

***AN ANALYSIS OF THE EFFECT OF FORMAL AND INFORMAL INSTITUTIONS
OF WATER RESOURCES MANAGEMENT ON RURAL LIVELIHOODS IN
MWANACHINGWALA, ZAMBIA***

BY

PRISCILLA MWINJI SICHONE

JULY, 2007



UNIVERSITY OF ZIMBABWE

DEPARTMENT OF CIVIL ENGINEERING

MASTERS IN IWRM



**AN ANALYSIS OF THE EFFECT OF FORMAL AND INFORMAL
INSTITUTIONS OF WATER RESOURCES MANAGEMENT ON RURAL
LIVELIHOODS IN MWANACHINGWALA, ZAMBIA**

BY

PRISCILLA MWINJI SICHONE (R068215P)

**A thesis submitted in partial fulfillment of the requirements of the Masters degree
in Integrated Water Resources Management**

SUPERVISORS: Mr. C Mabiza, Prof I Nyambe

UNIVERSITY OF ZIMBABWE

DEPARTMENT OF CIVIL ENGINEERING

MASTERS IN IWRM

JULY, 2007

DECLARATION

"I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text".

Student Signature.....Name.....Date.....

ABSTRACT

Water is a critical resource for rural livelihoods and lie at the heart of rural development in Southern Africa in general, particularly in Zambia. The institutional route to accessing water as laid by formal and informal governance has a bearing on rural livelihoods. Despite the detail of various water management instruments in Zambia, there is lack of clarity about who should provide this water in rural areas as well as the absence of coordination among the different institutional actors in the development and management of water resources. The study was carried out in Mwanachingwala ward, Zambia from the beginning of December 2006 to the end of May, 2007. The aim of this thesis was to analyse the effects of institutional operationalisation on rural livelihood with special focus on small holder farmers. Key informants, focus group discussions and unstructured interviews were used to assess institutions, in terms of their existence and their effectiveness for sustaining the rural livelihoods. The major findings of the case study identified how households secure water to sustain their livelihoods in the Mwanachingwala area through wells, boreholes, streams and the Kafue River, with every few individuals accessing taped water. The management of water resources at the local level was characterized by traditional institutions with traditional leaders managing the water which was mostly accessed through land plus a range of rules of access to water. These informal institutions at the local level were however were not linked to the formal institutions. An analysis of the statutory laws and policies indicated a missing link in the operationalisation of provision of water for rural communities impacting negatively on the livelihoods of the community in Mwanachingwala. This situation is further complicated by the different rules of access to water which come into play at the local level, with field observation revealing some discrepancy between the practices in place and the ideals highlighted by a human rights approach. Improved water governance facilitates access to water thereby improving livelihoods. However, it is vital to first assess the sustainability of such traditional water management practices for effective IWRM, and therefore improved water governance.

Key words: Formal-Informal Institutions, Rural Livelihoods, Access to Water

DEDICATION

This work is dedicated to my little angel Salifyanji whose presence in my life kept me going. During the difficult times when I could not go on, looking forward to be with you gave me inspiration.

ACKNOWLEDGEMENTS

I thank the my Master above, whose grace is forever sufficient for me. I give my most sincere thanks to my sponsors, WaterNet for awarding me this scholarship to do this Masters of Science Degree.

I would like to express my gratitude to my Supervisors, Mr. Mabiza and Prof. Nyambe for all the support during the period of research. They gave me the freedom to decide on my own way but with a close and good supervision. Mr. Mabiza introduced me to the world of Social Sciences and he encouraged me to go further and do as better as possible through positive criticism, motivation and enthusiasm. I also thank the Lecturers from Civil Engineering for the invaluable comments during the presentations. Many thanks to Mr. Kujinga for reviewing my work however late in my work I met him.

I have met nice people in the IWRM class of 2006-2007. Thanks to Brenda for being so supportive and Sangwani who was not just a friend but my study partner.

The contribution to my research project by my ZAWA workmates, NWASCO staff in particular, Mr. Muyemba, Mr Mpamba from the Department of Water Affairs Head Office, Mazabuka Municipality Town Clerk Mr Chingangu, Mr Chikumi from the Mazabuka District Health Office, Nkabika Headman Mr. Matthias Mweemba, Mr Mwala for providing me transport to go around Mwanachingwala.

I thank my mother and father for encouraging me to continue with education as well as the foundation they gave me, my sister Suwilanji for taking care of my baby Salifyanji during my absence and my baby sister Suzyo who never gave up encouraging me.

Finally, my husband Mweshi, to whom I owe more than I may be willing to admit. I admire his resilience and unwavering support. Wish you the best as you pursue your own research.

TABLE OF CONTENTS

| | |
|---|------|
| LIST OF TABLES | VII |
| LIST OF FIGURES | VIII |
| CHAPTER 1 | 1 |
| 1.0 Introduction..... | 1 |
| 1.1 Problem Statement | 1 |
| 1.2 Questions..... | 3 |
| 1.3 Objective..... | 3 |
| 1.3.1 Main Objective..... | 3 |
| 1.3.2 Specific Objectives | 3 |
| 1.4 Justification..... | 2 |
| 1.5 Definitions of Key Concepts..... | 3 |
| 1.5.1 Institutions..... | 3 |
| 1.5.2 Livelihoods | 4 |
| 1.5.3 Access to water | 4 |
| 1.5.4 Operationalisation..... | 4 |
| CHAPTER 2: LITERATURE REVIEW | 5 |
| 2.0 Introduction..... | 5 |
| 2.1 Background..... | 5 |
| 2.1.1 International Water Institutions | 6 |
| 2.1.2 Southern Africa..... | 8 |
| 2.1.2 Zambia’s Water Sector | 11 |
| 2.2.0 Access to Water | 14 |
| 2.2.1 Access to Water and Livelihoods | 14 |
| 2.3 Conclusion | 17 |
| CHAPTER 3: RESEARCH METHODOLOGY | 19 |
| 3.0 Introduction..... | 19 |
| 3.1. Location of Zambia..... | 19 |
| 3.1.1 Water Availability..... | 19 |
| 3.1.2 Socio – Economic Status | 20 |
| 3.1.3 The Kafue Flats..... | 21 |
| 3.1.4 Location of Mazabuka | 23 |
| 3.1.4 Mwanachingwala Ward | 23 |
| 3.2 Materials and Methods..... | 25 |
| 3.2.1 Research design | 25 |
| 3.2.2 Data Collection Techniques..... | 25 |
| 3.2.2.1 Document Review..... | 26 |
| 3.2.2.2 Interviews..... | 26 |
| 3.2.2.3 Focus group discussions | 26 |
| 3.2.2.4 Key informant interviews | 26 |
| 3.2.2.5 Direct Observations | 27 |
| 3.2.3 Data Analysis..... | 27 |
| CHAPTER 4: RESEARCH FINDINGS AND DISCUSSION | 28 |
| 4.0 Introduction..... | 28 |

