Writing and Speeches, 1965-1967*, Dar-es-Salaam, Tanzania. Pp 245.

The participation of women in relation to water management is important for a number of reasons. Women are the traditional custodians of natural resources and family health in rural areas. They also suffer most from the degradation of water and other natural resources. In rural areas of Tanzania, women spend long hours fetching water for their families. They are most often the collectors, users, and managers of water in the household as well as farmers of irrigated and rain fed crops. Women and children provide nearly all the water for households in rural areas. Domestic water is used for processing and preparing food; for drinking, bathing and washing, for irrigating home gardens, and watering livestock.

Women are viewed as the key to the success of water resource development and irrigation policies and programs (FAO 2005). They have taken the lead in promoting an environmental ethic and reducing resource degradation by reusing and recycling resources to minimize waste and excessive consumption. At the local level, women are knowledgeable about ecological health and ecosystem management. In places where the rate of rural-urban migration is high, and migrants are mostly men, women are left behind to safeguard the natural environment and ensure adequate and sustainable resource allocation within the household and the community. Women know the location, reliability, and quality of local water resources. They collect water, store it, and control its use and sanitation. Because of these social roles, women have considerable knowledge about water resources, including quality and reliability, restrictions, and acceptable storage methods.

Recent debates on natural resource management have pointed out the importance of women having access to and control over natural resources. Beginning in the 1980s, there was a growing awareness on the part of government officials that gender relations were central to implementation and formulation of resource-management policies. This awareness was granted

by scientists studying women and development, who discovered that many development policies impoverished and discriminated against women (Booth and Friedman 1996; Chant and Radcliffe 1992).

A variety of approaches can be used to explain the relationship between gender and the management of water resources. One of the approaches is ecological feminism or “ecofeminism,” which connects the environmentalist and the feminist movements. The word “ecofeminism” was coined in 1974 by Francoise d'Eaubonne, a French feminist, who wanted to bring attention to women’s potential role in bringing about an ecological revolution (Warren 1996). Like feminism itself, ecofeminism is a diverse ideology containing a variety of contradictory viewpoints (Molyneux and Steinberg 1995; Warren 1996). One may be a social ecofeminist, cultural ecofeminist, radical ecofeminist, or ecowomanist.

Despite their differences, ecofeminists share the viewpoint that there are connections between the domination of nature and the domination of women in contemporary society (Warren 1996). The basic principle of ecofeminism is that patriarchal philosophies are harmful to women, children, and other living things. These philosophies identify women as being closer to nature and men being closer to culture. Nature is seen as inferior to culture, meaning that women are also inferior to men (Agarwal 1992). Thus, ecofeminism seeks to strengthen the relationship between women and nature by critiquing their oppression (Alaimo 1994). As Ruether (1975:204) wrote:

Women must see that there can be no liberation for them and no solution to the ecological crisis within a society whose fundamental model of relationships continues to be one of domination. They must unite the demands of the women's movement with those

of the ecological movement to envision a radical reshaping of the basic socioeconomic relations and the underlying values of this [modern industrial] society.

Ecofeminists agree that the domination of women and the domination of nature are fundamentally connected, and that they should work toward their simultaneous liberation. Ecofeminists believe that an understanding of these connections is crucial to end the domination of women (Marshall 1993; Somma and Tolleson-Rinehart 1997; Warren 1987). But, ecofeminists differ as to “why” and “how” the domination of women can be ended.

Ecofeminist has been criticized by other people and by ecofeminists themselves. Feminist environmentalists criticize ecofeminists’ idea that women are linked with nature, and that women cannot be separated from nature. According to this view, ecofeminists ignore the social construction of gender and nature (Agarwal 1992). Critics argue that women do not have an exclusive relation with to nature, but that men too have a relationship with nature. Research on Africa reveals that women and men perform different activities as a result of the traditional gender division of labor, but all activities contribute to the well-being of the household (Leach 1994; Schroeder 1999). Ecofeminists are criticized for overlooking the material sources of domination, such as economic advantages and political power (Shiva 1989). Critics argue that ecofeminists need to consider both men and women so that everyone can take responsibility for managing natural resources (Agarwal 1992). Women in Tanzania and other developing countries are dependent on nature for the sustenance of themselves and their families. The destruction of nature means that women’s sources of survival are destroyed. Consequently, women are more likely to suffer the ill-effects of environmental degradation and environmentally unsafe practices. For example, the mismanagement of drinking water sources means that women have to walk

longer distances to get safe drinking water for their families as shown in figure 7.1. Women have to fight not only against ecological degradation, but also against traditional power structures and customary laws that subordinate their needs (Suliman 1991). More discussion on this will be given in the following sections.

Figure 7. 1: Women walking long distances to get safe water



7.2. The Status of Women in Tanzania

Women in Tanzania account for 70 percent of agricultural labor force. Of all the women in Tanzania, 90 percent are employed in agriculture. They are the major producers of food and cash crops (The World Bank 2002). They produce 60 to 70 percent of all the food that is consumed in Tanzania. They are the primary producer of food crops and significant producers of cash crops such as cotton, sisal, coffee, tea and tobacco. Moreover, women head about 25 percent of all households in Tanzania, a number that is increasing due to the HIV/AIDS epidemic (URT 2002).

They have the sole responsibility of child rearing, caring for the elderly and sick, fetch fuel and water, and tend small livestock (UNDP 2003). Compared to men, women work longer hours. They often start their domestic chores before dawn and work until dark. Most women work more hours per week than men. Women work 80 hours compared to 44 working hours for men who are employed in the formal sector (Lundqvist 1999). Women represent only 10 percent of the total wage-earning labor force in all sectors, most of these women are engaged in primary school teaching and nursing (Mbilinyi 1972). The low number of women in the formal sector is attributed to their low education and discriminatory hiring practices (Tripp 1994).

In terms of education, Tanzanian women are worse off compared to men. Women receive less education at all levels, and women are about twice as likely as men to have no education. The problem is more acute in rural areas, where 41 percent of women are unable to read or write (URT 2002). Table 7.1 shows that the literacy rate for women is 69.2 percent compared to 85 percent for males. Of the 4.5 million illiterate adults in Tanzania, 75 percent or 3.1 million of illiterate adults are female. The gender bias against the education of females begins in the home. The reason for low education achievement for women includes the traditional expectation that mothers should stay home and take care of the children, and the general male attitude that women are less intelligent and less responsible than men, early marriage, and high school drop out rate due to pregnancy and parent's preferences to educate male children rather than female children (Made and Whande 1989; Mbilinyi 1972). Heavy household workloads and strict gender roles greatly hinder girls' participation in school. But studies have shown that improving education for women improves their literacy and job skills, raises their earning capacity because educated women are more likely to participate in the labor

force which may provide bigger economic benefits. This may improve women’s lives and their families in general (Garrett and Ruel 1999; Levin et al. 1999).

Table 7. 1: Literacy Rate in Tanzania 2000-2004.

	Male	Female	Total
Adult literacy rate (percent)	85.2	69.2	77.1
Youth literacy rate (percent)	93.8	89.4	91.6
Adult illiterate population(000)	1,437	3,119	4,556
Youth illiterate population(000)	237	405	642

Source: UNESCO 2004.

7.3. Gender Relations and Property Rights

As explained in chapter two, property rights are critically important for economic development and livelihood of the people. Most people in Tanzania live in rural areas and depend on agriculture for their economic development. Land is regarded as a source of wealth, social status, and power (Strickland 2004). The relation between property rights and natural resources is an important factor in the effective management of natural resources. Secure property rights are a fundamental cornerstone upon which the local community builds their participation in the management of their natural resources. When people have secure property rights, they are more likely to invest in land, protect the environment, and build social harmony. This idea is supported by new institutional theorists who argue that community members have the capability to manage their resources. They will be willing to participate in the management of their resources if they are sure that they will benefit from their investments (Bromley et al. 1992; Ostrom 1990; Mccay and Acheson 1990). Similar findings were reported by Mendelsohn (1994) who observed that lack of secured property rights is one of the causes of wasteful deforestation of tropical forests in Brazil. About 95 percent of people in rural Tanzania acquire land under

customary laws or through inheritance. Most women settle on and use land that they obtain through family ties. Under customary laws, the acquisition and ownership of land is monopolized by male family members. The acquisition of land right through statutory institutions requires formal title to the land. Land titling affects women because they often have less access to money, political connections, or other resources that may help them acquire title to the land. One policy implication is that women need better access to credit so they can acquire land (Meinzen-Dick et al. 1997).

The constitution of Tanzania upholds the principle of equality and equal opportunities to its people. It states that “subject to provision of relevant laws of land, every person is entitled to own property, and has the right to protection of *his* property held in accordance with the law” (URT 1998:25). The use of word “protection of *his* property” here implies that the right to protection of property is granted to men only. The constitution doesn’t ensure that women’s rights to property will be protected. Moreover, the constitution requires all state authorities and institutions, in undertaking their activities to ensure:

Equal opportunities to all citizens, men and women alike, without regard to their color, tribe, religion or status in life;

That human dignity and other human rights are respected and cherished;

That all forms of injustice, intimidation, discrimination, corruption, oppression or favoritism are eradicated. (URT 1998:18).

Additionally, both the Village Land Act and the Land Act recognizes women’s right to land, protects women’s right to land, and prohibits discrimination against women with regard to land rights (Benschop 2002; ILO 2002). For example the sub-section 20(2) of the Village Land

Act, 1999 prohibits the use of customary law in determining the right of occupancy, if the law discriminates against, *inter alia*, women:

Any rule of customary law and any decision taken in respect of land held under customary tenure, whether in respect of land held individually or communally, shall have regard to the custom, traditions, and practices of the community concerned and the rule of customary law or any such decision in respect of land held under customary tenure shall be void and inoperative and shall not be given effect to by any village council or village assembly or any person or body of persons exercising any authority over village land or in respect of any court or other body, to the extent to which it denies women, children or persons with disability lawful access to ownership, occupation or use of any such land.(URT 1999a: 95-96).

The Land Act recognizes the right of every person to acquire, hold, use and deal with land without any restrictions on the basis of gender. There are two types of land ownership: “personal occupancy” and “co-occupancy.” Personal occupancy refers to land occupation held by one person through right of occupancy or lease. Co-occupancy is defined as “the occupation of land held for a right of occupancy or lease by two or undivided shares” (URT 1999b ss 159(1)). There are two types of co-occupancy: “occupancy in common” and “joint occupancy.” Occupancy in common is where any land, lease or mortgage is occupied in common, that is, each occupier has the right to undivided share of the property. In the case of the death of one of the co-owners, his /her share goes to his/her heirs (URT 1999b ss 159(3)).

Joint occupancy is land ownership where land is occupied jointly. None of the occupiers is entitled to any separate share of the land. In the case of the death of one co-owner, the other

party has the right of survivorship, meaning that the property goes to the surviving occupier or occupiers (URT 1999b ss 159(4)). The Land Act protects the family land by a presumption of co- occupancy, which recognizes both spouses' rights to the land (URT 1999b, ss. 161-164). Under the Land Act, married men are not supposed to dispose land through mortgages, sales, leases, and any other means without their wife's consent regardless of whose name is on the title deed (URT 1999b s. 112(3)).

Although the constitution and the Land Act advocates equal rights for women and men, they do not ensure these rights in practice. The actual implementation of gender equality is still a major problem. For example, lack of resources to enforce these regulations and the acceptance of the customary institutions seem to determine the failure of statutory laws on equality of women and men in land ownership. Although statutory law is considered supreme, in practice, customary laws tend to prevail, particularly in disputes over marriage, divorce, and property rights (Nzomo 1994). In focus group discussion, and during interviews with key informants, most people said customary laws affect their life the most.

The Marriage Act of 1971 recognizes equal rights to property rights among married couples. It says in section 56:

A married woman shall have the same right as has a man to acquire, hold, and dispose property, whether movable or immovable, and the same right to contract, the same right to sue, and the same liability to be sued in contract or in tort or otherwise. (URT 1971: 25).

But, section 60 of the Marriage Act states that if during marriage, a husband or wife acquire property in his or her name, it is presumed that the property belongs absolutely to that person,

the other person is excluded unless the spouses jointly register their property in both names. It states:

Where during the subsistence of a marriage, property is acquired:

(a). In the name of the husband or of wife, there shall be a rebuttable presumption that the property belongs to that person, to the exclusion of his or her spouse;

(b) In the names of the husbands and wife jointly there shall be a rebuttable presumption that their beneficial interests therein are equal. (URT 1971: 26).

This section of the Marriage Act contradicts with the Land Act which presumes co-occupancy of the family land, where each spouse has rights to the land (URT 1999b, ss. 161-164). Many people in rural area have customary land rights, and have not registered their land. The small amount of registered land is registered on men's names. In focus group discussions, I gathered that despite the Marriage Act of 1971 and the Land Act of 1999, and despite the fact that statutory laws are supposed to be superior to customary laws; customary laws are still used more and applied in rural areas than are statutory laws. When there is divorce, a woman is often chased away by a husband. She returns to her parents (without any property) and waits for remarriage. Moreover women said in focus group discussion that they have no means to lay claim to the family property upon death of a husband or divorce in formal courts because most of them don't have any formal documents or titles.

The Marriage Act prohibits spousal battery, but it does not impose any penalties for violating this provision (CRLP 1998). Customary laws that subordinate women remain strong in the Bariadi district. In focus group discussion with women, they said, in *Sukuma* culture,

husbands can discipline their wives and treat them any way they like, and women are supposed to obey. Women said they are vulnerable to domestic violence because legal action against domestic violence is less readily available to them. Nearly 70 percent of women I spoke with during focus group discussions, said they experienced some sort of alcohol-related violence in the previous year. Unfortunately, some of the women in the focus group discussion viewed the situation as a normal part of life in a village. Some reported that they have no choice but to tolerate brutal treatment by men. One woman explained her experience with a husband who is alcoholic. The husband spends all his money for drinking and doesn't care for his family. He comes home drunk and demands to get nice food. He also beats his wife, but the wife explained that she have no where to go and nothing to do. As she explained:

My husband is alcoholic, he uses all his money for drinking. He doesn't give me any money to buy food. When he comes home from drinking, sometimes he will beat me up if he doesn't find good food. It has been like that all since I got married to him. But what can I do? Where can I go? I always think what will happen to my children if I leave?

The constitution guarantees the right to work to as well as the right to equal pay for equal work to all people in Tanzania (URT 1998 ss 2(1-2)). But, the Employment Ordinance restricts the employment of women. For example, section 83(1) of Employment Ordinance stipulates that “no woman shall be employed in the hours of 6 P.M and 6 A.M in any industrial undertakings,” unless there is unforeseeable emergency. Also section 15(3) of Marriage Act prohibits married women from contracting another marriage during the time they are still married. But, the law allows men to contract more than one marriage at a time (CRLP 1998; URT 1971:11).

The *Sukuma* people are patrilineal. Property is owned and devolves along the male line and excludes women. Under this patriarchal system, women face a lot of social, economic and political barriers in their everyday life. Although women work in the fields and are the major cultivators, they often don't have property rights to the land they work on. In an interview, customary leaders and women said that in *Sukumaland*, the tradition is that women don't have the right to own property, but instead they have the right to use property through their male relatives (father, brother, son) or their husbands. In focus group discussions, women said that their right to use property must be exercised with their husband's consent.

Although women have access to land once they marry, this access to land often ends if they are divorced, lose a husband, or fail to bear children, particularly male children (Mbilinyi 1972). Because women are regarded as property, they cannot own land or obtain rights to property. In focus group discussion, women said that cattle and other household wealth are owned by men. Married women own nothing in the family, not even the children they bear. Inheritance is only given to male children. The situation is even worse for women who are not married, don't have sons, or are widows and divorced.

There are three different legal systems that govern inheritance laws in Tanzania. These include the statutory law, customary law, and Islamic law (Rwebangira 1996). Customary law applies to most people in the rural areas. Islamic law is applicable to those who profess Islam. The statutory inheritance law used in Tanzania is the Indian Succession Act of 1865 that was made applicable to Tanzania by the Indian Acts (Application) Ordinance, Cap.2 (Rehmtulla 1999). This law applies to Tanzanian residents of European origin, Asians who are not Moslems, and Tanzanians whose life styles do not incorporate customary practices (Rwebangira 1996). The Indian Succession Act of 1865 is seen as a codified English common law which was

imported to Tanzania mainland from India as it applied in India in 1907. Although this Act has undergone a number of changes in India, it has remained unchanged in Tanzania since its adoption (Brown et al. 2003). The statutory inheritance law maintains that when a man dies, one-third of his property belongs to the widow and the rest belongs to other family members. When a woman dies, the husband inherits all the property. This indicates that women's property belongs to the family, but man's property belongs to the man. The use of word "his property" instead of "their property" implies that property in the family belongs to a man and not to both a man and his wife. Section 27 of the Indian Succession Act of 1865 states:

*Where the intestate has left a widow, if he has also left any lineal descendants, 1/3 of his property shall belong to his widow and the remaining 2/3 shall go to his lineal descendants. If he has left no lineal descendants, but has left persons, who are of kindred to him, one third of his property shall belong to his widow, and the other shall belong to those who are of kindred to him. If he left none who are of kindred to him, the whole of his property shall belong to his widow.*³⁵

The multiple legal systems that regulate inheritance in Tanzania tend to co-exist. The applicability of these laws has been problematic due to increased in inter-marriages which makes it difficult to determine which law to apply. But the law which applies to the majority of people in Tanzania is customary law. The rest of the laws are rarely used even by the community they are intended to serve (Rwebangira 1996:25).

In *Sukumaland*, there is a belief that after a man dies, his property should return to his direct family, not to his wife. When the husband dies, the husband's relatives lay claim to the

³⁵ As quoted from Rehmtulla (1999:8).

land and other properties and often chase away the widow. The widow may be allowed limited use of the land provided she agrees marry one of her in-laws. This exposes women to the possibility of losing access to the land (Gray and Kevane 1999; Mwangi 1998).

Moreover, women are often chased away if their husbands divorce them. The fear of losing access to land has forced many women to tolerate abusive relationships (Palmer 2002). As one male respondent explained in focus group discussion:

I paid cows as a bride price to her father. The cows I paid keep on reproducing and multiplying each year. So I bought her to come and work for me, cook for me, bring water for me to bath, wash my clothes, and to bear children for me so I can have sons to take care of me when I get old. If I divorce her, it is up to me to decide whether I will give her some wealth or not since everything is mine. She came from her father with nothing.

In focus group discussions, women said that upon the death of a husband, the widow is expected to marry her brother-in-law (*gungelwa*). If the widow refuses, she loses the rights to use land or other family properties. Women said that if a widow refuses to marry one of her brother in-laws, she will no longer be regarded by her in-laws as a member of their family (*Osumaga ou mante abo*). The widow is allowed to use any family land to cultivate her crops because she has “denied” her in-laws and has distanced herself from them. Whatever property the deceased husband possessed, passes to his male heirs. The case of a 56-years old widow explained what might happen to women in *Sukumaland* when they lose their husbands:

My husband died ten years ago. After the funeral, the family elders sat down to discuss who should be my next husband. Two men, who were my brother in laws were selected and were told by the family elders to come and talk to me, just to get an idea if I was willing to get married to one of them. Each one asked if he could be my next husband.

The two men were required to send the report back to the family elders, whether I seem to like “staying” in the family or not. I did not want to get married to any of them. The next day, the family elders called up a family meeting. I was asked “who do you think suits to take care of you.” I mentioned a two years old boy to take care of me. Traditionally, mentioning a child to be your next husband signifies that you don’t want to be married again. The elders were angry about my decision. They took away everything from me, cows, beds, cooking pots, bed sheets, and everything from me. They said I have to give them everything because they paid bride price to my parents, and I don’t have any right to anything. I was left with six children and nothing to eat. I was confused and couldn’t find anyone to help. I decided to go back to my parents for help. When I came back to my house, I found that they have taken my land and my house. They chased me away.

If a widow has made her decision to be inherited by one of her in-laws at the family meeting, she will mention the man she prefers to be her husband. If the man is already married, the widow will be aware that his current wife or wives will not like it. But, women explained in focus group discussion that even if the current wife or wives doesn’t like it, she or they cannot stop the husband from taking another wife. The in-law who inherits a widow is supposed to take care of the widow as his wife. But this doesn’t always happen. As one inherited widow explained in a focus group discussion:

He never took any care of me. All he wanted was the wealth from my deceased husband.

After we got married, he sold all the cattle and used all the money.

I am the one who takes care of the family, he does nothing.

Surprisingly, widow inheritance is seen as a positive practice by some women. Some widows view widow inheritance favorably because it provided them with an opportunity to

continue having access to land. In an interview, a woman said that most widows decide to marry their in-laws because they have no choice. If they refuse to marry their in-laws they will be chased away and their children will suffer. Some inherited widows may be “lucky” if they marry a good man. An example of a “lucky” widow is a 60 years old woman, who explained her story during focus group discussion. This woman said she agreed to marry her in-laws because she had no choice. Her decision turned to be a good one as she explained:

I got married when I was 14 years old. My husband died four years later leaving me with two children. It was devastating. I had no choice but accepting to be inherited by my brother- in law. I respect him as my husband although it was difficult at the beginning. He is a good man and he takes good care of me. My deceased husband used to mistreat me, but this one doesn't. I continue to grow crops on the same land. Now my sons are grown up, they will inherit this land.

Today, widow inheritance is viewed in a different light. The high prevalence of HIV/AIDS threatens the custom of widow inheritance. HIV/AIDS has scared away many in-laws from inheriting widows, particularly if they are not sure what killed the widow's husband. Moreover, the population increase in *Sukumaland* has made land more scarce. As a result, many in-laws would prefer to “chase” the widow away so they can get possession of the land. Moreover, the frequent occurrences of drought, and the impact of structural adjustment programs, have contributed to increasing poverty among the *Sukuma*. Many people now realize that inheriting a widow and her children can be a burdensome expense.

The customary system of tenure is unable to provide tenure security for women. Tenure insecurity reduces women's incentives to invest in the sustainable management of natural

resources, which hinders productivity (Besteman 1994; Place and Hazell 1993). Because women don't have the right to manage the resource or exclude others from using resources, it is very difficult for them to practice sustainable resource management. "Full ownership right including the right to dispose of the property through sale or inheritance, is often assumed to provide the strongest incentive to maintain resources over time" (Meinzen-Dick et al. 1997).

Data from focus group discussions revealed how gender perceptions about property rights are embedded in the patriarchal system of the *Sukuma*. Surprisingly, when I asked women respondents, if given a choice and the power to implement it, how they would distribute inheritance among their children, 42 percent said they would distribute wealth equally among both male and female children, 55.4 percent said they would give more wealth to the male children than female children, and 3 percent said they would give nothing to their female children (Table 7.2). I also asked men how they would prefer to distribute their inheritance among their children (Table 7.3). The majority of men (83.3 percent) said they would give more wealth to male children, a response consistent with the fact that a majority of women preferred giving inheritance to male children. Only 5.2 percent of men said they would give equal share of inheritance to male and female children, compared to 41.5 percent of female respondents. Moreover, 11 percent of men reported that they would give nothing to female children, compared to only 3 percent of women respondents.

Table 7. 2: Women's Perceptions about Inheritance

Distribution of inheritance	Percentage
Give equal share for male and female children	41.5
Give more wealth to male children	55.4
Give nothing to female children	3.1
Total	100.0

Table 7. 3: Men’s Perceptions about Inheritance

Distribution of inheritance	Percentage
Give equal share for male and female children	5.2
Give more wealth to male children	83.3
Give nothing to female children	11.5
Total	100.0

It is amazing how women’s self-image has been affected by customs and norms. Women see themselves as inferior people who don’t have the right to own or inherit property. This shows the deep-rooted culture of customary property rights, which makes it difficult to implement the statutory laws that ensure equitable property rights to both men and women. One woman who said that she would not give anything to her female children justified it by saying that:

Giving inheritance to a female child is like throwing it away. It will not benefit her, but rather will benefit her husband and his family. Once she gets married, she will move to her husband’s family. The husband may take all that wealth from her and use it to pay dowry for a second wife or use it all for drinking local beer. If her husband dies, his relatives will take away everything from her. It is more secure to give inheritance to male children because the family wealth will remain in the family, it can help every member of the family including the female children who need help or are chased away by their husband or in-laws.

In this situation, a political economist would argue that the statutory legal system is important because people tend to act according to their norms (which may be discriminatory). Also the community-yoke thesis maintained that statutory institutions can provide rules of justice

that can free people from customary ties (which may be discriminatory). But, as Hayami(1998) and new institutional theorists maintained, statutory institutions need to work together with customary institutions because statutory institutions may not have the resources to enforce their laws.

The fact that women cannot own property makes them dependent on their husbands for their livelihoods. So a woman must rely on the goodwill of her husband and male children. This was also observed by Mbilinyi (1972) who pointed out that lack of property rights to women intensifies their economic dependence on men. The situation becomes worse if a husband does not take care of his wife and children in good faith. Properties such as the houses and agricultural fields are recognized as belonging to the husband, and if formal title is obtained, they are often registered only in the husband's name. According to customary laws, one can not sell land without getting permission from clan elders, and sometimes from children (if they are adults). Moreover, the Land Act required men to obtain their wife's consent before they can sell any family land. But women said in focus group discussions that in many situations a husband can decide to sell the land without his wife's permission, even if she and her children depend on the production from that land. Under these circumstances, women may be unwilling to invest in a land if they believe that it may be taken from them.

Although poverty affects the whole household, it affects women more than men. Greater poverty among women is due to inadequate economic resources and opportunities, low levels of education, and low participation in the decision-making process. Poverty forces women into situations where they are dependent on men and vulnerable to male domestic violence.

7.4. Gender Perceptions and Division of Labor

In the *Sukuma* culture, the division of labor is gender-based. Women have the primary responsibility for domestic work. This includes cooking, fetching water, collecting firewood, doing laundry, cleaning the house, managing household health, and raising children. Table 7.4 shows data obtained from focus groups where people were asked to give a detailed explanation of daily activities in a household, and say who does what activity at what time. Data on table 7.4 indicates that women work longer hours than men. In fact, women barely have time to rest.

Table 7. 4: Household Gender Division of Labor³⁶

Time	Women's activity	Men,s activity
6.00 - 7.00 am	Wake-up, fetch water and milk the cows	Wake up ³⁷
7.00 - 8.00 am	Fetch water, prepare breakfast, and clean the house	Wait for breakfast
8.00 - 1.00 pm	Farm / off-farm work	Grazing livestock, farm/off-farm work e.g. brick making, home repair, thatching the roof, etc.
1.00- 2.00 pm	Cook lunch	Rest and wait for lunch
2.00 - 3.00 pm	Take lunch, and wash dishes	Take lunch and rest
3.00 - 5.00 pm	Farm / off-farm work	Go to work: grazing, farm/ off-farm work
5.00 - 6.30 pm	Fetch water, fire wood and greens from bushes for dinner	Back from work and rest
6.30 - 8.00 pm	Prepare dinner, milk the cows, attend the children	Rest, go to drink local beer, talk and play games with friends
8.00 - 9.30 pm	Take dinner and attend the children	Take dinner and rest
9.31 - 6.00 am	Sleep	Sleep

³⁶ These were general estimates given by focus groups.

³⁷ In the rainy season, men sometimes together with women will to go the field to ox-plow.

Although both men and women wake up at the same time, women have more work to do during the day than men. They have to do both domestic work and farm work, while men do farm work or other economically productive work. While women are busy with domestic work, men will rest and wait for food to be prepared or they go drink or visit their friends. Although men are more engaged in heavy physical labor work like farming, livestock grazing and watering, brick making, new house construction, and home repairing, they get time to rest. Women have tight schedules every day, as one task follows another.

In addition to walking long distances to fetch water, I observed that sometimes women waste a lot of time waiting in long lines for their turn to collect water from a water source. During the dry season, most water sources both natural and developed produce very little water, so women take a long time just to fill one bucket. In some cases, women must leave at the middle of the night to avoid long queue at the natural water sources. In shallow wells managed by water-user groups, an equal amount of water must be distributed to each member household, a process that takes a long time. In other cases, women said in focus group discussion that a woman might have to spend three hours waiting at distant water pump along with scores of other women, for a turn to fill a water container, and then return carrying the weight of a full water container. In most cases, a water container or bucket weighs about 20 kilograms and carries 20 liters of water as shown in figure 7.2. Women who carry this weight on daily basis may end up getting headaches, joint pains, and, in extreme cases, get curved spines and pelvic deformities (Greenberg 2003; Water Aid 2000).

The gender division of labor is also revealed during the development of shallow wells. When the new established water-user group decides to dig a well, they require one member in each household to participate in the digging.