| | |
|---|----|
| 4.1 Sources and Uses of Water | 28 |
| 4.1.1 Domestic Water | 28 |
| 4.1.2 Wells | 29 |
| 4.1.3 Boreholes | 31 |
| 4.1.4 Reliability of domestic water sources | 33 |
| 4.2 Major livelihood strategies | 33 |
| 4.2.1 Small gardens..... | 35 |
| 4.2.2 Livestock watering..... | 37 |
| 4.2.3 Fishing..... | 38 |
| 4.3 Informal Institutions in Mwanachingwala..... | 40 |
| 4.3.0 Institutional Background..... | 40 |
| 4.3.1 Rules of access to water | 40 |
| 4.3.2 Penalty for offenders..... | 41 |
| 4.3.3 Main institutional actors | 42 |
| 4.3.4 Community’s Views about Formal Institutions in Water Resources Management..... | 44 |
| 4.3.5 Discussion..... | 46 |
| 4.4 Rural water supply representation in Legislation and Policies..... | 48 |
| 4.4.0 Legislation..... | 48 |
| 4.4.1 Policies..... | 48 |
| 4.4.1.2 The Agricultural Policy (Final Draft), 2000 | 49 |
| 4.4.1.3 National Policy on Wetlands Conservation, 2000 | 49 |
| 4.4.2 Formal Institutional Actors..... | 50 |
| 4.4.4 Narratives of Formal Institutional Official on roles in the provision of water for the rural areas | 51 |
| 4.5 Discussion of gaps in formal Institutions | 52 |
| CHAPTER 5: CONCLUSION AND RECOMMENDATIONS | 54 |
| 5.1 CONCLUSION..... | 54 |
| 5.2 Recommendations..... | 55 |
| REFERENCES | 56 |
| APPENDICES | 62 |
| Appendix I: Table showing the sample breakdown by homestead..... | 63 |
| Appendix II: Household Interview Guide..... | 64 |
| Appendix III: Focus group discussion guide | 65 |
| Appendix IV: Key person interview guide | 66 |
| Appendix V: Responses to questions about knowledge of water reforms in Mwanachingwala | 67 |
| Appendix VI: Responses to questions about knowledge of water reforms in Kawama..... | 67 |
| Appendix VII: Table of percentage use of wetland | 67 |
| Appendix VIII: Table of percentage of obligation to access land in the wetland..... | 67 |
| Appendix IX: Organisational Structure of the Water Sector in Zambia | 69 |

LIST OF TABLES

| | |
|--|----|
| Table 1: Sources of Domestic Water in the Mwanachingwala Ward..... | 29 |
| Table 2: Average yields for 2006 in Mwanachingwala area | 33 |
| Table 3: Punishment of offenders | 42 |
| Table 4: Functions and roles of the traditional leaders with regards to the water resources | 43 |
| Table 5: A summary of the legislative framework at the national level as it applies to institutional roles in providing water for rural communities. | 48 |
| Table 6: Authorities and agencies responsible for water resources management at local level..... | 50 |

LIST OF FIGURES

Figure 1: The Sustainable Livelihood Framework. 16

Figure 2: Map of the study area in the Kafue Flats..... 21

Figure 3: A communal well at Kawama Primary School used for domestic purposes..... 30

Figure 4: One of the boreholes sunk by JICA in Kawama 32

Figure 5 : Percentage use of wetlands in Mwanachingwala 34

Figure 6: Small vegetable gardens grown next to the estate canal 36

Figure 7: Sources of water for small gardens irrigation 37

Figure 8: The conical funnel fishing gear used to catch small size of fish..... 38

Figure 9: Water Access obligations 41

Figure 10: Knowledge of DWA, D-WASHE, V-WASHE and the Water Act in the five villages in Mwanachingwala..... 45

Figure 11: Knowledge of DWA, D-WASHE, V-WASHE and the Water Act in Kawama. 46

LIST OF ACRONOMY

| | |
|---------|--|
| CMMU | Community Management and Monitoring Unit |
| CSO | Central Statistics Office |
| DISS | Department of Infrastructure and Support Services |
| DFID | Department for International Development |
| DTF | Devolution Trust Fund |
| DWA | Department of Water Affairs |
| ECZ | Environmental Council of Zambia |
| FAO | Food and Agriculture Organisation |
| GRZ | Government of the Republic of Zambia |
| GWP | Global Water Partners |
| IWRM | Integrated Water Resources Managemeeet |
| LA | Local Authorities |
| MDG | Millenium Development Goals |
| MENR | Ministry of Enviroment and Natural Resources |
| MEWD | Ministry of Energy and Water Development |
| MLGH | Ministry of Local Government and Housing |
| MoH | Ministry of Health |
| NGO | Non Governmental Organisation |
| NWASCO | National Water Supply and Sanitation Council |
| NWP | National Water Policy |
| RWSSU | Rural Water Supply and Sanitation |
| SADC | Southern Africa Development Community |
| SLF | Sustainable Livelihood Framework |
| UNCED | United Nations Conference on Environment and Development |
| WASHE | Water Sanitation and Health Education |
| WDB | Water Development Board |
| WHO | World Health Organisation |
| WRAP | Water Resource Action Plan |
| WRM | Water Resources Management |
| WWC | World Water Commission |
| WSS | Water Supply and Sanitation |
| WWF | World Wide Fund for Nature |
| WWG | Water Watch Groups |
| ZACPLAN | Zambezi Action Plan |
| ZAWA | Zambia Wildlife Authority |

CHAPTER 1

1.0 Introduction

Water resources management involves different types of institutions, ranging from very large, trans-boundary, international entities to regional and local ones based at community level (GWP, 2006). There are a number of institutions in Zambia charged to manage water resources, particularly those in the rural areas. According to the *Zambian National Water Policy* (GRZ: NWP, 1994), there have been institutional changes essential for dialogue and co-ordination to ensure some measure of integration. A balance has to be met between providing a fully integrated approach where specific issues may get lost due to lack of expertise or interest, and a sectoral approach where different policies are followed without any co-ordination.

Zambian water resources are managed by a dual legal system of statutory and customary law. However, customary law is more prominent at the local level. For the small holder farmers, traditional institutions derive from cultural narratives, governed access to and use of water. Traditionally owned land is not subject to state law though it amounts to around 70 per cent of Zambia (Chileshe, *et al*, 2005). Hence, the formal water institutions lack relevance for rural communities, who rely on their indigenous institutions for the management of natural resources.

The availability and functioning of freshwater ecosystems have a significant impact on the livelihoods, health and security of the poor (WWF, 2005). Water is the essential element in rural livelihoods for food security and income options it generates in rainfed and irrigated crop production, industry, domestic processing, aquaculture, livestock, recreation, navigation and transport, and electricity supply. Safe water and sanitation are cardinal to health through potable water supply, safe food preparation, hygiene, better nutrition. Against this background, water access clearly needs to increase to meet people's needs and to help raise standards of living.

Rural water supply in Zambia has been dodged with a number of problems. The tendency for many years was more based on centralizations of management of rural water supplies through the central Government or donor agencies (NWASCO, 2004). Even after the institution of the policy of decentralization in Zambia, still the tendency was to shift authority only to the district levels ignoring the lowest levels. This has made the institutional framework for rural water supply to be an issue of intense debate.

1.1 Problem Statement

Institutions tasked to manage water resources have been lacking in executing their responsibilities in rural water development and supply. The impacts of this situation have been jeopardizing the livelihoods of the rural people who to a large extent depend on water.

The nature and extent of the different actors involvement ranges from formal to informal functions. Several pieces of legislation are used in the development and management of water resources as part of the formal institutional set up. With unclear roles and responsibilities, the situation has led to duplication of effort and important functions falling between the institutions (NWASCO, 2004).

While there is a global consensus on the need to implement stakeholder participation approaches to achieve the Millennium Development Goals for food security, poverty reduction and preservation of ecosystems, the day-to-day reality in most countries is a competition between different groups and sectors for water (Batram, 2005). According to Mtisi (2002), getting right the institutional set up has the potential to improve livelihoods and promote sustainable development. The focus has been on effectively achieving improvements on balancing access to water with improved quantity and quality for livelihoods and for resilient ecosystems in achieving equity, environmental sustainability, and economic efficiency through the institutional framework. Access to adequate amounts of water can have significant effects on the socio economic status of the community facilitating activities such as irrigated agriculture, fishing, livestock keeping and many other activities hence improving livelihood and security of the poor. This study will focus on the institutions in water resources management in Zambia, how they impact on issues of access and livelihoods of small holder farmers in rural communities of Mwanachingwala community of the Kafue Flats.

1.2 Justification

It is still largely ignored that rural small-scale water uses are primarily governed by customary normative frameworks and organisations, and only partially influenced by governmental and other external legislative frameworks which in essence are institutions.

The consensus in the wake of the United Nations Conference on Environment and Development (UNCED) of 1992 suggests that the implementation of what has come to be known as "sustainable development" should be based on local-level solutions derived from rural initiatives (Ghai and Vivian, 1992; Ghai, 1994).

The study is aimed at demonstrating that water scarcity usually described in its physical form also has a social construct which justifies the study because how aspects of water scarcity impacts on livelihoods. This study therefore, is meant to bridge this gap in institutions at local and national level context and contribute towards academic debate on water management in small-scale irrigation.

The Kafue Flats Wetlands is an area of international importance, supporting agriculture and other uses that constitute important components of rural livelihood in southern Africa. This study is therefore meant to shed more light on the institutions charged to manage water resources based on principles underlying access to water of equity and stakeholder participation to improve rural livelihoods thus better address aspects of socio economic development for Zambia.

1.3 Questions

- How do small holder farmers' people gain access to water?
- How do emerging practices and institutional arrangements affect small holder farmers' access to water resources? What new governance arrangements are required to encourage a livelihoods approach?
- How do the livelihood concerns and contexts of poor people get represented in policy issues concerning water resources in local and national arenas?

1.4 Objective

1.4.1 Main Objective

- To assess how the current formal and informal institutional setup operating in Mwanachingwala, Zambia impact on access to water of small holder farmers and their livelihoods.

1.4.2 Specific Objectives

- To identify how households secure water to sustain their livelihoods in the Mwanachingwala area
- To analyze the institutional setup in water resources management at local level in Mwanachingwala.
- To identify gaps in the institutional framework and how these impact on the community's livelihoods in their quest to access water resources.
- To analyze how statutory laws and policies in water resources management at local level relate to the community's livelihood strategies.

1.5 Definitions of Key Concepts

1.5.1 Institutions

Institutions are constituent rules of society or 'rules of the game' as defined by Jepperson (1991) in Bandaragoda (2000). Institutions set the ground rules for resource use and establish the incentives, information and compulsions that guide economic outcomes related to the use of the resource. Institutions can either be formal or informal. Apart from the written laws, rules and procedures, informal established procedures, norms, practices and patterns of behaviour form part of the institutional framework. After years of tradition, informal practices also become 'rules' in their own right when they are accepted by society. Institutions are the dynamic products of social, cultural and political practices of a given society and are deeply rooted in a society's historical and environmental experience. They are understood as both enabling (in terms of providing people with ways through which they can negotiate their way through the world) and constraining (in providing the rules for action) (Mehta et al, 2001). The predominant model of institutions in common property resource management literature is essentially bureaucratic; ascribing value to formal manifestations of association and to unilineal progressions from 'weak' to 'robust' forms (Ostrom 1990, Nelson, 1995). Although rules in use are recognised as a major part of resource use there is nevertheless an emphasis on

clearly structured arrangements for decision making often involving representation, regularization and formalisation (Cleaver 1998b). ‘Traditional’ and ‘informal’ institutions are often considered inherently weak and there is a common assumption that modern arrangements can make good the deficiencies of the traditional (Seabright, 1993).

1.5.2 Livelihoods

Livelihoods are the means people use to support themselves, to survive, and to prosper (Ashley and Carney, 1999). Livelihoods are an outcome of how and why people organize to transform the environment to meet their needs through technology, labor, power, knowledge, and social relations. Livelihoods are also shaped by the broader economic and political systems within which they operate. Food security remains a key concern. It is therefore important to ensure that the new approaches to water resources management contribute to improved agricultural productivity and that they help increase the poor people’s access to food.

1.5.3 Access to water

Access to clean water is central to healthy and productive lives for the poor. Yet at the beginning of the 21st Century over one billion people still lack this vital resource (WWC, 2000). A key issue is understanding water as a productive asset for the poor as well as an economic good, which can be combined with other assets to generate financial and non-financial livelihood benefits. Recognizing that potential livelihood impacts of good interventions go far beyond health is an important starting point. In addition to human consumption, water is put to a wide range of productive uses in order to secure food and non-food income at household level. Furthermore, significant opportunity costs are associated with accessing water, both in terms of time/labor expended on water collection activities as well as cash expended at the source and transport costs. Access to water is often a key determinant of livelihood security, by impacting on a broad range of other activities and assets.

1.5.4 Operationalisation

Operationalisation is the process of converting concepts into specific observable behaviors that a researcher can measure. Measurement, or operationalisation, is the process of moving from an abstract concept to a specific indicator that we can actually observe (<http://www.la.utexas.edu/~kgreen/>, accessed on 24th June, 2006)

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

Much attention of collective action for natural resource management has focused on the importance of institutions that are constraining and enabling structures in people's livelihoods. According to Ostrom (1990), institutions provide the incentives to shape the economic maximizing behavior of individuals in socially preferred directions, and the sanctions to punish those who cheat or free ride on the public good of collective action. Institutions can be designed or crafted by external intervention and, provide due attention paid to the structures (rules and roles) and norms (relations of trust and co-operation) contained within them, then collectively beneficial outcomes may be achieved (Uphoff, 2000). Access to water through traditional institutions and the associated narratives, gives water a transcendental quality that links the livelihoods and religious aspects of communal people. Limited access to water by Africans (both communal and small scale farmers) was by the establishment of modern institutions governing access to and use of water. Further, the introduction of modern institutional routes to water was a new phenomenon for both small-scale and communal farmers.

2.1.0 Background

Institutional structures vary from country to country, but whatever the specific structure it is essential to have mechanisms for dialogue and co-ordination to ensure some measure of integration. A balance has to be met between providing a fully integrated approach where specific issues may get lost due to lack of expertise or interest, and a sectoral approach where different policies are followed without any co-ordination. The roles, responsibilities and functions of water organizations vary.