Figure 7. 2: Women have to fetch water and carry heavy weight on their head everyday



In focus group discussion with water-user groups, they said that every household is required to bring food to the well site, on a rotating basis. Men are responsible for digging the well, and women are responsible for cooking the food. The food to be eaten by men at the well site is supposed to be special, and nicely cooked. In focus group discussions, villagers said that men wouldn't eat any "normal" food brought to the well site. Women were expected to do their best to prepare special meals. In focus group discussions, men said that they deserved to eat special meals because digging a well is a difficult task, which needed energy and motivation to do. They also said that they felt that their wives care for them and appreciate their work when they brought special meals to them. Women said that men were so picky, men wouldn't even touch the food if it wasn't special. In *Sukuma* culture, this is a bad thing, and makes women feel embarrassed. As a woman explained in an interview:

We were not supposed to bringing potatoes or any food that is not special. Also women who bring food to the well site must be clean, and the food containers must be clean too. If you take normal food or food which is not properly cooked, men won't eat it, and the whole village will know. You will be embarrassed to death that day! If it is your duty to cook, you must do whatever possible to prepare special food. Sometimes you can borrow money or find temporary paid farm work to raise money to buy special food.

Table 7.5 shows the data from the household survey which indicates that the collection of domestic water is mainly the responsibility of women. The majority of respondents (94 percent) reported that the collection of domestic water was primarily the responsibility of women.³⁸ In the survey, 59 percent of respondents reported that the collection of water for domestic use was exclusively women responsibility, meaning that women are solely responsible and men are excluded from drawing water for domestic use. Also 36 percent reported collection of domestic water was predominantly the responsibility of women. This means that men were also responsible but women were more frequently responsible than men in collecting water for domestic use. Men were more engaged in livestock watering than women. A small number of women were engaged in livestock rearing activities such as cleaning, milking and watering, normally when men are absent or sick. About 45 percent of household survey respondents said that livestock watering was predominantly a man's responsibility. With regard to irrigation, table 7.5 indicates that women are also engaged in irrigation, with about 45 percent of respondents reporting that both women and men are more or less equally involved in irrigation.

³⁸ This is the sum of the percentage of respondents who said that collection of water for domestic use is exclusively and predominantly women's responsibility.

Table 7. 5: Who is Responsible for Drawing Water for Different Uses? (Percentage)

Who is responsible?	Type of water use		
	Domestic	Livestock	Irrigation
Exclusively women	58.6	1.6	11.1
Predominantly women	35.9	18.4	0.0
Women and men more or less equally	3.6	35.2	44.5
Predominantly men	1.4	44.8	33.3
Exclusively men	0.5	0.0	11.1
Total	100	100	100

Surprisingly, I gathered from women in focus group discussion that the majority of women agree that domestic chores are their responsibility and that they wouldn't let men help them with domestic chores. One woman explained in a focus group discussion:

I wouldn't let my husband cook, wash dishes, or fetch water, it is my responsibility. It is a shame for a man to do domestic chores, and the whole village will talk about if it happens. I wouldn't let him unless I am very sick.

Other reasons given by women in focus group discussion and during informal discussions as to why they won't allow men to help them with domestic chores are all rooted in the customary ideologies about women. These include:

"The community will say you are growing horns, and trying to be a man"

"People will say you have used witchcraft to make your husband behave like a woman"

"His parents and relatives will hate you for mistreating and harassing their son"

"You will be regarded an abusive wife"

"It will be a ticket for divorce"

Most male respondents that I talked to through informal discussions and through focus group discussions were not in favor of equally sharing domestic tasks with women, except if

their wives were very sick and they could not find a female relative to help. This view was also given by some women in focus group discussions. Women said before they can let their husbands do domestic work when they are very sick, they will try to find a relative or a close friend to come and help first. Men said it is embarrassing for them to intrude into women's "colonies." In *Sukuma* culture, a kitchen is regarded as a place for women or "women's colony" because they are the ones who are responsible for cooking and washing dishes. I also observed that women do not eat together with men. In most cases women eat in the kitchen with children while men eat in the dining room, sitting room, or outside. The few men who favored sharing domestic tasks with women said they would do so only if they were not seen by other people and they would not carry water on their head as women do, but instead they would use bicycles or trolleys. As one customary leader reported in an interview:

Domestic chores are women's job, we also have our own jobs. It is okay to help our wives with domestic work when they are sick, but it is not possible to do it on a regular basis when everybody knows that your wife is healthy. This is our culture and it has been like that.

Other reasons given by male respondents as to why they won't be willing to share domestic chores with women included:

"Your wife will think you are disrespecting her for taking her job"

"She will think you don't love her"

"Other men will laugh at you"

"It is embarrassing for men to do women's job"

"I am a bread winner"

"What did I pay the bride price for?"

“People will think you have mental problems”

“It is degrading to men”

“Unacceptable in our culture”

“You will never be respected”

The above reasons show that most men believe that they are “better” than women. They think domestic work is degrading and embarrassing to them. Some felt that since paid the bride price and they are bread winners, so women should do domestic chores. Others indicated the influence of culture in gender division of labor where men who participate in domestic work are not respected. Also some men felt like women feel loved and respected when they are left with the responsibility of domestic work. This was also mentioned by women in focus group discussions that “if men are in charge of domestic work, what will we do?” Women said that they will feel worthless if their husbands begin to take charge with domestic work, except in an emergency situation.

Women are also highly involved in agricultural production. Data from the household survey indicates that the major sources of irrigation water in the dry season included rivers (56 percent), ponds (22 percent), and shallow wells (22 percent). In the wet season, rainfall (98.2 percent) is the major source of water, with paddy rice as a primary irrigated crop. Table 7.6 shows the data from household survey which indicate that a large number of respondents (44 percent) reported that women and men were more or less equally involved in irrigation, while 33 percent reported that irrigation was predominantly a male’s responsibility. Women were more involved in wet season irrigation, specifically on paddy rice production. Men were more involved in dry season irrigation, mainly vegetables and fruits, rather than in wet season irrigation. Most men, who engaged in irrigation during the dry season, said in focus group

discussions that they did so for commercial purposes and not for growing crops for home consumption. Women said in focus group discussions that a woman is traditionally responsible for growing and harvesting the crops, while her husband owns the produce by virtue of being the land owner. He also decides how much produce is sold and how much is kept for household consumption. The husband usually takes the produce to market and sells it, thereby taking control of cash income for the household. So, although women are highly involved in irrigated agriculture, men control the benefits of the harvest.

Table 7. 6: Gender and Irrigation

Who operates the irrigated parcel?	Percent	
	Dry season	Wet season
Exclusively women	11.1	16.1
Predominantly women	0.0	66.1
Women and men more or less equally	44.4	14.3
Predominantly men	22.2	3.6
Exclusively men	22.2	0.0
Total	100.0	100.0

Customary laws have greatly influenced the way men and women perceive themselves. Gender perception has a great impact on the decision-making process because it dictates who has the right to make decisions (Nemarundwe 2003). Tables 7.7 and 7.8 show how men and women in the focus group discussions perceived themselves. Women place an emphasis on domestic responsibility and problems that women face everyday. Women view themselves as mothers and wives, but as also being powerless and inferior, with responsibility for the family and domestic work. Although both women and men view men as powerful, bread winners, head of the households, and decision makers, some women view men as controllers and oppressors. By contrast, men view themselves as superior. They view themselves as intelligent and powerful,

strong, as kings, decision makers, leaders, and bread winners. Both men and women excluded men from domestic responsibilities and child care.

Men perceive women as inferior, and responsible for all domestic and family responsibilities. Both men and women acknowledge the role of women as mothers and hard working. But, in focus group discussions, men revealed that they felt that they don't have to work hard in the household because they paid a bride price for a woman and expected her to work hard and bear children in return. In everyday life, women are supposed to be submissive to their husbands and do whatever they are told by their husbands without question. One key informant said that women are supposed to submit to their husbands because that's what the bible says. During an interview with him, he was holding a bible and he read bible verses to me:

The bible made it clear. In first Timothy chapter two verses 11 to 14, it says "let a woman learn in silence with all submission. And I do not permit a woman to teach or to have authority over a man, but to be in silence. For Adam was created first, then Eve. And Adam was not deceived, but woman being deceived, fell in to transgression."

The above bible quotations were also mentioned by men in focus group discussions. I asked women in focus group discussions how they thought about the above verses, and they said that although the bible says women need to submit to their husbands, it also says husbands must love their wives and take care of them. Women also said some men don't take care of their wives and children (*Ili mradi olei na ngosha guke, ngosha mahano*). Women also said that it is true that Adam was created first, but Eve was created from Adam's rib, this is a symbol of oneness. So women agreed that they need to submit to their husbands, but, they also said they expect to receive love and care in return.

As one woman explained in an interview:

How can you submit to a man who beats you and harasses you every day?

A man who doesn't care about you? A man who uses all the money to drink beer, and doesn't care about the children? A man who is not faithful?

Table 7. 7: Women's Perceptions about Themselves and about Men

How women perceive themselves	How women perceive men
Hard working	Bread winner
Mother and wife	Leaders
Child bearing and child care	Head of household
Care for the family	Powerful
Powerless	Intelligent
Less educated and unintelligent	Controller
Insecure life	Oppressors
Suffer a lot of problems	Decision maker
Inferior	Unfaithful
Does all domestic work	

Table 7. 8: Men's Perceptions about Themselves and about Women

How men perceive themselves	How men perceive women
Bread winner	Child bearing
Head of household	Hard working
King of the family	Takes care of family
Powerful, stronger	Responsible for domestic work
Decision maker	Cant make good decisions
Intelligent	Patient
Leaders	Mothers of the house

I observed that when greeting men, women are supposed to show respect and submission by kneeling down. It is unacceptable for *Sukuma* women to greet men while standing. I also observed women's submission during meetings with men. Women sat on the floor while men sat

on chairs as shown in figure 7.3. Similar results were reported by Nemarundwe (2003), who observed village meetings in the Romwe district of Zimbabwe and found that women sat on the ground while men sat on the chairs or on other elevated positions. Similar results were also observed by Agarwal (2001) who found that in India and Nepal, women sat on the floor while men (especially the older ones) sat on the cots or chairs during meetings. Sometimes women sat on the side or at the back of the meeting space. This made women's participation less effective because points made by males during meetings (who happen to sit in front) received higher priority.

Figure 7. 3: Women shows respect to men by sitting of the ground and let the men sit on the benches



Although sitting on the ground was viewed as a cultural behavior, it reflects the different positions that men and women have in the community, where men are viewed as the dominant group. As observed earlier, gender perception among the *Sukuma* is rooted in their culture. Women acknowledged that they often don't speak up in village meetings and that they often accepted decision made by men even if they didn't agree with them. Women said they could not make "intelligent" points that would convince men to accept their ideas. Moreover, because men are viewed as superior, women could not challenge or men's ideas.

Over the years, women in *Sukuma* land have experienced some change in gender relations. Although men are still viewed as bread winners, an increasing number of women have engaged themselves in income-generating activities. Villagers reported that in the past, men were expected to provide everything for their family. Today, this trend is changing because more and more women are engaging in income-generating activities. They attributed this trend to government policies aimed at empowering women and helping women improve their lives by engaging in income-generating activities.

In focus group discussion, women said they have the interest and commitment to improve their standard of living. They have tried to pool their scarce resources to form small groups for development. They have organized themselves in different groups and have established different income-generating activities. In some villages, women have registered their groups and have applied for loans from the government. These women work together on issues like cash-crop production and tailoring. Some women's groups have established credit institutions (*ifogong'ho*) where people could borrow money and return it with 10 percent interest per month.

Women reported that NGOs such as CARE have provided financial support to women's groups. Moreover, women have benefited from the Health through Sanitation and Water

(HESAWA) programs that began in Tanzania in 1985. HESAWA is mainly financed by the Swedish International Development Cooperation Agency (SIDA) to work on rural water supplies, environmental sanitation and health education, focusing on poverty eradication and gender equality. To achieve its goals, HESAWA has invested in the development of human resources by training village health workers, craftsmen, water technicians, and water pump caretakers, where both men and women have equal access to training. Women groups have also benefited from HESAWA's credit program which provides financial support for women's groups.

Although women are now engaging in income-generating activities, women said in focus group discussion that their participation is subject to approval by their husbands. Moreover, most women said they have no say on how to spend the money they earn. They are supposed to get approval from their husbands before they can spend their money. But men can spend their money and other family wealth like cows the way they want even without their wives' consent. Some women reported that they try to hide the actual amount of money they make from their drunken husbands who may take the money and use it for drinking.

Changes have affected men as well. In focus group discussions, women said that in the past men never fetched water, but this is slowly changing. I observed young boys from 7 to 11 years in the villages fetching domestic water. But when boys fetched water, they didn't carry water containers on their head but used a bicycle or a trolley instead (figure 7.4 and 7.5). Most women in the villages reported that drawing water for domestic use is a woman's job and that they won't let their sons draw water if there were girls in the family.

In my observations, young boys were accompanied by an adult if they collected water from developed shallow wells, and unaccompanied if the water source was a spring. Older men

(teenagers and above) still do not fetch domestic water in the villages unless women are sick and there is no one to fetch water. However, I observed young boys and adult men fetching water for sale in Bariadi town as shown in figure 7.5.

Figure 7. 4: When men fetch water, they don't carry on their head they use bicycles instead



Figure 7. 5: A water vendor in Bariadi town center



Water vending was only observed in Bariadi town and it is not common in rural areas.

Water vendors, who were all men, supplied water in restaurants, small hotels, and guest houses and in some well off households. Water for sale was mainly obtained from natural sources, from the charco-dam in Bariadi town, and from private shallow wells where water vendors had to buy water and sell it for profit.

7.5. Gender and Institutional Arrangement for Water management

Although women are very important in the economy of Tanzania and are significant users of water, they rarely make decisions about water management policies. Women remain under represented at all levels of policy formulation and decision-making in water management, from local positions to the ranks where national and international environmental policies are determined. Their experience and skill in water-resource management is often marginalized in policy-making and decision-making bodies, and in educational institutions and environment-related agencies.

The new system of water-resource management in the Bariadi district, and Tanzania in general, requires the creation of domestic water-user groups that make cash and inkind contributions. The new system appears to be more gender neutral because each water-user group has a water committee with an equal number of men and women (three men and three women). Each member of a water-user group gets equal benefits regardless of gender. But the system of membership fees and other money contributions may affect women with low financial ability, particularly women who may not be able to get money from their husbands, who may regard water as the wife's responsibility and place a lower value on saving women's time and effort than

women do themselves (Cleaver and Elson 1995). However, having an equal number of men and women in the water committee does not mean equal participation in decision making.

Although the involvement of women in water committees and water-user groups provides women with new opportunities to manage water, in reality women are less likely to exercise real power in a patriarchal system where men have more power than women and tend to dominate in most situations. One of the reasons is that women lack self-confidence, due to cultural constraints, which prohibit women from freely expressing themselves and participating in discussions at public gatherings of men and women (Lundqvist 1999). Another cause of lack of women's self-confidence and inferiority is their low level of education. As pointed earlier, women in Tanzania have low levels of education compared to men.³⁹ This means that women have difficulty in understanding the structures of different statutory systems. Issues such as how to register land, how to get land ownership, and how to contest land are not understood by a majority of women. Although participation in water-user group meetings could give women a voice in making decisions about water management, women rarely attend these meetings. Women's low rate of participation may be caused by rules that may limit attendance to only one person per household, in which case the man usually attends meetings. Other factors that influence women participation are: a loss of social prestige that may accompany a woman appearance in public; too little time that may be given to women at meetings; or lower literacy rates among women which give them a lower status in public meetings (Meinzen-Dick 1999a).

Moreover, women are more committed to other domestic roles like cooking, childcare and general sanitation, so they tend to have little time to attend meetings. The few women who

³⁹ For example, the literacy rate in 2004 for men in Tanzania was 85 percent compared to 65 percent of females (Engenderhealth 2005).

did attend meetings often sat at the back and kept quiet. In many water- related meetings, men dominated the meetings, elected each other in leadership positions and made most of the decisions with regard to water management (UNDP 2003). Traditionally, it was assumed that the men, as heads of households, represent their wives and that they will inform their wives about everything that was discussed at the meetings. Unfortunately, that is not always the case. Research shows that “much communication is gender segregated, and so male family members will keep the information to themselves” (Lundqvist 1999:14).

7.5.1. Gender and Customary Institutions

In my observations, I found that customary institutions in the Bariadi district are gender-biased. In both the *Dagashida* and *Sungusungu*, only men are allowed to join, and they tend to apply a male-biased interpretation of customary laws. Women are not allowed to join either of these two important customary institutions. Women are also not allowed to attend *Dagashida* or *Sungusungu* meetings. They are only informed that a law has been adopted or that decision was made, and they were expected to follow whatever decisions were reached. Women don't get an opportunity to challenge decisions or contribute to the discussions made by men. As one woman explained in a focus group discussion:

Men will make all the decisions themselves and keep most of them as secrets. They wouldn't tell us what they have discussed even if we ask. They only announce to us what they have decided and what we should do. They get a lot of money from fines paid by offenders of traditions and culture. Sometimes offenders are told to pay a cow by “Sungusungu” or “Dagashida.” The money is then distributed among men. Women receive nothing; they don't even bring the money home. When they get the money, they

go to drink local beer. If an offender pays a cow, they will slaughter the cow and eat the meat at the meeting. They won't bring a single piece of meat at home. Sometimes they get a lot of money. If this money could have been used for development, we could have solved a lot of poverty problems in our village. We could have built hospitals, schools and we could have dug a lot more wells.

All the *Sungusungu* groups I talked to said that the major reason for not allowing women to join *Sungusungu* was that women didn't keep secrets. Moreover, there is a danger involved in local policing work, which may not be suitable for women. For example, patrolling the village at night or chasing and roughing criminals. In focus group discussions, I asked *Sungusungu* and *Dagashida* members whether they would be willing to work with women. One *Sungusungu* member said:

No! We won't allow women in Sungusungu or Dagashida, our work will be so difficult if we work with women. Women like to talk and gossip a lot, they never keep secrets. It is hard to arrest an offender and investigate cases if you dispose all the information about him or her

The above discussion shows that customary institutions discriminate against women. However, chapter six shows that customary institutions are strong in water access and prevention of pollution and abuse issues. The biggest challenge that the government faces is to ensure that customary institutions provide for gender equality in development and governance processes.

7.5.2. Gender and Statutory Institutions

The United Nations Beijing Platform for Action addressed the issue of power inequality between women and men in public affairs. Governments were urged to take action in order to ensure gender equality in access to and participation in power structures and decision-making, and they were urged to promote women's capacity to participate in decision-making and leadership. The Beijing Platform for Action has recommended the following actions be taken to increase women's capacity to participate in decision-making and leadership. Governments, national institutions, the private sector, political parties, trade unions, employers' organizations, sub-regional and regional bodies, non-governmental and international organizations, and educational institutions were asked to:⁴⁰

- a. Provide leadership and self-esteem training to assist women and girls, particularly those with special needs, women with disabilities and women belonging to racial and ethnic minorities to strengthen their self-esteem and to encourage them to take decision-making positions;
- b. Have transparent criteria for decision-making positions and ensure that the selecting bodies have a gender-balanced composition;
- c. Create a system of mentoring for inexperienced women and, in particular, offer training, including training in leadership and decision-making, public speaking and self-assertion, as well as in political campaigning;

⁴⁰ Source: UN 1995.

- d. Provide gender-sensitive training for women and men to promote non-discriminatory working relationships and respect for diversity in work and management styles;
- e. Develop mechanisms and training to encourage women to participate in the electoral process, political activities and other leadership areas.

Tanzania has tried to increase the representation of women at all levels of government. The aim is to reach the goal of the 1997 Gender and Development Declaration of having 30 percent of women in decision-making by 2005, which was set by the Southern Africa Development Community (SADC). The latest election held in December 2005 resulted in increased women's representation in decision-making positions. The new presidential cabinet led by President Jakaya Mrisho Kikwete has 16 women (26 percent), comprising six ministers and ten deputy ministers. In this cabinet, women have been appointed to occupy positions that had never been occupied by women. Such positions included the Finance and Cooperation, and Foreign Affairs ministries.

In 2005, Tanzania became the third country within the South African Development Community (SADC) to achieve the target of having women 30 percent of women in the parliamentary seats. Other SADC countries that have attained this goal are Mozambique and South Africa. The number of women in the parliament has increased from 21.53 percent in 2000-2005 to 30.41 percent in 2005-2010 parliamentary terms (Table 7.9).

Women who aspire to political office are faced with a number of constraints. First, the majority of women have lower incomes than men, and they have no power to use family resources to campaign unlike their male counterparts. Moreover, the traditional stereotype that women cannot be good leaders, affects women. Most voters prefer to vote for men. Given the slow progress in increasing the number of women in the decision-making process, one strategy is

to establish a legal quota system and adopt gender-sensitive campaign training for women candidates. Another strategy is for the government to provide campaign subsidies for women.

Although the increase in the number of women in the parliament is a big step towards women empowerment in decision making, the number alone is not sufficient enough to transform patriarchal norms that exist in Tanzania. The most important issue is for women to have an impact on the transformation of patriarchal systems. To achieve this change, women need support from members of society, both men and women, and from institutions (both customary and statutory), and NGO's to create gender awareness as well as to increase women's confidence and participation in development. Moreover, patriarchal ideologies that exist in Tanzania, together with customary perceptions and attitudes about women cannot change overnight. It is a slow process which requires a team effort as explained by Hayami (1998). The multiple legal systems that exist in Tanzania need to be harmonized to support each other. Relying on statutory institutions alone is not enough to bring social change.

**Table 7. 9: Distribution of Members of Parliament by Gender
for 2000-2005 and 2005-2010 Parliamentary Terms⁴¹**

Gender	Parliamentary term (year)			
	2000-2005		2005-2010	
	Number	Percent	Number	Percent
Female	62	21.53	97	30.41
Male	226	78.47	222	69.59
Total	288	100	319	100

⁴¹ Data were obtained from the Parliament of Tanzania website
<http://www.parliament.go.tz/bunge/Assembly2.asp>

Tanzania ratified the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) in 1981. CEDAW was adopted by United Nations General Assembly in 1979. By ratifying CEDAW, countries pledge to end discrimination against women in all forms. CEDAW stresses on the equality of men and women in the legal system, and established that women should have the same rights as men. It calls for changes in constitutions, legislation and policies to reflect gender equality. Although the ratification of CEDAW is an important step for social and legal reform, it is not a sufficient measure of the government's commitment to end gender discrimination (Clark 1991; Cook 1990).

For example, Tanzania has not incorporated CEDAW into statutory law through an Act of Parliament. This means that it cannot be treated as part of statutory laws for the purpose of making formal judgments or court decisions (Rehmtulla 1999). Although Tanzania ratified the CEDAW, and incorporated the Bill of Rights in its constitution, "it is clear that the state is not altogether progressive in implementing these objectives beyond the level of rhetoric" (Manji 1998:666). Addressing gender discrimination means addressing the judicial, legislative, customary laws, and administrative powers.

CHAPTER EIGHT

8. WATER MANAGEMENT INSTITUTIONS: CONFLICT RESOLUTION, COMMUNITY PARTICIPATION, AND STRENGTHS AND WEAKNESSES

8. 1. Introduction

This chapter provides an assessment of customary and statutory institutions for water management. This includes the analysis of effectiveness and strengths and weaknesses of customary and statutory institutions. As explained in chapter four, effectiveness of institutions was analyzed using three criteria: the role of institutions in conflict resolution, the extent of community participation, and how effective institutions are in achieving gender sensitive goals. The strengths and weaknesses of customary and statutory institutions were analyzed in order to determine how their strengths complemented each other and how weaknesses might be strengthened to achieve sustainable water management in rural Tanzania.

8.2. Institutions and Conflicts Resolution

Conflict refers to a state of disharmony, opposition, or disagreement that can occur when two goals are incompatible (Dyer and Song 1997). Conflicts over resources occur when a scarcity of resources causes competition and disagreement (Grimble and Wellard 1997). Conflicts can occur at the micro-micro level or micro-macro level. Micro-micro conflicts are those that occur among individuals or groups within a community. Micro-macro conflicts are those that occur between individuals or groups on the one hand, and government, or private companies on the other.

Conflicts are often viewed as negative because they cause tension, wasteful competition, uncertainty, and violence. But, conflict is not always negative. In fact, conflicts can be beneficial if managed effectively. Conflicts can play an important role in informing society that there are problems that need to be solved. Conflicts may cause the society to consider new ideas and alternatives to solve problems. Well-managed conflicts can strengthen relationships, bring new ways of thinking, and can lead to consensus that better meets the needs of an individual and society in general (Bourgeois 1985).

Conflict resolution refers to strategies that seek to resolve an existing conflict or incompatible interests and behaviors. A conflict is resolved if the incompatibility between two parties disappears, or when sources of conflict situation are removed through a mutually acceptable process (Bar-Siman-Tov 1994). This study discusses two types of natural resource-related conflicts that occur in the Bariadi districts, water-related and land -related conflicts. The discussion below examines these conflicts and how they are resolved.

8.2.1. Water-Related Conflicts

The ability of community members to access and use water resources in the Bariadi district is defined mainly by customary laws. As discussed earlier, these laws determine the priority of water use, provide control of water use, and dictate who has right to the resource and who has an obligation to manage water resources. These laws involve both private and public rights and obligations to particular water resource use.

In focus group discussions, villagers said that the most common cause of conflict among irrigators is the theft of water. Because most irrigation during the wet season depends on rainfall availability, some rice farmers steal water from neighbors' paddies. They usually steal water at

night. Customary institutions prohibit such theft, and impose heavy sanctions on water thieves. In focus group discussions, irrigators explained that water theft is mainly done when it rains. The thief will typically divert or redirect the flow of water of other nearby farmers to direct the water on his or her own paddy farm. In some cases, a thief pokes a hole into the nearby paddy wall at night, so the water can flow on his or her paddy farm and then seals the hole before dawn.

The first level of conflict resolution is conducted by the two irrigators. After a thief is caught, he or she is confronted and asked to stop or return the water he or she stole (if the paddy farms are in a plain area, the thief will be asked to poke a hole on the paddy wall so the water he or she stole can flow back to the owner). The second level is when the two can not resolve the conflict, or come to agreement. The irrigator whose water was stolen, reports the thief to *Sungusungu* or *Dagashida*. In focus group discussions, *Sungusungu* and *Dagashida* members said repeat offenders are fined, or in serious cases, ostracized. Once they are taken to *Sungusungu* or *Dagashida*, offenders are required to pay double fines, one for the *Sungusungu* or *Dagashida* and one for the victim of water theft.

Conflicts also exist between small-scale irrigators and other water users. The major source of water for irrigation during the dry season is rivers, ponds, and developed wells. In focus group discussion with irrigators, they said that when water is scarce, irrigators upstream may use up most of the water, so little water remains for downstream users. This causes conflict between irrigators and water users downstream.

If the river is trans-boundary, where upstream and downstream water user belongs to different villages, the solution to this kind of conflict requires joint action. Customary institutions in both villages get together and formulate joint laws because every one has an equal right to a

natural water source that passes by their community. So, in addition to settling intra-community water conflicts, customary institutions also settle inter-community conflicts over water. Statutory institutions are “too thin” in rural areas to effectively and quickly identify and solve upstream-downstream water conflicts (Van Koppen et al. 2004).

Livestock keepers get into conflicts when they are not able to access enough water for their livestock. In focus group discussion with livestock keepers, customary institution members, village elders, and local government officials, they said that most of the conflicts occur in the dry season because most the common water sources for livestock watering dry out, and then, livestock keepers compete with other livestock keepers or with neighboring communities for water. A *Sungusungu* chairman said in an interview that when conflicts arise, most people first negotiate. But, if negotiation doesn't work, they will ask customary institutions to resolve the conflict. In many situations, conflicts are resolved. In a few cases, the loser may appeal to statutory institutions for resolution.

Domestic water use also leads to conflicts when water is scarce. Most shallow wells have water guards who make sure there is no theft and there is peace at the well. In focus group discussions, water-user groups said that no one is allowed to fight, argue, or use abusive language at the water source. Those who are at odds are supposed to report their disputes to the chairperson of the water-user group.

During participant observation, I observed that at natural water sources like springs, there were no special guards, except that villagers were supposed to watch one another. A woman key informant explained the suffering she goes through during the dry season. She is a member of a domestic water-user group but she doesn't get enough water from a shallow well during the dry

season, so she has to get more water from springs. Her story shows that people try to resolve the conflict by themselves first, before they report it to customary institutions. As she explained:

When you get at the spring, there is a long queue. In the dry season there isn't enough water for all of us. You have to wake up at 5.00 am before everybody else otherwise you won't get water on that day. Sometimes you can be at the spring up to noon waiting to fill up your bucket. Everyone is supposed to line up; there is no way you can cheat because everybody at the well will have seen you. We all watch each other and we know who came first. Sometimes people want to cheat and jump to the front. But we normally confront them and make sure they are embarrassed or report them to the Dagashida.

The above situation can occur at a time when water is scarce and everyone scrambles for water. When water is plenty, it is less likely that there will be very long queues at the water sources, but still some people may not want to line up. Instead, they may want to cheat and draw water quickly. As the above woman explained, community members watch each other and confront those who want to cut the line.