The roles, responsibilities and functions of water institutions vary. They may include:

- Policy formulation
- Education and awareness programmes
- Networking and information exchange
- Regulation, control and enforcement
- Allocation and supply of water
- Flood control and risk mitigation
- Water treatment and reuse
- Conservation and protection
- Pollution control and water quality management

(GWP-TAC, 2000).

The Water Sector in Zambia has all along operated on various ad-hoc sub-sector water user objectives that provide guidelines for development and management purposes. These

guidelines were contained in the Ministerial Policy Statement on “Construction, Maintenance and Operation of Public Water Supplies” of December 1974. This has obscured the formulation and/or implementation of a sustainable national water strategy.

With the adoption of a National Water Policy in 1994, government has made some progress in the development and management of water resources. The National Water Policy recognizes the importance of water to society. Some key policy measures adopted include: recognizing water as an economic good; institutional and legal reforms in which water supply and sanitation functions are separated from water resources; legal reforms to strengthen capacity for the effective administration of the Water Act Cap 132 of 194; regulatory and executive functions are separated; introducing ground water resource regulations and; the adoption of an integrated water resources management approach.

2.1.1 International Water Institutions

International trends in water resources management has been significantly shaped by the IWRM Dublin principles from the International Conference on Water and the Environment held in Dublin in 1992 as well as from the 1992 Rio Summit’s Agenda 21 of the United Nations Conference on Environment and Development. These principles were also adopted by the World Bank as a new policy framework approach to managing water resources (World Bank, 1993). These new ideas on water resources management includes:

- Institutions of decentralized management with greater stakeholder participation
- Promotion of an integrated approach to water management focusing on river basin/catchment management, as well as across economic sectors and ministries,
- Increased social equity in access to water and voice in water related institutions.

Keohane and Nye (1993: 19) argue that localisation processes are more practical than wholesale change because it is easier to maintain and adapt existing institutions than make new ones. Motives for reform arose out of a mix of general facts about water resources in the world Africa and the particular experiences of individual states (Swatuk, 2000). To put it bluntly, the goals of these reforms are equity, efficiency and sustainability – all buzzwords in current global water governance (Swatuk and Rahm 2004). The means to achieve these goals combine activities undertaken at global, regional, and national levels. For Dovers (2001: 215), ‘institutions are both barriers to and opportunities for ecologically sustainable human development. Institutions can pervert or empower human potential’. This hope for empowerment, it seems to me, formed the basis for the creation of new institutions.

According to Wolfe and Brooks (2003) the scarcity of water however dearly held by people actually stirs increased international cooperation with the developing of institutional strategies for adoption to the problems. However, while interstate water diplomacy has faltered, less formalized institutions socially and politically embedded rules, roles, and practices have emerged to help shape water governance locally and globally. Integrated Water Resources Management (IWRM) can help alleviate water poverty by improving access to water and minimizing environmental ill-effects associated with current patterns of water resources development in developing countries

like India (Lawrence, Meigh and Sullivan 2003). IWRM is defined as a process that promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (GWP-TAC, 2000). Among several things, IWRM involves working to improve the potency and effectiveness of three pillars of the water institutional framework: water policies, water laws and water administration in managing the water affairs of a society through a new emphasis on direct water demand management.

According to Kabudi (2005), the water resources laws the world over do not make provisions for recognition of customary laws and practices. This is one of the gaps in the legislation that needs to be addressed. As noted elsewhere, “the non-recognition of traditional or customary water users is at the root of many water use conflicts.” (FAO: 1997) Even in cases where customary practices conflict with the objectives of the water resources laws, awareness and enforcement efforts may help to change the existing practice. There are proposals for provisions on the relevancy of customary law for water resources management and rural water supply service delivery. Customary water laws may provide relevant provisions on conflict resolution, community participation in the management of water resources and water allocation.

Many international organizations work to meet the unmet water needs of human populations, including the United Nations, the Water Supply and Sanitation Collaborative Council, the World Bank, international aid organizations such as US AID, the Swedish Agency for Development Cooperation, the Canadian International Development Agency and nongovernmental organizations such as WaterAid and Water for People. These efforts have made significant progress in increasing access to basic water needs for hundreds of millions of people.

Yet, despite these efforts, many water-related problems have worsened. The incidence of cholera soared in the 1990s and expanded in geographic extent. The populations in urban areas without access to clean water and sanitation actually increased between 1980 and 1990, despite great efforts to meet these needs (WHO, 1996). Even more distressing has been the apparent difficulty the world water community has had in setting new targets and goals for meeting basic needs.

Global Water Partnership (GWP) established in 1996 is an international network open to all organizations in the water resources sector through regional, country or individual level membership. GWP coined the definition of IWRM as well as developed the IWRM tool box and has since been promoting IWRM as a means of reconciling the different and often conflicting demands for fresh water. GWP works in regions and countries by establishing strategic alliances and partnerships, by mobilizing political will, promoting good practices in IWRM and country-level or area-level action to put these concepts to practice.

According to Tushaar and van Koppen (2006) a critical implicit assumption underlying the IWRM discourse is that water poverty – reflecting lack of access to water for

productive and consumptive needs for communities – is a result of the water scarcity and the failure of water institutions and policies to counter it. If this is, indeed the case, then, embracing IWRM can be a big answer to water poverty of nations.

The world is on track to meet the drinking-water target of halving the proportion of people without sustainable access to safe drinking-water and basic sanitation by 2015 (UN, 2003), but sub-Saharan Africa lags behind. Global coverage in 2002 reached 83%, putting the world on track to achieve the Millennium Development Goals (MDG) target. Progress in sub-Saharan Africa was also impressive: coverage increased from 49 to 58% between 1990 and 2002, a 9 percentage point increase. But this falls far short of the progress needed to achieve the MDG target of 75% coverage by 2015 (WHO, 2005). (IWRM) is a process that can assist countries in their endeavour to deal with water issues in a cost-effective and sustainable way. Investment in integrated water resources development and management can contribute to meeting the MDGs as a whole, both through broad interventions designed to promote sustainable development in an area (such as multipurpose river basin development and aquifer management) and through targeted action addressing one of more particular goal in a specific locations (such as watershed management within degraded areas farmed by poor families). Both types of interventions are important for turning many of the MDGs into a reality.

Whilst the eight UN Millennium Development Goals define the main areas of global concern that affect development objectives and related activities, the two that are of the greatest importance to the this study are Goal No 1, "Eradicate extreme poverty and hunger" and Goal No 10, take measures to " Halve, by 2015, the proportion of people without access to safe drinking water and basic sanitation.". In particular, using the Millennium Development Goals as a guideline, a rural livelihood approach covers the socio-economic and environmental issues that affect the rural communities as follows:

- Protection of the Nation's current water resources base.
- Improvement and development of water resources.
- Introduction of cross-sectoral approaches for co-management with communities of the water resources.
- Development of mechanisms for re-investment and revenue sharing with the poor.
- Identify and prioritise impoverished areas and develop compensatory mechanisms and incentives for rehabilitation.
- Introduce effective environmental information, education and communication nationwide.