Conflicts can also occur when pastoralists graze their animals in croplands, either because of carelessness or accident. This is another major source of conflict because most people depend on agriculture for their livelihood. Once their crops are grazed, their livelihood is threatened. In focus group discussions with livestock keepers, village elders and customary institution members, they said that grazing on other peoples' crops is regarded as a serious offence and is sanctioned severely. In many situations, the conflict is solved by negotiation between the two parties, and the livestock owner is asked to pay the loss his or her animals caused. In a situation where the two parties cannot agree, they will take the dispute to the

customary institutions. But, livestock keepers said they usually try to negotiate and solve the conflict before they are taken to customary institutions. They also said that it is better to negotiate and agree with the victim for many reasons. First, if the dispute is taken to a customary institution, they will have to pay a bigger fine. One *Sungusungu* chief said “we charge bigger fines because we don’t get paid for what we do, we totally depend on fines to run our institution.” Also *Dagashida* members said they charge bigger fines because half of it goes to the victim, and the other half remain in *Dagashida*. They used the word “bigger fine” to refer to double the amount of compensation asked by the victim.

Second, it is important for livestock keepers to have a good relationship with their neighbors because they need their help when there is cattle theft. Cattle theft is very common among the pastoralists. Livestock keepers often rely on fellow villagers to help search for their stolen cattle. Maintaining a good relationship with fellow villagers is very important for cattle owners, so they usually plead guilty if their animals are caught grazing in other people’s crops, and most of the time they assume responsibility for their actions. Livestock keepers explained in the focus group discussions:

We livestock keepers are very scared of fines. If you are caught, you will always want to negotiate and come into consensus because you will be required to pay a larger fine when you are taken to Dagashida or Sungusungu. If you don’t solve the conflict with your neighbors, who will help you when your cows are stolen? When your cows are stolen and you whistle for help, people won’t come to help search for your cows. They will say you were so proud that you grazed their crops and they won’t come to help.

Third, there is a belief that livestock keepers will be cursed by ancestral spirits if they disobey customary laws. Livestock keepers said they worry that angry spirits will result in the loss, death, or infertility of their livestock.

8.2.2. Land-Related Conflicts

Land conflicts in the Bariadi district are mostly related to boundary disputes, disputes between relatives over inheritance, and disputes between individuals and local government over the allocation of land. Most of these disputes are solved by customary institutions or households. In a situation where the dispute is not solved by the customary system, it is taken to the statutory institutions. In focus group discussions with local government officials, they said that each village has a committee for boundary and land disputes (*Kamati ya Migogoro ya Mipaka na Ardhi*) established by the local government. Serious cases of land and boundary disputes are taken to this committee. But the committee works along customary lines. As the chairman of the committee explained in focus group discussions:

When we get a complaint about land or boundary, first we call the village elders who have been in this area for a long time. Village elders know better than us. They also help us to identify witnesses who live or farm close to the disputed area. Then we will go and look at the land or boundary. The witnesses and village elders know who has customary right in what area and where the boundaries are. They will show us who is right and who is wrong, then we will decide.

In this case, it is very interesting that in some situations statutory institutions use customary institutions to resolve conflicts. It shows the potential of the two institutions to cooperate, taking advantages of the strength of each institution. The chairman of the committee

for boundary and land disputes said that the committee solves most land and boundary disputes. In a situation where an individual is not satisfied, they make an appeal to the formal court. But, most people in all the focus groups said they try to avoid going to formal court because it is too expensive both in terms of time and money. They also reported that because of corruption, they had lost faith in formal courts. Similar report was provided by Langseth and Michael (1998), who conducted a research on corruption in Tanzania, and found out that corruption and bribe payments, resulted in lower satisfaction with public service delivery, and less efficient public services.

Most of conflicts over land inheritance occur when family members disagree about who should get what land. As one woman explained in a focus group discussion:

My husband died in 1995. He left me with five children of whom two were sons. My husband had other children with another woman in another village. The sons of the other woman showed up at the funeral and wanted their inheritance. My two sons wouldn't let their step-brothers get equal share of land. Then a big fight emerged. The step-brothers claimed to have equal rights. Family elders intervened, the step brothers didn't get equal share since their mother was not married to my husband.

The above woman was lucky because she has sons who could inherit the property of their father, so she could continue to use the family's land. But women who don't have male children may face difficulty if their husbands die or divorce. Perhaps the most difficult land disputes occur between individuals and the government. In focus group discussions, villagers reported that the local government sometimes took their land for developmental projects like schools or health care centers. There was one such conflict between villagers and TASAF (Tanzania Social

Action Fund). TASAF is a government institution established to reduce poverty by building schools, bridges, clinics, and water sources. In one incident, villagers explained, TASAF wanted to take private land for a development project. A conflict arose because land owners didn't have anywhere else to farm. In another situation, the land was allocated to someone else through statutory land rights. In focus group discussions with livestock keepers, one villager described the situation:

I was shocked when I went to my farm and found someone building his house. This is the land I inherited from my parents. The land has been ours from our great parents. When I asked why he took my land, he showed me a title deed; he said the land was allocated to him by the local government. It has been three years now but I haven't been able to get my land back. When I went to customary institutions, I won the case, but the guy appealed to the formal court because he has a formal land right and I have nothing. The case is still in court and a ruling has not been made. It pains my heart to see how poor people are oppressed by their own system.

This conflict underscores the serious conflict between customary and statutory institution which is a result of lack of recognition of customary institution by the statutory institutions. The villager had customary right to the land in question, but because he didn't have formal right, he was at a risk of losing his land. In this situation, the security of tenure provided by the formal land right had created insecurity of tenure to a villager above. The above story tells how unhappy the man is with statutory institutions. He felt he is being oppressed with the formal system of land rights. This story provides evidence that the formal system of land right is not of interest to most villagers.

In the case of conflict resolutions in Bariadi district, it is clear that customary systems are preferred and widely used. A customary leader said in an interview that the customary institutions take into account facts that are not presented in formal court systems. Most conflicts that occur in rural areas are often part of long-running disagreements. In order to handle a conflict effectively, a customary leader said, it is important to understand the history of the underlying conflict which is hard for the formal court system. He said “the judges sit in the courts, and they may not know what exactly happens in the village. But, we know our people, and we know who is right and who is wrong.” These statements are consistent with the land related conflicts, where the use of village elders who are not directly related to the case, is perceived to bring a more just solution to a conflict.

8.3. Institutions and Community Participation

One of the central issues to sustainable rural water management is the concept of participation, involving rural people in making decisions concerning the water they use and the environment they live in. The concept of community participation entails the idea that community members who inhabit an environment over time are often the ones best able to make decisions about its sustainable use (McIvor 2000). The idea of community participation is also supported by new institutional theorists that the best way to achieve sustainable resource management is to design institutions that are governed by resources users themselves and to involve local resource users in resource management (Blomquist 1990; Bromley 1992; McKean 1992; Ostrom 1990; Pinkerton 1989; Singleton and Taylor 1992; Tang 1992).

Participation can be categorized in many different ways. Studies on participation have come up with different types of participation (Agarwal 2001; Pretty et al. 1995). This study

adapts Agarwal (2001) levels of participation as described in table 8.1. The levels of participation are arranged from lowest to the highest level. The lowest level is nominal participation which is explained by membership in a group, and the highest is interactive participation, where people have a voice and influence group's decisions. Agarwal (2001) points out that effective participation requires a shift from the lowest (nominal) to the highest (interactive) level of participation.

Table 8. 1: Levels of Participation (Agarwal 2001)

Form/ level of Participation	Characteristic Features
Nominal participation	Membership in a group
Passive participation	Being informed of decisions <i>ex post facto</i> , or attending meetings and listening in on decision- making without speaking up
Consultative participation	Being asked an opinion about specific matters without guarantee of influencing decisions
Activity-specific participation	Being asked to (or guarantee to) undertake specific tasks
Active participation	Expressing opinions, whether or not solicited, or taking initiatives of other sorts
Interactive participation (empowering)	Having a voice and influence in the group's decisions

The highest level of participation (interactive participation) is achieved when the community has total control of its resources. But, not every community member has a voice and influence in the community's decision making. In the Bariadi district, although community members in focus group discussions said they participate in planning and implementing water management laws, in reality most of decisions about water- management laws are made by

customary institutions, which are primarily led by men. As explained in chapter five, members of customary institutions said women are not allowed to join *Dagashida* or *Sungusungu*. Also in focus group discussions with women, they said they cannot join *Dagashida* or *Sungusungu* because that is a “men’s thing.” Most women said they will not join *Dagashida* or *Sungusungu* even if they were allowed to do so because it just doesn’t look “natural.” People will say women “have grown horns” (*bazwile mhembe*) if they try to join *Dagashida* or *Sungusungu*, or if they speak up, give their ideas, or challenge men in village or clan meetings. Therefore, women in Bariadi district are not even nominal participants in the *Dagashida* and *Sungusungu* institutions. As explained in chapter seven, women are supposed to do what has been decided, and they are not supposed to question it. This was also revealed through my personal observation during focus group discussion with *Dagashida* and *Sungusungu* members, who were all men. I was the only woman, so they were all amazed, and wondered what gave me courage to “face” them, talk with them, and even ask them challenging questions. One *Sungusungu* chief said most women won’t even dare to come close to a place where *Dagashida* or *Sungusungu* members are holding their meetings. He also said *Sukuma* women won’t even ask some of the questions I was asking them, like why women are not allowed to join *Dagashida* or *Sungusungu*. He gave the reason that “it has been like that, women cannot be equal or above men.”

In an interview with village executive officers they said that the local government requires both men and women to equally and actively participate in decision making regarding water management. But, in practice that is not always the case. For example, the local government requires water committee to be comprised of equal number of males and females. However, in practice customary law still influences gender relations. Participation of women in water-user groups is mainly passive. In most cases women will physically attend meetings, but

rarely participate actively. They usually sit and listen when the decisions are made without speaking up. Moreover, the male members of customary institutions rarely consult women when enacting laws or making decisions about water management laws. Despite the limited participation of women in decision making, women are more drawn to specific tasks related to water management activities like cleaning the area around the water source, and guarding the water sources. Thus, women lack active and interactive participation in decision making. The National Water Policy recognizes the importance of stakeholder participation in water resource management. The policy states:

Water supply and sanitation facilities provided without the active participation of the beneficiaries in planning and management are often not properly operated and maintained and hence are unsustainable. (URT 2002a).

This implies that community participation in the management of water resources is very crucial to achieve sustainable development. But, in reality community members are not involved in the formulation of statutory water management laws. Currently, community participation in the management of water resources through statutory institutions in the Bariadi district consists of “passive participation,” and, in a few cases “consultative participation.” The recognition of the importance of community participation in water management alone is not enough. The reality is that statutory institutions still treat the community as passive recipients of information and outside expertise who have nothing to offer in return (McIvor 2000).

Nemarundwe (2003) pointed out that community participation in the management of local natural resources can lead to economic and managerial efficiency because:

- A. It allows local people to bear the cost of natural resource management. They will be able to make decisions rather than waiting for the decision to be made by outsiders.
- B. It will reduce administrative and management transaction costs incurred by the statutory institutions.
- C. Community members will be able to use their local knowledge, values and customs in the design and implementation of natural resource management projects.

Therefore, participation should include all stakeholders, not just men, if they are going to achieve a balanced decision making process. True participation should involve a joint decision making for planning and implementation of water management projects (Heyd and Neef 2004). The state needs to work together with customary institutions to formulate and implement water management laws that will also include gender progressive policies in order to bring a change in norms and gender perception. This research appeals for co-management between statutory and customary institutions and other stakeholders involved in water management. A similar appeal was made by Singleton (2000) who argued that co-management will take advantage of the capacities and incentives of both state and local water managers. Moreover, co-management has a potential to succeed because it will combine local knowledge with scientific knowledge produced by state agency scientists. This combination will produce more complete, finely-tuned set of information which may be used as a base to make better decisions and formulate better water management laws.

8.4. Strengths and Weaknesses of Statutory and Customary Institutions

Previous studies of water management in Tanzania found that there is coexistence and interdependence between customary and statutory institutions (Sokile et al. 2005), and that their

interface is complex. There are situations where the two institutions conflict with each other, situations where the relationship of the two is of suspicion and disdain, and situations where customary institutions operate with relatively favorable oversight on the part of statutory institutions (Roy 2005).

The importance of customary laws is often underestimated by statutory institutions. Von Benda-Beckmann and Von Benda-Beckmann (2001) said that policy makers tend to make three kinds of mistakes. First, policy makers assume that all laws do not issue from state institutions are customary and long established. In fact, customary laws are not static, but emerge and change over time. Many are quite recent.

Second, policy makers tend to assume that every community member act according to customary laws because these laws are deeply ingrained in local society. In reality, people do not fully comply with customary laws, and levels of compliance vary in every community. That's why customary institutions in each community enact new laws so they can adapt to changes that are constantly occurring in the community. Finally, policy makers assume that all customary property is communal property. In reality, property in rural areas is never fully communal, but a mixture of communal and individual, and public and private elements.

Field research in the Bariadi district indicates that most people trust customary institutions more than statutory institutions. In focus group discussions, villagers reported mistrust and dissatisfaction with statutory institutions. They felt that the state's relationship with them is unequal, and that the state uses constitutional power to marginalize them. This was also revealed by the "evil-market" thesis that the "market" is "evil" because it undermines traditional moral codes and exploits poor people.

Leaders of customary institutions reported that they had to get permission from formal institutions to ostracize individuals in communities. In situations where customary leaders didn't obtain permission, they were arrested by local government officials. Moreover, rural communities preferred to use informal institutions to solve conflicts than using formal legal means, which they viewed as costly and corrupt. But, as explained by new institutional theory, customary and statutory institutions do not operate in isolation (Poteete and Ostrom 2004). They reinforce or counteract one another (Pelling and High 2005). Customary law greatly influences people's perception about statutory law and the implementation of statutory laws regarding property rights and dispute resolution.

8.4.1. Strengths of Customary and Statutory Institutions

Customary institutions have the potential to work more efficiently in rural areas than statutory institutions (Schlager 2005). First, I observed that people respect customary laws because the rules are made by community members, for community members, and they are improved over time. Because customary laws originate from local institutions, they normally take in to account their environments and other problems facing the community. Community members said they are committed to enforcing their laws because they participated in enacting them.

Second, customary laws are applied within a small geographical area, so they meet the specific needs of a particular locality. Community members are better able to manage their resources because they are knowledgeable about their local environment and the water they use, which they consider when making decisions (Leach et al. 1999; Tsing et al. 1999). Among the *Sukuma* for example, there are different customary laws governing drinking, irrigation, and livestock water uses. Likewise there are different laws for private, public, developed and natural

water sources. Through customary institutions, local resource users may be able to apply management designs that are capable of quickly adjusting to local environmental change (Colding and Folkes 2000).

Third, I observed that community members have powerful social ties because they live together and know each other, have dense social networks, strong primary relationships, and group solidarity. Customary institutions are supported by effective information networks. In focus group discussions, villagers said it is easy for them to watch each other and observe who is breaking the rules. Additionally, the collective management of water resources brings the community together and strengthens existing ties and spirit of cooperation. Furthermore, discussions with focus groups and key informants revealed that customary laws are known by all community members because every community member is notified of a new law at village meetings. Customary laws provide strong incentives for community members to comply with them by raising the cost of non-compliance through penalties such as social ostracism. Members of *Sungusungu* said that the fear of social ostracism, shame, and loss of reputation increases people's willingness to comply with customary laws and makes the guilty submit to punishments ordered by customary institutions.

Fourth, villagers said in focus group discussion that the punishments imposed by customary institutions are more immediate and more efficient than those imposed by statutory institutions, such as imprisonment, which is costly. In focus group discussions, *Dagashida* members said that it took a long time to go through the court system and to prosecute offenders. They also said that customary institutions punish offenders "on the spot" (*sidalalaga eisha Dagashida*).

As one member of *Dagashida* explained:

Before the government knows there is a problem in the village, Dagashida knows first and immediately tries to solve the problem. We punish the offender right away, contrary to the government which sometimes takes a month to punish an offender. If we get information about an offender in the morning, we will arrest and punish him or her on the same day, and he or she will have to pay the fine on the same day.

In an interview, one village chairman said that the enforcement and implementation of customary law is cost effective because community institutions have the ability to regulate use and arbitrate disputes quickly and cheaply. There is little need to pay bureaucrats to manage and enforce statutory laws (Sokile and Van Koppen 2004). Similar results were observed by Colding and Folke (2000:7) who pointed that statutory institutions should consider the benefits of customary institutions. They explained:

Informal institutions may facilitate a reduction of transaction costs. This is done by providing for reduced costs in institutional monitoring, enforcement of appropriators, and sanctioning of violators. Biological conservation and nature management should capitalize on such benefits. These benefits, implicit in most informal institutions, indicate that it may be worthwhile to make use of them in nature management designs in both non-Western and Western settings. (Colding and Folke 2000:7).

Perhaps one of the most striking features of customary institutions is that they do not require recognition from statutory institutions to function. I gathered from focus groups and key informants that customary institutions have greater local legitimacy in the Bariadi district. A

customary leader said customary institutions have been operating since time immemorial, and they still operate despite the lack of enforcement support from statutory institutions.

In an interview with key informants at the Ministry of Water, they said that statutory institutions can provide expertise and technical knowledge in the management of water resources. This is because statutory institutions have access to larger-scale ecological information, as well as tools of data analysis that may not be available to local communities (Singleton 2000). Statutory institutions have greater access to financial resources, which may be used to provide local communities with subsidies that will support water management activities. Because of poverty, customary institutions may be incapable of meeting all the costs for water management. Table 8.2 provides a summary of the characteristics of statutory and customary institutions that help describe their strength and weaknesses.

Table 8. 2: Characteristics of State versus Customary Institutions

	Customary institutions	Statutory institutions
Scale	Smaller-within boundaries of communities, unless coordination among communities	Larger-crossing boundaries of communities
Typical resource application	Extraction	Pollution
Information	Specific, time, and place	Generalized, technical
Social ties and norms	Powerful	Weak
Rules	Multiple depending on resource and users	Tend to be uniform across resource and users
Monitoring and enforcement	Tend to be informal, rest heavily on social ties and norms	Tend to be uniform across resource and users

Adapted from Schlager 2005.

Although statutory institutions can provide tenure security through formal water and land rights, some villagers in Bariadi district said they have experienced tenure insecurity. This happened because some people obtained statutory land rights to land that belongs to another person who does not have formal land rights. Thus, formal land rights may provide security of tenure to better-off people, but not to poor farmers who can not afford the transaction costs of acquiring formal land right (see section 6.3.1).

8.4.2. Weaknesses of Customary and Statutory Institutions

Table 8.2 indicates that statutory institutions make laws that are uniform for different resources users and across all communities. They don't consider the fact that norms and customs are not uniform for all communities in Tanzania. Although uniform laws are easy to design, monitor, and enforce, resource users are less likely to comply with laws that do not specifically apply to their unique circumstances (Schlager 2005). In addition to making laws, state institutions must enforce them. One of the problems faced by the local government is poor infrastructure. For example, I observed that most villages in the Bariadi district are isolated. Due to poor infrastructure, local government officials said that it is very difficult for the district council to communicate efficiently with all the villages in the district. It is important that statutory laws leave room for local communities to elaborate local approaches to resource management that reflect specific cultural, legal, and hydrological conditions (von Benda-Beckmann and von Benda-Beckmann 2001).

The state also faces difficulty because of its limited human and financial resources (Arnold and Campbell 1986), and a heavy reliance on formal punitive sanctions to enforce their

laws. Tanzania is one of the poorest countries in the world, where financial limitations prevent the governments from hiring enough personnel to enforce water management laws. Villagers said that because the government lack enforcement capacity, some people in rural areas are unaware of existing statutory laws, and others think the laws are no longer in effect. Villagers said that some offenders were not punished, so people decided not to follow some of the laws because there were no incentives to comply with them.

Another problem facing statutory institutions is the corruption of employees who are in charge of enforcement and capture by elites where interest groups shape or influence statutory institutions for their own benefit (Olson 1971). Corruption exists when an individual uses a public office or official position for his or her personal interest. In focus group discussions, villagers said that the few personnel who are hired by the government to enforce water management laws are poorly paid, and hence some of them are corrupt or unmotivated. Tanzania doesn't have an effective welfare and national social security program. People try save funds for their retirement. Many government officials feel insecure because they may lose their source of income if the party in power changes. So they try to get as much money as they can while they still hold office. Officials also try to acquire wealth through quick and easy means (Fidelis and Adjibolosoo 1994:124). According to The World Bank (2002(a):145), "widespread corruption in the public sector has led to massive economic losses in terms of reduced income from taxes, revenues and other fiscal charges; loss of income from natural resources; and losses through misappropriation of government asserts."

In focus group discussions and key informant interviews, villagers said that they trust customary institutions more than statutory institutions because customary institutions are "free"

from corruption. They also said that it is not easy for the offender to escape punishment by bribing the whole entire village. As two members of customary institutions explained during focus group discussions:

Statutory institutions have a lot of politics. There are smart people who know how to defend their interests and can get away with everything. If you take them to court, they will win the case even if they committed the offence.

With customary institutions, every community member is a witness. You can't bring politics, or try to be smart to get away with your offence. Everything you do in the community is seen by every community member.

Local government officials also lack authority to make decisions on their own. In an interview, local government officials said that although they have been given power by the central government to enact by-laws and make decisions on water management, their decisions has to be approved by the central government. Many natural resource management problems require immediate action, but this is hard to do under the current local government structure (Mniwasa and Shauri 2001). The by-laws enacted by local governments are required to be consistent with statutory laws, otherwise they won't be approved. Because community members have limited participation in the passage of statutory laws, the laws may not incorporate local conditions and customs (Nkonya et al. 2005).

Because the government lacks the capacity to enforce its rules, it needs to work with customary institutions. The government needs to strengthen, recognize, and formalize customary laws for water management. Customary institutions have proven to be more effective in law enforcement than statutory institutions. This supports Hayami (1998) idea of harmonizing the

“evil market” with “community yoke” thesis on one hand, and moral economy with political economy perspective on the other. Customary and statutory institutions complement each other. The state could provide customary institutions with resources and the expertise to manage water. This could lead to increased participation in water resource management by local communities. The failure of the government to enforce its laws increases corruption and reduces people’s commitment to manage their water resources. As Schlager explained:

The government must implement, monitor, and enforce the rules that it has adopted in a consistent fashion. If the government officials repeatedly violate rules, or refuse to enforce them against certain individuals, commitment among water users is likely to erode. If the water users have no means, or very weak means, by which to hold government officials accountable, commitment problems may become that much more severe. Thus, in this situation, it is not just a matter of providing assurance to water users that all water users will follow the rules, it is also a matter of providing assurance that the government will also follow the rules.(Schlager 2005:45).

Although customary institutions are highly desirable in rural areas, it would be wrong to assume that customary laws are necessarily more equitable than statutory laws, or that rural communities have the technical expertise they need to manage their water resources. Customary institutions can be inequitable, especially for women (Meinzen-Dick and Pradhan 2002). As explained in chapter seven, customary laws in Bariadi district have shown considerable inequalities based on gender. The traditional system in the Bariadi district is patriarchal, which denies women the right to property and economic opportunities. Women are exposed to violence, abuse, and exploitation. Although women and men have equal rights to land according to

statutory law, in practice, women's ownership of land is very rare. Inequality in land rights has an impact on water rights too, because water and land rights are usually connected. For example, the rights to irrigation water from public water sources are usually distributed among individuals, usually men who own land by the river. People who don't have land by the river cannot use water from the river for irrigation (unless they borrow or rent land by the river), but they can draw water from the river for other uses. Thus, the unequal distribution of land causes an unequal distribution of water (von Benda-Beckmann and von Benda-Beckmann 2001). As one irrigator explained during focus group discussions:

We irrigate by the river and when the river dries out, we dig a well on the river bed. Everybody irrigates his or her own land, but some have rented, at a cost of about Tanzanian shillings 5,000 (about \$5) for quarter of an acre. The contract ends after every harvest. If an individual want to continue using the land, he or she must renew his or her contract with the land owner.

Statutory laws for water management also show some elements of inequality. For example, statutory management of irrigation water in Tanzania is done through formal water rights or water permits. Once a water right is acquired, an individual is supposed to pay water user fees depending on how much they extract (Mwaka et al. 1999; Sokile and Van Koppen 2004). The use of water permits by the state law makes it too difficult for many rural people to obtain water rights. Many rural people are not willing to apply for water right and pay water fees because they believe water is a common-pool resource. Moreover, water permits are very expensive. Water rights for domestic water supply cost Tanzania shillings 35,000 (about US\$ 35). "In a country with an average GNP per capita of just \$210, this amount of money is very significant" (Huggins 2000).

Most people in rural areas still give more allegiance to customary laws and institutions and so are less likely to apply for water use permits from formal government institutions. This has created a recipe for conflict. There are many instances of disputes between holders of 'deemed' (customary) rights and those who have been given formal water rights (Huggins 2000). Some combination of both customary and statutory institutions may potentially increase the efficient management of rural water sources.

CHAPTER NINE

9. CONCLUSION AND POLICY IMPLICATIONS

9.1. Introduction

The major purpose of this study was to understand the impacts of customary institutions on rural water management and to analyze how they may be used to complement statutory institutions. This study contributes to research on institutional arrangements for rural water-resource management by addressing the differential impact of customary and statutory institutions on managing rural water resources for different water uses. The study also analyzed the role of gender and showed how customary and statutory institutions affect men and women's participation in water management in different ways. Comparisons between customary and statutory institutions were drawn, and they revealed the level of compliance, effectiveness, and strength and weakness of each institution.

9.2. Theoretical Framework, Data Collection and Analysis

This study adopted three related theoretical frameworks for understanding institutional frameworks that play a part in rural water management. First are moral theories including the moral economy and the "evil-market" thesis. Second are rational choice theories including the tragedy of the commons, political economy and "community-yoke" thesis, and the third are the new institutional theories.

This research used both primary and secondary data. Primary data for this research were collected in 2005 for a period of four months from a sample of 20 villages in Bariadi district, in Northwestern Tanzania. Data were collected through household survey, focus groups discussions, participant observation, key informants, and photographing. Secondary data were

obtained from district water office, District council office, regional water office, The Ministry of Water and Livestock Development, and from literature. In this study, an attempt was made to integrate qualitative and quantitative analysis in the analysis of the impact of customary institutions. This was useful because it reduced the likelihood of bias and increased an understanding of the phenomena that were being investigated. The use of both qualitative and quantitative methods helped to increase the reliability of the results because it was possible to cross-check one result against another.

The rationale of this study was based on the idea that access to safe water is very crucial for improving human health and alleviating poverty. Improving access to safe water could lead to the improvement of production in agriculture (Kaliba 2002). An improvement in agricultural production could lead to an increase in household food security and income in general. Moreover, an improvement in water access could help to reduce women's workload particularly long-distance walks in search of safe drinking water. The next section summarizes the major findings of this research and provides recommendations for policy makers.

9.3. Important Findings and Recommendations

9.3.1. Compliance with Customary and Statutory Institutions

The analysis of determinants of compliance with customary and statutory law was conducted using three regression models. The first regression model assessed the determinants of compliance with customary law that prohibited bathing or washing clothes by the drinking water sources. The second and third regression models assessed compliance with two statutory laws. The first statutory law requires each household to have a toilet facility and the second statutory law prohibited agricultural activities at a distance of less than 30 meters from a water source.

Results from the three regression models indicated that significant factors that affecting community's compliance with customary laws are market access, family size, membership with associations (credit and water), level of education, area of farmland owned by the household, tropical livestock unit, group size, and the household health. Significant factors that affected compliance with statutory laws included religion, type of roof for the main house, association membership (security, credit and water), family size, and tropical livestock unit owned by the household.

Regarding compliance with customary law that prohibited bathing or washing clothes at the drinking water source, variables such as access to market, participation in water associations, farm size, age of household head, and household health had a positive association with compliance with customary law. The rest of the significant variables, namely education, tropical livestock unit, and group size had a negative association to compliance with customary law. This implies that improving access to information and market, supporting the establishment of water-user groups and associations, encouraging community members to join those associations, and improving access to safe water and access to health facilities are crucial for community participation in local water management. Moreover, the government needs to empower, support, give more autonomy, and work hand-in-hand with customary institutions to increase the likelihood of compliance from the educated and rich members of the community.

The regression model for compliance with the statutory law that required each household to have a latrine indicated that all the significant variables, namely religion, the type of roof for the main house, membership in security association, tropical livestock unit owned by the household, and household health had a positive association to compliance with this law. The third regression model, for compliance with the statutory law that prohibited agricultural

activities close to drinking water sources, indicated a positive association with religion and membership in security and support associations. The rest of the significant variables, namely membership in water associations, age of household head, and household health had a negative association to compliance with this law. This implies that the government needs to support rural development activities that will help improve rural income because wealth indicators such as the type of roof for the main house and tropical livestock unit increase the likelihood of compliance with statutory laws. Likewise, younger household heads tended not to comply with customary law but were more likely to comply with statutory law. This suggests that the government needs to recognize the need to promote both customary and statutory institutions. The positive association between membership in security and support associations and with compliance with the statutory law that prohibited agricultural activities close to drinking water sources implies that the government needs to support religious groups and other associations such as security and support organizations that promote and encourage compliance with water management laws.