(Batram, 2005)

2.1.2 Southern Africa

According to Nicol (2002), regionally, SADC is the most visible intergovernmental institution, and has made water resource management a clear priority at its inception in 1992. In the Southern Africa, there has been a realisation now more than ever of the limited nature of the water resource and the need to manage it effectively. Many country-specific, bilateral and region-wide initiatives have been launched since the drought of 1992, such as the creation of the SADC Water Sector, and its Co-ordination Unit in

presently in Botswana, the signing of the Protocol on Shared Water Resources, the active presence of the Global Water Partnership, and the organization of the Round Table Initiative spearheaded by UNDP and SADC Water.

Swatuk (2005) indicated that in southern African states, specific reforms being undertaken include, *inter alia*, development of a state-centric water ‘vision’ embodied in a ‘master plan’ to guide and help coordinate all actions; the crafting of new water laws; development of new institutions to manage water, including inter-sectoral coordination – for example, integrating land and water resources within (transboundary) integrated river basin management (IRBM) frameworks. Reforms are also directly encouraging and empowering rural communities, along with other actors in civil society (NGOs, companies), so that sustainable resource management becomes a self-sustaining entrepreneurial activity wherein the state acts primarily as regulator. Water resources are to be treated as an indivisible unit (the water cycle), and systems of delivery are being reformed to achieve full cost recovery over time.

SADC’s International and Regional Cooperating Partners have always played an important role in the success of the organisation. The SADC Protocol on Shared Watercourse Systems—the first to be signed by all states—was finally submitted for approval in 2001. The protocol covers general principles, the establishment of river basin management institutions, the objective of river basin management institutions, and the functions of these institutions. Issues included are ensuring optimum utilization ‘consistent with adequate protection of the watercourse system’ and abiding by the principle of ‘community of interests’ (referring to multiple stake holding) in the equitable utilization of those systems, as well as the need to establish basin commissions between states.

The Regional Strategic Action Plan (1999-2004), another SADC output, was based on each SADC country’s ‘Country Situation Action Reports’ (funded by the UNDP) and incorporates the Southern African Vision for Water, Life and the Environment in the 21st Century. In recent years, SADC as a region has undergone major changes. These include the restructuring of SADC Institutions, a process that has seen the streamlining of institutional structures responsible for implementing and coordinating the SADC Common Agenda; the development of the Regional Indicative Strategic Development Plan (RISDP) and the Strategic Indicative Plan for the Organ (SIPO). The RISDP and SIPO are structured and aligned to respond to the wider goals of supporting SADC Member States achieve the Millennium Development Goals (MDGs) and poverty reduction strategies being implemented. In addition, they integrate the goals, objectives and implementation framework of the New Partnership for Africa’s Development (NEPAD), fully subscribed to by SADC and the Member States.

While the SADC countries have committed themselves to foster regional cooperation in many different sectors, by and large, this has not been translated into practical implementation at the national level. Cooperation is mostly at the government level, and in some cases, quasi-government institutions such as universities, but lacking at the

community level. It is only recently that communities involved in community-based natural resources management programmes have started sharing experiences.

In addition to the SADC Secretariat headquartered in Gaborone, Botswana, SADC has decentralized its programmes, entrusting each SADC member state to coordinate a particular sector or sectors. Lesotho manages the environment and water sectors under separate coordination units: Environment and Land Management Sector (ELMS) under which ZACPLAN was initiated, and Water Sector Coordination Unit (WSCU).

Other SADC sectors/institutions, whose mandates have a bearing on cooperation in the Zambezi Basin, include:

- Energy Sector Coordination Unit, Luanda, Angola.
- Inland Fisheries, Forestry and Wildlife, Lilongwe, Malawi.
- Tourism, Port Louis, Mauritius.
- Southern African Transport and Communications Commission, Maputo, Mozambique.
- Marine Fisheries, Windhoek, Namibia.
- Mining, Lusaka, Zambia.
- Drought Monitoring Centre, Harare, Zimbabwe.
- Food Security, Harare, Zimbabwe. (Chenje, 2000).

A significant indication of this lack of coordination is that the institutional frameworks proposed to manage water and land reforms are distinct and, to date, unrelated. While land reform will rely on existing or new governmental bodies, the unit proposed for IWRM in all SADC countries is the river basin or catchment. International conferences and principles (UNCED Agenda 21, the Dublin Water Principles) as well as the World Bank, European Union, Asian Development Bank and other lending organizations have promoted the creation of decentralized Catchment, Watershed or River Basin Councils to assume many management functions from central government. This idea has been embraced by Southern African planners.

Studies undertaken by Derman and other authors (2001) in Malawi and Zimbabwe as part of the BASIS Phase I program point to the institutional complexity associated with water and land reforms and the need for better coordination and sequencing, if access by marginalized groups is to be broadened. To date, little effort has been made by policy makers or program implementors in Zimbabwe, or Malawi, even though changes in one sector will have significant impacts on the other and will ultimately condition the success of both reforms. For example, in Zimbabwe the new Constitutional Amendment on Land (2000) makes no reference to new institutions and policies embedded in the Water Act (1999) and vice-versa. Malawi's proposed land and water reforms also appear to be taking place in a parallel but uncoordinated fashion. The Land Policy Reform Commission was appointed in 1998 to review the land question in Malawi, but without any reference to water issues. Currently, a new Water Policy and Implementation Plan are in final draft but with little reference made to land matters (or to the studies produced

under the Land Commission). This disjunction between water and land has significant ramifications.

Access to safe drinking water is only available to some 60% of the people in SADC (Gleick, 1993). The right to water could also be considered even more basic and vital than some of the more explicit human rights already acknowledged by the international community. And a transition is underway making a right to water explicit. Certainly no rational water policy for the 21st century can continue to ignore this most fundamental need. Therefore, as a first step, governments, international aid agencies, water agencies, non-governmental organizations, and local communities must work to provide all humans with a basic water requirement and to guarantee that water as a human right. By acknowledging a human right to water and expressing the willingness to meet this right for those currently deprived of it, the water community would have a useful tool for addressing one of the most fundamental failures of 20th century development.

Water use patterns hold up a mirror to social organization. Swatuk (2005) explains the high proportion of SADC state populations that lack access to safe water and adequate sanitation. Only the most industrialized SADC states – i.e. South Africa and Zimbabwe – and those with very small populations and high revenue bases – Namibia and Botswana – have been able to deliver safe water to their populations. With regard to safe sanitation, only South Africa and Tanzania – quite a developmental achievement for such a weak economy – have delivered here. While illustrating a good deal of inter-state cooperation over water resources management, at regional level one can see that many people suffer not overt violence, but structural violence: there may be no water wars, and there may be a great deal of inter-state cooperation at a very high level, but people are dying because of poverty-related resource access issues.

To summarize, the institutional changes underway in Southern Africa take as their aim to improve access to water for people regardless of race, ethnicity or gender; to raise productivity; and to encourage sustainable use of scarce resources. In short, they aim to improve the lives of the region's diverse peoples.

2.1.2 Zambia's Water Sector

Generally, national institutions are developing policies in line with integrated water resources management principles. However, expertise in water management institutions is still heavily biased towards hydrology and engineering. At least 56% of the population in urban and rural areas do not have access to safe water supply, and as much as 90% do not have access to satisfactory sanitation facilities (GRZ: NPE, 2004). According to the 2003 Human Development report for Zambia, overall poverty levels reached nearly 73% in 1998, averaging about 83% in rural areas and 56% in urban areas with women generally faring worse than men in both.

In 1993, the Government adopted the “Seven (7) Sector principles” to guide the reformation of the water sector (Nyambe, 2000). The reforms that began in the water supply and sanitation sub-sector have established clear institutional structures from the national/central level to the local government level. The reforms in the water resources

sub-sector were launched in June 2001 under the Water Resources Action Programme (WRAP), and like those of the WSS are geared to also address the institutional and legal frameworks, amongst others. There are number of institutions involved in water activities in Zambia. These include government, non-government and the private institutions. Their nature of involvement ranges from policy/legal formulation and implementation to service provision and consumption. Sectoral ministries retain overall responsibility at the national level for land, water and other natural resources.

According the National Water Policy (1994), there are generally seven (7) broad categories of institutions identified to be involved in water activities in Zambia, grouped as follows:

- (i) Government ministries and departments (e.g. MLGH, MEWD, MoH, DWA)
- (ii) Local Authorities (e.g. city, municipal, district councils)
- (iii) Regulatory Authorities (e.g. Water Board, Environmental Council of Zambia (ECZ) and NWASCO)
- (iv) Commercial Water Utilities (e.g. Lusaka, Kafubu, Mulonga Water and Sewerage Companies)
- (v) Private Sector (e.g. Zambia Sugar Company, Chilanga Cement)
- (vi) Bilateral and multi-lateral institutions (KfW, DFID, World Bank, UNICEF etc.)
- (vii) NGOs and CBOs (Care International, Water Aid, Residents Development Committees)

The water sector has numerous linkages to other institutions in the country whose activities may be based or to a greater extent rely on the services provided by water resources as indicated in Appendix II. In order to implement the policies outlined in the Zambian National Water Policy of 1994, whose objective connotes essentially promoting sustainable water resources development with a view to facilitate an equitable provision of adequate quantity and quality of water for all competing groups of users at acceptable costs and ensuring security of supply under varying conditions. This entails establishing a well defined institutional structure that will achieve the intended policy objective. It should be recognized that any institutional framework adopted for the water sector must be in line with the national development effort and fit within the existing government structure. Additionally, the Policy states it is imperative that the necessary legal reforms consistent with the overall institutional structure and the prevailing socio-economic environment be effected at both national and sectoral levels.

Traditional water laws and regulations are in actual fact more significant than the formal water law in the rural areas of Zambia (Chileshe, 2005). Customary law refers to set of rules and norms practiced by a community over a long period of time and most often are not codified. These laws provide for a set of rights and duties to be observed by certain community and against outsiders. In traditionally governed systems, water rights are riparian, which are juxtaposed with the non-priority permit system that the government administers on public water. The occupier of traditionally governed land must register the water bodies on their land and any intended use for the water body including estimated daily volumes. The register is held at the land and deeds register. Unfortunately enforcement of the registration is rather weak and most traditional landowners do not

adhere to the legal requirement as is the case in Mwanachingwala, Mazabuka. The balancing act between the role of the central government and the district councils on one hand and the community based water user associations is not yet concluded

In the case of water resources, various communities in Zambia have a long history of practicing certain customary laws for management of such resources. Even in the advent of colonial invasion, customary water law continues to exist in parallel with statutory law. These traditional ethics and practices are deep rooted and have been found to be useful in resolving water use conflicts, defining water allocation for different local uses and provide for catchment protection. Customary laws or practices, if consistent with statutory laws may also form the basis for community support for enforcement of statutory laws.

Water is critical to the livelihoods of Zambia because of its importance in food and agriculture, health, industry, energy, transport and tourism (GRZ: NWP, 1994). It also provides formal employment to many people involved in water management and the various water supply and sanitation schemes in the country. In food and agriculture, water is a prime factor in the production of adequate food for Zambia. Water makes the soil productive, It is also important in the sustenance of the fishing industry which has an important role to play in the provision of 40% of the protein consumed in Zambia. (ZAWA, 2006). Agriculture provides employment of 74% of employment for the rural populations (GRZ: NPE, 2004). The amount and quality of water consumed by a community determines its standard of living. The benefits from supply of sufficient quantities and good quality and sanitation are important in as far as the sustenance of health is concerned. Improved access to water in Zambia has yielded direct socio economic benefits. For many people (particularly in rural areas), obtaining water is time consuming and heavy work, taking up most of the women's time.

According to the NWASCO report (2004), at independence, Department of Water Affairs (DWA)'s responsibilities for development of water supply for townships and rural areas became the dominating activity. Institutional reforms have recently been made, shifting the responsibility of water supply, with regard to operations and maintenance, from the DWA to the Ministry of Local Government, thus separating regulatory functions from executive functions. Thus, at present, the main mandate of DWA is water resources development and management.

The National Water Policy of 1994 states that the Water Development Board (WBD) provides management of the nation's water resources in terms of administrating water rights. The WBD, whose members represent a range of public and private stakeholders, has long been responsible for water allocation; although weak and poorly funded, it provides a foundation for water resources regulation. The Ministry of Energy and Water Development has moved away from direct involvement in the implementation of programmes in the water sector, and assumed greater involvement in the functions of policy-making, planning, monitoring and co-ordination of programmes. The Water Board was originally part of the Department of Water Affairs, with a Water Officer as a senior executive in charge of water allocation and issuing of water licences. As part of the Water

Supply and Sanitation Sector Reform Program in Zambia, the water utility functions have been transferred from the MEWD/DWA to the Ministry of Local Government. A Water Officer now discharges the responsibilities of the Water Development Board and Secretary to the Board seconded from DWA. DWA is temporarily involved in the development of water supplies in their former areas of responsibility. The reform is a good opportunity to improve the management and development the water resources for the long-term benefit of the nation as well as the region. Although there is some water resources management skill within the Water Development Board, the capacity is quite limited, and the need to build and extend capacity within national water management institutions, as well as within society at large, is fundamental.

The Water Board was established under an Act of Parliament of the laws of Zambia to control the use and abstraction of all surface water resources by considering and granting water rights. The Minister of MEWD appoints the Water Board members, with its chairman reporting to the Permanent Secretary. All WDB staff is currently seconded from the Department of Water Affairs. The Water Board manages currently about 2-3000 licenses and some 150 licenses are granted or renewed annually.

2.2.0 Access to Water

The disparities in access to fresh water around the world are overwhelming. According to Gleick (1993), more than 1.1 billion people in the developing world do not have safe drinking water, which represents 17% of the global population. Furthermore 2.6 billion (42% of the world population) lack access to basic sanitation. The United Nations Educational Scientific and Cultural Organisation (UNESCO, 2002) global studies have indicated 80% of the population without access to drinking water is rural dwellers, but future population growth will be mainly urban. The needs for water are enormous, with the problems particularly being of countless small communities in the rural areas without adequate access to safe drinking water and water for productive purposes. Worldwide, growing populations with higher living standards are making ever greater claims on finite fresh water resources for agricultural, domestic, industrial, and other uses. In an increasing number of river basins, the physical limits of available water resources are being reached. There are significant rights issues surrounding the different conceptions of the resource and entitlement to access, based not on water rights *per se*, but on rights to participate, and institutional barriers to the exercise of these rights.