Evidence from this study suggests that some of the challenges facing rural communities include low levels of education, large family size, and poor sanitation. Although education had no significant relationship with compliance with statutory laws, it had a significant negative association with compliance with customary laws. This indicates that more educated people are less likely to comply with customary laws, and are more likely to get into trouble with customary institutions. This finding is supported by Freire (1972) who criticized the western education that was adopted by many African countries after their independence as “elitist” because it ignored indigenous African social and cultural values, and alienated people from their culture and traditions. He believed that multi-cultural education is essential for national education and development. This implies that education in Tanzania must incorporate important elements of

culture that guide social life. Although policy makers prepare national educational programs, no consultation with the local communities is carried out. Through its curriculum, the current education system transmits and enforces western values and neglects traditions and customs of indigenous people. The government needs to recognize that peoples' customs and traditions are important as well. This might lead to the possibility of researching on ways to include customs and traditions along with formal education.

Educated young people may also play a major role to bring change. As the older generation retires, young people, if equipped with proper education, will carry on and continue to appreciate customary laws and their importance in conserving the environment to rural people. This may increase the likelihood of compliance with customary laws from the educated members of the community. To have an educated and informed population is very important for policies and strategies to reduce poverty, excessive population growth, and environmental degradation.

9.3.2. Gender and Water Management

As expected, this study found that women are not significant decision makers in most water management institutions. Customary institutions continue to discriminate against women as do statutory institutions. To my surprise, most women “accept” this discrimination especially on issues of property rights. Most women said they prefer to give inheritance to male than female children. Although non-governmental organizations have helped build self-confidence and empower women through financial support for income-generating activities, the gender barriers imposed by customary laws are still a major problem in rural areas.

This study expected statutory laws to be more gender sensitive than customary laws. Although the constitution and the Land Act are against any form of discrimination, it was amazing to find out that other statutory laws such as inheritance laws and the Marriage Act have some provisions that tend to contradict the constitution and the Land Act. Moreover, the enforcement of the constitution and the Land Act is still weak. In practice, customary laws continue to discriminate against women, particularly on issues of property rights. This research has similar findings as that of Michael (1998), who observed that at the top-level of decision making, the Ministry of Water and Livestock development in Tanzania is male dominated, and that women's participation in water management at the village level is still limited. Women's input is missing in the enactment of water management laws in customary institutions. This research recommends that policy makers design policies that could liberate women from gender-discriminating laws. The state needs to ensure that women have full rights to property, just like men, and challenge customary laws that obstruct women's full participation in the management of natural resources. This can be done by educating rural people about the importance of incorporating women in decision making for managing water resources. Women have accumulated a lot of invaluable environmental experience and knowledge. They have always been the ones to find water, and choose sources according accessibility, availability, distance, time, quality and use. So it is important that their concerns are represented in decision-making.

The limited participation of women in decision making regarding water management means that women's perspectives, needs, knowledge, and proposed solutions are often ignored (Shiva 1989). Because women are major resource users, they are the ones who are directly affected by water management policies. Women may not be aware of some restrictions made by men with regard to water management and may continue to break the rules. Weakness in

communication, representation, democracy and accountability in water management may lead to free riding and corruption (Ostrom 1992). Sustainable development will be hard to achieve unless women's contribution to environmental management is recognized and supported. Both women and men affect the environment through their economic and household activities. Understanding gender differences is crucial for developing policies aimed at sustainable resource use, and improved health and well-being. Thus, women should be treated as partners in the development of the natural resource management policies, and they should be involved at all levels. The goal of development cannot be achieved if specific plans and expertise do not work to improve women's position and condition. There is a need to have an approach that could facilitate a balanced community where men and women will not be unequal partners (Nahar 2002).

The study also found that women have lower levels of education compared to men. Women's education is a very important dimension of development. Increasing women's education is crucial for women's empowerment. The lack of education among rural women increases their dependency on men and their vulnerability to gender discrimination. It also reduces their ability to participate in development activities and increases their likelihood of being excluded from new opportunities (Olumakaiye and Ajayi 2006). Investment in women is particularly needed in Tanzania because women are the major users of water and are responsible for drawing water for the family and for providing food to the family. Therefore, there is an urgent need to increase access to education for all, particularly the girls.

Moreover, women themselves need to learn about their rights and take charge in the process of change. Women's active involvement in water management requires a strategy of empowerment. Empowerment combines education and capacity-building in the water sector with

participatory processes that give women the opportunity to participate in decision-making. The government needs to facilitate women's empowerment by formulating development policies that increase the knowledge and skills of both women and men. Empowering women with water rights strengthens their access to water for both domestic and income-generating uses. Better access to water would liberate women from the daily suffering of fetching water. Moreover, better access to water would allow women to increase their income through gardening and farming, livestock, aquaculture, forestry, and other water-based enterprises (Van Koppen 2001). Increased participation by women in water management would also likely improve household hygiene and sanitation because women are more involved in household hygiene and sanitation than men.

9.3.3. Effectiveness of Customary and Statutory Institutions

As expected, this research found that conflict resolution in the Bariadi district is deeply rooted in the culture and history of the *Sukuma* people. The norms and customary laws define the traditional ways of resolving local water and land conflicts. This study found that customary institutions are mostly used to solve land and water conflicts. It was interesting to find out that sometimes statutory institutions use customary institutions to solve land and water conflicts in rural areas. Conflict resolution for land and water disputes using customary laws follows three steps: to settle the dispute using discussions and negotiation; to take corrective measure by compensating victims of wrong doing; and to ensure fairness in the judgments. Customary institutions members said they try to make sure that the methods of resolution and the procedures for resolving a conflict are fair to all parties of the conflict. Respondents reported that they wanted their problems and conflicts solved quickly. That's why they were more likely to go to

customary institutions to resolve conflicts. Because of rising corruption in Tanzania, this research found that community members in the Bariadi district trusted customary institutions and felt that most of the judgments made by customary institutions were fair and balanced. Respondents pointed out that formal courts were costly, located too far away from their community, and took too long to render verdicts. Individuals referred their cases to formal courts only if customary institutions did not successfully resolve the conflict.

Regarding community participation, this research found that customary institutions were more participatory than statutory institutions. This was expected because local communities enacted and enforced their own laws. This is one of the reasons why people complied with customary laws. But, as noted earlier, women lack representation in customary institutions. Although the establishment of water-user groups provided more opportunities for women to participate in decision making, the norms were still a barrier for women that prevented them from participating in decision making. Customary institutions need to take into account women's role in water management decisions. It is important to sensitize customary institutions to this problem. This might be done by persuading NGOs and other organizations in rural areas to sensitize rural institutions to ensure that every one is involved in decision making.

9.3.4. Strengths and Weaknesses of Customary and Statutory Institutions

Research on natural resources management has stressed the importance of community-based natural resources management (CBNRM). This has been caused by the failure of many state programs in developing countries to manage natural resources effectively. As a result, resource degradation has been on the rise, increasing the incidence of the disease and death associated with water pollution and poor hygiene. One of the reasons associated with the failure

of state institutions is the fact that they have often neglected the role of local people and their customary laws in designing and implementing solutions for these problems.

Statutory institutions tend to apply uniform laws for everyone. But, customary laws are also important because they originate from local institutions and normally take in to account the local environment and other problems facing the local community. Moreover, customary laws are designed for a specific locality and for specific uses of water. Compared with statutory institutions, customary laws are cost effective because the laws are administered and enforced by local people. As expected, statutory institutions find it difficult to enforce their laws because of a lack of resources, poor infrastructure, and corruption.

This alternative approach, the CBNRM, has been proposed as a crucial strategy for the sustainable management of natural resources. The CBNRM approach recognizes that local communities are knowledgeable about their local resources and have greater interest in the sustainable use of their local natural resources than statutory institutions. Moreover, community members have the motivation to manage their local resources collectively, provided that they have the assurance that they will benefit from their investments. In rural areas, local water users know each other, so they can easily monitor each other to make sure everyone abides by local customs. They can easily and quickly identify violators of water laws than statutory institutions.

This research found that most rural people are not aware of the statutory laws for water management. Rural communities have enacted their own laws to manage their water resources. Respondents reported lack of human resources capacity at the local level to plan, manage and implement water management activities and policies as one of the major challenges of decentralization in Tanzania. Hence recognizing and formalizing customary laws can help to address the problem of lack of human resources. Similar results were observed by Ayee

(1996:50) who pointed out that effective decentralization requires the state to deliberately plan and build on what already exists in the community by taking into account the historical and institutional realities that determine why things are the way they are.

9.3.5. The Role of Customary and Statutory Institutions in Water Access

As expected, this research found that customary institutions are the most influential in water access and prevention of water pollution and abuse. For example, most laws enacted by water-user groups were consistent with the customary laws and were focused on prevention of pollution and abuse, and equitable water access. The awareness of the customary and water-user group laws was also generally high perhaps due to the participatory nature of those institutions. Thus, local institutions for water management may be empowered and motivated to increase their participation and cooperation in achieving equity in access to water and prevention of water pollution as a way to reduce the cost of water management using statutory institutions.

The results of this research also underline the complementarities of the plural legal instruments that exist in Tanzania. While the local government appears to have a strong institution related to development of water, customary laws have stronger institutions related to equitable water access of natural water sources. These laws have been adopted by water-user groups for equitable access of water from developed sources. The same applies to laws for prevention of pollution and abuse of drinking water sources.

9.4. Concluding Comments and Recommendations

This study found that customary institutions are more effective at the local level compared to statutory institutions. This study therefore is in favor of empowerment, strengthening and integrating customary and statutory institutions through participatory

processes that ensure equal contribution in decision making process. The current National Water Policy and the National Water Sector Development Strategy in Tanzania have ignored customary arrangements for managing rural water resources. Also the river basin management approaches have paid little attention to management of domestic water sources (which are mainly underground water sources in rural areas).

Water supplies in the Bariadi district are not sufficient to sustain water needs particularly in the dry season. Most natural and developed water sources are seasonal. There is a need to consider how to develop water supplies in rural areas. Rural water supplies also need to be improved because they are much poorly developed than urban areas. This imbalance in the provision of social services has contributed to rural-urban migration, which in turn has led to development of slums, environmental pollution, and crime in urban areas. Current efforts to develop rural water supplies therefore need to be revived. The development of more shallow wells, deep wells, and boreholes to tap underground water is a pragmatic strategy that could increase the availability of safe water in dry regions like the Bariadi district. The government needs to work on the implementation of its laws, not just adoption of laws. This can be successful if the government cooperates with local institutions. The government needs to consider a participatory approach to water management that involves users, planners, and policy makers at all levels.

Female participation in water management is still limited. The emphasis of equal number of men and women in water committees, and the reliance of water-user group meetings as a way to involve women in decision making is not enough. Women participation is still influenced by culture and gender stereotypes that place women in an inferior position. A more gender-sensitive approach is needed to increase women's participation. It is important to recognize that

community members, both men and women, are not homogenous. People differ in term of power, wealth, class, and their ability to express their needs, concerns, and ideas. These differences put women in a more disadvantaged position. Therefore, a more gender-sensitive approach is important to understand and “unpack” these differences and change them in order to facilitate equal participation in decision-making by men and women. The government needs to ensure that women’s and men’s needs, opportunities, constraints, concerns, roles, and experiences appear as an important component of water management policies, projects, legislations, and strategies.

The government can also promote a more gender-sensitive education curriculum that will emphasize on the importance of customs and traditions, incorporate non-discriminating aspects of culture, and empower young people both men and women to overcome gender stereotypes that exist. The government can encourage NGOs and international organizations to fund, promote, and support development of gender- sensitive water management strategies in rural areas. This include the use of youth-focused organizations that can help increase the participation of young people in water management and to educate them about water priorities, gender issues, and the importance of women participation in decision making. Young people can be used as agents for change for effective water management. Youth holds key to the future, so they can be used to promote gender awareness among their peers, community members, and policy makers.

Although this study found that customary institutions are still strong in the study area, they can come into conflict with statutory institutions. There is a need for participatory legal reform that will address the weaknesses of both customary and statutory institutions. Local community participation in rural water management would provide important values, ideas, and

experiences that could lead to a practical, relevant, achievable and acceptable water management approach (Dungumaro and Madulu 2003). This research found that investment in social networks ensures security and access to water by the members of social network. Policy makers need to consider the cultural and political principles that underlie their interventions (Mollinga 2000), and recognize and consider the plural legal system that now exists in Tanzania. Relying on a single system to managing water resources is not enough. Suitable combinations of different institutions and laws may be more efficient and practical in the management of rural water sources.

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APPENDIX A

HOUSEHOLD SURVEY QUESTIONNAIRE

Questionnaire Number: _____ Date of interview (dd/mm/yyyy) _____

Interviewed by: _____ Date checked (dd/mm/yyyy): _____

Division: _____ DIVCODE: _____ Ward: _____ WRDCODE: _____

Village: _____ VILCODE: _____

PART 1. HOUSEHOLD CHARACTERISTICS

1. (a) Household¹ head: Sex (M/F) _____ Age _____

(b) Respondent: Sex(M/F) _____ Age _____

Respondent's relationship with the household head _____

(ask only if the respondent is not household head)

2. Ethnic background _____

(1=Sukuma from Bariadi, 2=Sukuma from outside Bariadi, 3=Non-Sukuma)

3. Religious affiliation: _____

(1=Christian, 2=Moslem, 3=Ancestors, 4=Atheist, 9=Other (specify) _____)

4. Highest level of formal education of household head (years) _____

5. If no formal education is reported in Q.4, is the respondent able to read and write?

Yes=1, no = 0 _____

6. Major source of income of household head _____

1=Cereal production, 2=Cotton production, 3=Vegetable production 4=Livestock production, 5=Non-farm activities, 6=Employment (earns regular salary), 9=Others (specify) _____

7. Household members: Below 15 years _____ Above 15 years but still dependents (i.e. in school or not able to work) _____ Above 15 years and not dependents (i.e. able to work) _____

8. When was this household established in this district? (e.g. by becoming independent from parents or by migrating from other villages outside Bariadi district) _____ (year)

9. Mention name of district if migrated from outside Bariadi _____

10. What is the type of roof does this household have for their main house? _____

1= grass, 2= tiles, 3= corrugated iron sheets, 9= others(specify) _____

PART 2: A. HOUSEHOLD PARTICIPATION IN PROGRAMS & ORGANIZATIONS AND WATER MANAGEMENT INSTITUTIONS

1. Does the household belong to any association or participate in any program and organization? No=0, Yes=1 ____ If yes, report the name of the association/program/organization, and its major focus.

Name of organization, program or association	Major focus ^a	Who initiated t? ^b	Type of organization ^c	Major contribution to association/NGO ^d	
				Quantity (specify eg Tshs, 5 hrs of labor etc)	Duration/cycle (eg per day or per week)

^a Major focus: 1.Financial services (Savings or credit) 2.Mutual support activities 3.Provision of commercial labor 4. Provision of exchange labor 5. Provision of free labor 6. Agricultural extension 7. Health or nutritional education/training/sensitization 8. Construction & maintenance of community based infrastructure 9. Provision of Aid/facilitation 10.Marketing & Processing of agricultural products, 99.Other (specify)

^b 1=Villagers around this area(up to district level), 2=People from outside Bariadi but within Tanzania 3=Outside Tanzania, 9 = other (specify) _____

^c 1=NGO (Non-government organizations include both international and indigenous organizations established to provide services to communities or districts. They are autonomous and required to conform to the government's regulatory requirements regarding registration an reporting.)
 2=CBO (Community-based organizations are those that evolve and are administered, financed and managed at the local level. Community-based organizations are not registered with government). This includes customary institutions such as *dagashida, sungusungu*, etc.)
 3= Government program or project. Program is a long-term/permanent activity implemented by government. Project is a short-term activity with specific time frame of implementation
 9= Others (specify)

^d This could be labor per month, per year, annual contribution, etc (mention quantity and duration of contribution) e.g. 124 hours per month for entire year, or 124 per month for 3 months in a year, or Tsh 4000 per year as membership fee.

2. Where does the household get water and who owns the source of water? (*probe to get all 3 water use: domestic, watering cattle and irrigation*)

Source of water ^a	Is the source seasonal or permanent? Seasonal=0, permanent=1	Major use of water ^b	Was the water source developed or is naturally occurring? Natural =0, Developed=1	If developed, who developed it? ^c	Who owns water source? ^d	Who normally draw water from the water source? ^e	If the water source is not private, how many households abstract water from source?

^a Source of water : 1=river, 2=spring, 3=shallow well, 4=deep well, 5=surface water (pond, dam, etc)

^b Use of water: 1=domestic use (drinking, cooking, washing, etc), 2=watering animals, 3=irrigation 9=Others (specify) _____

^c Who developed: 1=This household, 2= villagers, 3=division or district authority, 4=NGO from outside village, 5=central government, 6=International donor (non-NGO), 9=others(specify)

^d Who owns water source: 1=This household, 2= villagers, 3=division or district authority, 4=NGO from outside village, 5=central government, 6=International donor (non-NGO).

^e Who draws water: 1= exclusively women 2=predominantly women 3=women and men more or less equally 4=predominantly men 5=exclusively men

3. What is the major source of water for bathing? _____

1=river, 2=spring, 3=shallow well, 4=deep well, 5=surface water (pond, dam, etc)

4. Where do members of the household bath?

Member of household	Location of bath ^a	
	Dry season	Wet season
Children (0-10 years)		
Girls (11-15 yrs)		
Boys (11-15 yrs)		
Women (>15 yrs)		
Men (>15 yrs)		

^a Location of bath: 1= at the source of water, 2= draw water and bath at home, 3= draw water and take bath away from source of water but not at home

5. What is the major source of water for washing clothes? _____

1=river, 2=spring, 3=shallow well, 4=deep well, 5=surface water (pond, dam, etc)

6. Where do you wash cloths? _____

1= at the source of water, 2= draw water and wash at home, 3= draw water and wash away from source of water but not at home

7. If you have ruminants (cattle, sheep and goats), where do you water them?

Type of ruminant	Number of ruminants owned by the household	Where do you water them?			
		Dry season		Wet season	
		Watering point ^a	Primary use of water ^b	Watering point ^a	Primary use of water ^b
Cattle (2 yrs or older)					
Calves (below 2 yrs)					
Goats					
Sheep					
Others(specify)					

^a Watering point: 1= at the source of water, 2= draw water and water animals at home, 3= draw water and water animals away from source of water but not at home

^b Primary use of water: 1=domestic use (drinking, cooking, washing, etc), 2=watering animals, 3=irrigation

8. How far are your crop plots from the sources of water and who normally operate on the crop plot?

Type of crop	Source of water ^a	Distance (say units eg meters, feet etc) from source of water	Who normally operate on the crop plot? ^b
Annual cereal & leguminous crops			
Vegetables			
Sugar cane			
Orchards (fruit farm)			
Fiber crops (cotton)			
Other(specify)			

^a Source of water: 1=river, 2=spring, 3=shallow well, 4=deep well, 5=surface water (pond, dam, etc)

^b Who normally operate on plot: 1= exclusively women 2=predominantly women 3=women and men more or less equally 4=predominantly men 5=exclusively men

9. Does the household irrigate any crop? _____ No=0 Yes=1 (If “no”, move to Q 12)

10. If “yes” to Q.9, what soil and water conservation structures or practices do you have on crop plots close to water sources?

Soil and water conservation (SWC) structures/practice	Do you have the SWC structures? no=0, yes=1	Use of water ^a
Soil bund		
Terraces		
Trash/stone lines		
Stone walls		
Drainage ditches		
Live barriers		
Others (specify)		

^a Use of water: 1=domestic use, 2=irrigation water, 3 =livestock watering

11. Do you have a human waste disposal structure? No=0, Yes=1 _____
 (Check “yes” if you see a toilet)

12. If “yes” to Q.11, what is the distance from human disposal structure to water sources?
 (specify units) _____

13. If “no” to Q. 11, where do members of the household release themselves? (*Enumerators need not ask this question if they see a toilet*)

Water source for:	Location of human waste disposal ^a							
	Short call (urinating)				Defecation			
	Boys	Girls	Men	Women	Boys	Girls	Men	Women
Domestic use								
Irrigation								
Watering animals								

^a Location of human waste disposal: 1=behind bushes/other place with reasonable privacy away from water source (>30 meters), 2=any place regardless of distance from water source 3. Place closer to water source(< 30 m)

14. On average, how many hours does this household spend per month to do the following activities at the common source of water? Also mention the household member who normally offers labor for managing and developing common water source

Activity at common water source	Use of water								
	Drinking water			Irrigation water			Water for animals		
	member ^a	Hrs/ month	# of months/ yr	member ^a	Hrs/ month	# of months/ yr	member ^a	Hrs/ month	# of months /yr
Cleaning/ desilting									
Development of water source									
Guarding									
Attending water user meetings									
Other (specify)									

^a member of household offering labor: 1= exclusively women 2=predominantly women 3=women and men more or less equally 4=predominantly men 5=exclusively men

B. WATER MANAGEMENT REGULATIONS

15. For the common sources of **domestic drinking water** that this household uses, what are the regulations that are in place to ensure equitable water access, prevention of pollution and abuse, and development of water source?

Regulation (mention at most three for each group)	Who enacted regulation? ^a	Method of enforcement	Level of compliance in the village ^b	If the level of compliance is low (few or no one complies) why?
a. Equitable water access regulations:				
1				
2				
3				
b. Prevention of pollution and abuse				
1				
2				
3				
Development of water source				
1				
2				
3				

^a Who enacted: 1 = central government, 2=local government, 3= customary institution, 4=NGO/religious organization 5 =water user association/group, 9=others (specify)

^b Level of compliance: 1= no one complies, 2=some comply 3=majority comply, 4= all comply

16. For the common sources of **water for animals** that this household uses, what are the regulations that are in place to ensure equitable water access, prevention of pollution and abuse, and development of water source?

Regulation (mention at most three for each group)	Who enacted regulation? ^a	Method of enforcement	Level of compliance in the village ^b	If the level of compliance is low (few or no one complies) why?
a. Equitable water access regulations:				
1				
2				
3				
b. Prevention of pollution and abuse				
1				
2				
3				
Development of water source				
1				
2				
3				

^a Who enacted: 1 = central government, 2=local government, 3= customary institution, 4=NGO/religious organization 5 =water user association/group, 9=others (specify)

^b Level of compliance: 1= no one complies, 2=some comply 3=majority comply, 4= all comply

17. For the common sources of **irrigation water** that this household uses, what are the regulations that are in place to ensure equitable water allocation, prevention of pollution, siltation and abuse, and development of water source?

Regulation (mention at most three for each group)	Who enacted regulation? ^a	Method of enforcement	Level of compliance in the village ^b	If the level of compliance is low (few or no one complies) why?
a. Equitable water access regulations:				
1				
2				
3				
b. Prevention of pollution and abuse				
1				
2				
3				
Development of water source				
1				
2				
3				

^a Who enacted: 1 = central government, 2=local government, 3= customary institution, 4=NGO/religious organization 5 =water user association/group, 9=others (specify)

^b Level of compliance: 1= no one complies, 2=some comply 3=majority comply, 4= all comply

18. For the private sources of water that this household uses, what are the regulations that are in place to exclusion of others to access, prevention of pollution and abuse, and development of water source?

Regulation (mention at most three for each group)	Who enacted regulation? ^a	Method of enforcement	Level of compliance in the village ^b	If the level of compliance is low (few or no one complies) why?
a. Equitable water access regulations:				
1				
2				
3				
b. Prevention of pollution and abuse				
1				
2				
3				
Development of water source				
1				
2				
3				

^a Who enacted: 1 = central government, 2=local government, 3= customary institution, 4=NGO/religious organization 5 =water user association/group, 9=others (specify)

^b Level of compliance: 1= no one complies, 2=some comply 3=majority comply, 4= all comply

19. In addition or in absence of statutory or customary regulations, do you take any steps to exclude others from using and/or polluting the water at the private source?

Steps taken (mention at most three for each step taken)	Method of enforcement of own steps ^a	Cost of enforcement of own steps per month ^b	Level of success to enforce own steps ^c	Who took these steps? ^d	Who enforces these steps? ^d	If no steps taken, why? ^e
Exclusion of others						
1						
2						
3						
b. Prevention of pollution and abuse						
1						
2						
3						
Development of water source						
1						
2						
3						

^a Method of enforcement: 1=guarding, 2=physical barrier (confinement), 3=fines, 4=others (specify)

^b If respondent reports cost in terms of labor, convert to equivalent salary per month. Likewise, convert any other in-kind payment to equivalent monthly salary.

^c Level of success of enforcement of own steps: 1=not successful at all, 2=somehow successful, 3=successful, 4 = very successful

^d 1= exclusively women 2=predominantly women 3=women and men more or less equally 4=predominantly men 5=exclusively men

^e Why no steps taken? 1= customary institutions enforce strict rules for private water use and access, 2=statutory institutions enforce strict regulations for private water use and access, 3= It is futile to take any steps since they will not be successful, 4=no need of taking any steps since water is plentiful and/or there is no potential of abuse/pollution or water theft 9 =others (specify)

20. In your opinion, what do you think are the major strengths and weaknesses of the statutory and customary water related regulations that you mentioned above? Mention at most three important regulations (A, B, and C) for each type and at most three strengths and three weaknesses (1, 2, and 3) for each regulation.

Customary Regulations			
	A	B	C
Strengths			
1			
2			
3			
Weaknesses			
1			
2			
3			

Statutory Regulations			
	A	B	C
Strengths			
1			
2			
3			
Weaknesses			
1			
2			
3			

PART 3: WATER MANAGEMENT SYSTEMS

1. What is:
 - a. Total area owned (acres)_____
 - b. Total area rented in or borrowed in 2004/05 (acres)_____
 - c. Total area cropped (acres)_____
 - d. Total area irrigated (acres)_____

2. List the crops that you irrigate and not irrigate. Mention at most three important crops per parcel.

	Irrigated Crops							
	Parcel 1*		Parcel 2*		Parcel 3*		Parcel 4*	
Season (Dry or rainy season)	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy
Area of plot irrigated (acres)								
Who claims ownership of this parcel? ^a								
How did the owner acquire the parcel? ^b								
Who operates the parcel? ^c								
Who benefits from the harvest? ^c								
Source of irrigation water ^d								
Type of source: 1=private(own), 2=private (neighbor's) 3=public								
Crops irrigated:								
1								
2								
3								
Production from each parcel per season (kg, bags, etc/plot)								
Crop 1								
2								
3								
Production of the same crops grown without irrigation (same crops, non-irrigated)								
	Parcel 5*		Parcel 6*		Parcel 7*		Parcel 8*	
Area of rain fed parcel (acres)								
	crop	production	crop	production	crop	production	crop	production
Crop 1								
2								
3								

*A parcel is a contiguous piece of land with the same land use

Note: if there are more than four parcels irrigated or rain fed, create additional columns on the RHS

- ^a Who claim ownership: 0= female 1=male 2 =both 3. non-household member
^b How parcel acquired: 1= inherited/given by family member, 2. bought, 3.allocated by government
 4. given by non-family member 9.other(specify)
^c 1= exclusively women 2=predominantly women 3=women and men more or less equally 4=predominantly men 5=exclusively men
^d Source of irrigation water: 1=river, 2=spring, 3=shallow well, 4=deep well, 5=surface water (pond, dam, etc)

3. If there is a large difference in production per acre, why do you think this is the case? check whichever is applicable.
 (a) Availability of irrigation water/rainfall regimes
 (b) Soils are more fertile in the plot that yield higher
 (c) Both (a) and (b)
 (d) Other reasons (specify) _____

4. Report the amount of water drawn by this family from all sources of water for domestic use and for watering animals

Type of water source	Source of water ^a			# of animals watered/year		Who usually water animals ^b	Amount drawn per day for domestic use		Who draws water for domestic use ^b
	a	b	c	Cattle	Goats & sheep		Amount/day ^c	Unit of measure ^d	
							Dry season	Rainyseason	
Public									
Private (own)									
Private (neighbor's)									
Other (specify)									

^a Source of water :1=river, 2=spring, 3=shallow well, 4=deep well, 5=surface water (pond, dam, etc)

^b Who usually water animals:1= exclusively women, 2=predominantly women, 3=women and men more or less equally, 4=predominantly men, 5=exclusively men

^c Estimate this on daily basis by probing the pattern of drawing water

^d Units of measure: 1=20 liter container (e.g. *debe*, bucket (*ndoo*), etc), 2=200 liter Drum, 3=Other (specify and request for the container and estimate volume)

5. Estimate the distance (specify units) to sources of water and time spent to draw water or water animals.

Type of water source	Domestic use		Watering animals	
	Rainy season	Dry season	Rainy season	Dry season
Public				
Number of days of drawing water per week				
Distance to source of water (km)				
Time spent to draw water (hours) for each trip				
Private (own or neighbor's)				
Number of days of drawing water per week				
Distance to source of water (km)				
Time spent to draw water (hours) for each trip				

6. In the past three months, how many days has working adults (above 15 years & not students or unable to work) have lost labor days due to sickness? List all adults and they days they lost due to illness or attending to someone sick in the family.

Adult #	# of days lost due to own sickness	Type of disease suffered by the adult			# of days lost due to attending the sick in the family	Type of disease suffered by a family member(patient attended by the adult)		
		a	b	c		a	b	c
1								
2								
3								
4								
5								
6								