2.2.1 Access to Water and Livelihoods

According to Crow and Sultana (2002), in urban areas of the industrialized world access to clean, plentiful water is almost universal and approximately equitable. However, in the global south, particularly in rural areas, access to water is more problematic, more differentiated, less secure, and frequently requires substantial expenditures of work, time and money. Access to the key resources of land and water is problematic in Zambia as it is throughout the region. (Nyambe, *et al*, 2002) It is well known that historical inequalities in access to land were particularly marked in the settler society of Zambia, but they also have influenced settlement and access to water in the country. Far less attended to is that access to water has frequently depended on access to land. In recent

years, water's relative invisibility in the policy reform process and in the accompanying political debates, along with the rising pressures on water, have received more consideration.

Access to water is gained through a range of social relationship falling into four main modes of access namely:

- Ownership of land and a well or pump providing access to ground water or a water course
- Market access - purchase of water, such as from the owner of a well
- Common property access – obtaining water from the river, stream or some communal well
- State backed provision – local or national government projects, such as the municipal water or pumped water (Tushaar and van Koppen, 2006)

Each of these modes of access has particular characteristics, or social dimensions of cost, labour time, decision making, historical trajectory or long term dynamics, and response to external shocks. In most rural regions of Africa, access to water is obtained through all four modes. The access to water of both households and enterprises may then be differentiated by material and other social divisions. From disaggregating of the social relations of water, material inequalities influence water security and deprivation through a range of processes operating at different social levels. These processes include property relations, inequalities of income, state provision, rules of access to common social property and social status. Conditions of access to water for many rural households constrain both health and livelihoods. Poor households generally get access to unsafe water, and their access may also be insufficient to sustain potential livelihoods, for example irrigated agriculture. A review of participatory poverty assessment in several African countries concluded that better water supplies were consistently perceived by the poor as a high priority (Booth *et al*, 1998).

Improved access to water is a powerful tool to diversify livelihoods and reduce vulnerability for small producers. Low prices, fluctuating markets, adverse tenancy, and insufficient labor can all explain why smallholder farmers must engage in diverse livelihood strategies; they cannot survive from agricultural activities alone, even with better water husbandry (Adato and Meinzen-Dick, 2002). As water users, smallholder farmers value their water access for its contribution to income, household needs, and the social networks and entrepreneurship it supports. Many argue that new opportunities still exist to help smallholder farmers gain better livelihoods despite water scarcity and to build a more vibrant local economy around them. Indeed, it is essential to prioritize small holder farmers' water access in the interests of reducing poverty, vulnerability, and social injustice.

The sustainable livelihoods conceptual framework is a particular form of livelihoods analysis used by a growing number of research and applied development organizations, including the Department for International Development (DFID) of the United Kingdom, the United Nations Development Programme (UNDP), as well as nongovernmental organizations (NGOs) such as CARE and Oxfam (DFID 1997; Carney *et al*. 1999).

According to Ashley and Carney (1999) the sustainable livelihoods (SL) approach to development and poverty reduction tries to take into account conventional, participatory and livelihood approaches. The concept of “livelihoods” has become increasingly popular in development thinking as a way of conceptualizing the economic activities poor people undertake in their totalities. It aims to promote development that is sustainable not just ecologically, but also institutionally, socially and economically and to produce genuinely positive livelihood outcomes. The sustainable livelihoods framework provides a common conceptual approach for examining the ways in which community based watershed management fit (or sometimes do not fit) into the livelihood strategies of households or individuals with different types of assets and other resources, strategies that often involve multiple activities undertaken at different times of the year.

Illustrations of sustainable livelihood approaches can be seen in CARE’s partnership effort with local NGOs with community-based organisations in Mali and Zambia (Drinkwater, *et al*, 1999). Strengthening civic action to promote household livelihood security involves strengthening government, the private sector and civic groups in order to help the poor reduce risk improve access to services and lower transaction costs.

More generally, the Sustainable Livelihood Framework diagram (as in Fig.1) suggests a snapshot approach, when, in fact, it should be seen as dynamic. Livelihood strategies, vulnerability factors, asset portfolios, and policies, institutions, and processes are often in a state of flux, so it is important to operationalize the framework in a way that incorporates this temporal dimension.

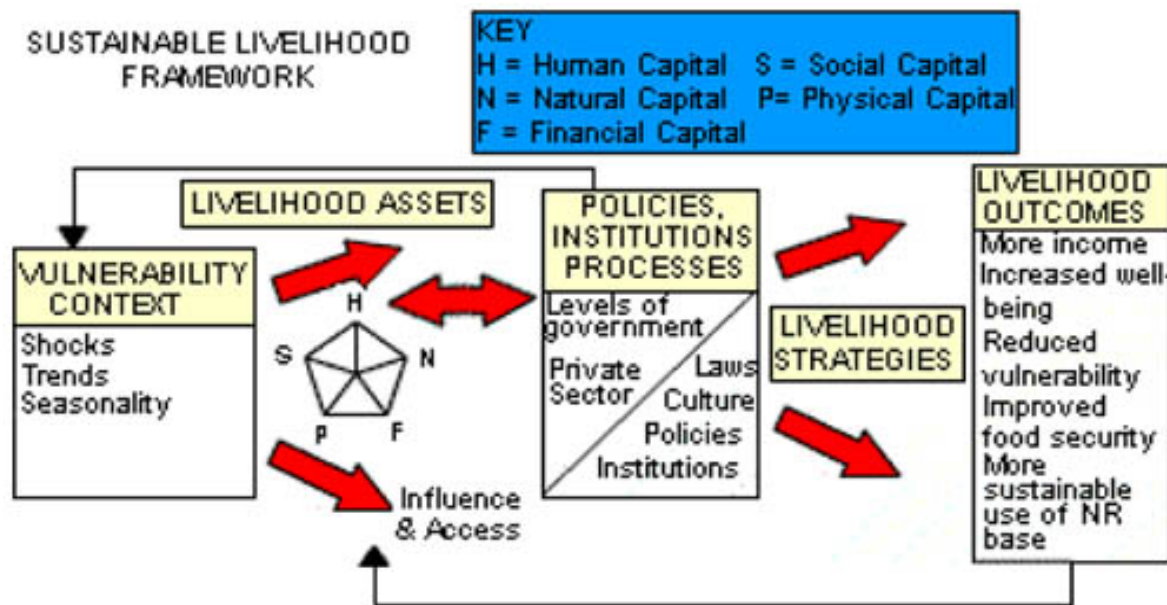


Figure 1: The Sustainable Livelihood Framework.
 Source: Carney. “Sustainable Rural Livelihoods”. 1998, p.5

According to Ashley and Hussein (2000), the key framework components are assets (physical capital; financial assets; natural capital; social capital, human capital). These are the basic livelihood building blocks. Poverty analyses have shown that people's ability to escape from poverty is critically dependent on their access to assets (Booth et al., 1998). Both quality and quantity of assets matter, along with the options to convert assets into productive activities. Livelihood activities which are what people do.

People usually pursue a diverse portfolio of activities, including on-farm activities, off-farm activities and migration. Outcomes are components of improved livelihoods or well-being (e.g. good health, more income, reduced vulnerability, empowerment, food security, more sustainable use of the natural resource base). These are what people are trying to achieve through their activities. External influence that are coined as institutions, organisations and policies that affect the assets and opportunities that are available, and their productivity: e.g. government policy, formal organisations (farmers' groups, local authority) and informal institutions, which include societal rules and norms (market networks, credit systems, discrimination) and access to markets.

The context is the external environment in which people operate. The natural, demographic and economic context shapes people's access to assets, and shocks and trends tend to increase their vulnerability. People's strategies, priorities and preferences are people's own priorities help shape their livelihoods. 'Strategies' may never be articulated, but they nevertheless influence people's choice of which activities to combine, which outcomes to pursue, and which assets to invest in. For example, reducing vulnerability and coping with drought may be priority strategies for some, investing in family education a priority for others. The various components of livelihoods are closely inter-related; change in one often leads to change in others. Understanding such dynamic effects is a key challenge of the SL approach that is not adequately reflected in the two-dimensional framework.

A key issue is understanding water as a productive asset for the rural people as well as an economic good, which can be combined with other assets to generate financial and non-financial livelihood benefits. Recognising that potential livelihood impacts of good interventions go far beyond health is an important starting point. In addition to human consumption, water is put to a wide range of productive uses in order to secure food and non-food income at household level. Furthermore, significant opportunity costs are associated with accessing water, both in terms of time/labour expended on water collection activities as well as cash expended at the source and transport costs. In short, access to water is often a key determinant of livelihood security, by impacting on a broad range of other activities and assets. A useful way of conceptualising this idea is in the form of a model household water economy.

2.3 Conclusion

The current chapter has shown that water institutions, formal and informal, need to be in the right perspective to attain sustainable livelihoods; both in terms of food production and income generation, and that water scarcity leads to poverty. The chapter has also

presented various institutional scenarios that various societies from all over the world, especially in Africa, have relied on for water governance and sustaining their livelihoods. However, while rural livelihoods have depended on traditional wisdom to manage their water resources since time immemorial, the introduction of modern water management practices has neglected the potential of this. This could be one of the reasons why IWRM has failed to address issues at the most local scale.

CHAPTER 3: RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the area where the study was carried out, and the methods used in this study. It begins by describing the study area. It then discusses the design of this research and the research instruments used to collect the data. The chapter further discusses the sample design, the sampling techniques and the criteria for the choice of sample size. It also gives details of the data collection process and the problems encountered during data collection. The rationale behind the selection of the data analysis method used is given. Last to be presented is a discussion of the gaps in the data.

3.1. Location of Zambia

The study was carried out in Zambia which is part of the Southern Africa Development Community (SADC). It borders with Zimbabwe and Botswana to the South, Namibia to the Southwest, Angola to the West, Democratic Republic of Congo and Tanzania to the North-West and North respectively, and Malawi and Mozambique to the East. Zambia is land locked and has an area of 752,614 km² its latitudes between 15° 30' N and 22° 30' S, and longitudes 25° W and 33° E with an altitude between 350-2164m (GRZ: NPE, 2004). The climate comprises of three distinct seasons; the rainy season, the cool dry season and the hot dry season. It has four major biomes consisting of forest, woodland, grassland and aquatic systems. These encompass large parts of the Zambezi and Congo drainage systems and it is thus probably the best watered country in Africa. It is endowed with a wealth of natural resources within ecosystems with landscapes that include extensive forests, grassy plains, hills and steep escarpments; huge lakes and rivers, deep valleys and ecologically rich wetlands together with areas of anthropic origin such as cropland, plantation forests and urban settlements.

3.1.1 Water Availability

The Zambezi Basin covers 40% of Zambia and shares the transboundary river of the Zambezi with seven other countries (Chenje, 2000). Over 70% of Zambia's surface area and of its population are within the Zambezi Basin, half of this population lives along the Kafue River, a major tributary of the Zambezi, with the south much more prone to drought. However, the Kafue River only contributes 15% to the nation's water resources. The overall water resource potential is given in Box 1 whereas the sectoral estimate for water use in 1995 showed hydropower generation had the largest share of 1150m³/sec, crop irrigation 62 m³/sec, industry and domestic uses at 14m³/sec. Per capita consumption rates in large cities averages 180 litres and 150 litres / day for small urban centres (Nyambe, 2002).

Box 1: Zambia's water resource potential and use

- Surface water: 237 million m³/day
- Ground water: to be abstracted about 157 million m³ /day.
- 3% of the water resource are consumed as domestic, industrial or agriculture
- 1% of the groundwater potential is currently used for drinking and for irrigation
- 42% of surface water is used for hydropower
- 97 % of Zambia's water flows to other countries (includes 42% of hydropower usage)

Source: Yachiyo Engineering Co. Ltd (YEC), 1995 – National Water Resources Master Plan

The annual rainfall decreases from an average of 1000mm in the northern parts of the country to an average of 600mm in the southern part (Chenje, 2000). The run-off generated locally is 100,000 MCM annually (Mac Donald, 1990). Although the south receives half the amount of rainfall as the north the total run-off produced by the north is five times that from the south. In comparison to other countries in the Zambezi basin the total run-off from Zambia contributes 40.7% of total basin flow. Apart from surface water resources, Zambia enjoys favorable ground water conditions compared to most countries in the southern African region with regards to depth, storage at 174030 MCM and ground water recharge of 160 00MCM per annum (Mac Donald, 1990).

3.1.2 Socio – Economic Status

Zambia's resident population recorded in the 2000 census is about 10 million (GRZ: CSO, 2004). However, the population adopted for analytical purposes in this chapter and the rest of the report is about 10 million of which about 50% are females. The population has continued growing but at a lower rate declining from an average annual growth rate of 3.1 percent between 1969-1980 to 2.7 percent between 1980-1990 and 2.4 percent during the last inter-censal period of 1990- 2000. The proportion living in rural areas in the past decades has continued to increase, whilst the proportion of the urban population has declined from 38 percent in 1990 to 35 percent in 2000.

According to the 2002-2005 Poverty Reduction Strategy Paper, about 73% of Zambians are classified as poor with 63% of these residing in the rural areas. Poverty is attributed to lack of economic growth which is constrained by many factors, but of key concern are macroeconomic instability, low savings, low investment, food security, and unemployment. In addition, human resource productivity is constrained by HIV/AIDS and its social consequences.

The economy is heavily dependent on primary production and services. The bulk of the rural population lack productive capacity and have not been able to fully exploit the natural capital at their disposal. In terms of economic performance and the role of agriculture, according to the March 2004 Ministry of Finance and National Planning review, Zambia's economy is experiencing modest recovery spurred by a growth in the NTE sector, with an average real GDP growth rate of 3.7% for the period 2001-2003.

3.1.3 The Kafue Flats

The study area is in the Kafue Flats (wetland) situated in the southern part of Zambia, on the Kafue River which is one of the main tributaries of the Zambezi River. The Kafue Flats is an extensive flood plain about 255 kilometers long and 60 kilometers wide. It covers some parts of districts of Kafue, Mazabuka and Namwala and covers an area of more than 6,500 km² (Williams, 1977; Chabwela, 1994) as indicated in the figure 2.2, a representation of the study area. The Kafue Flats covers the southern and central provinces and is located between latitudes 15°41'S 027°16'E with an average minimum elevation of 1,000 meters above sea level.

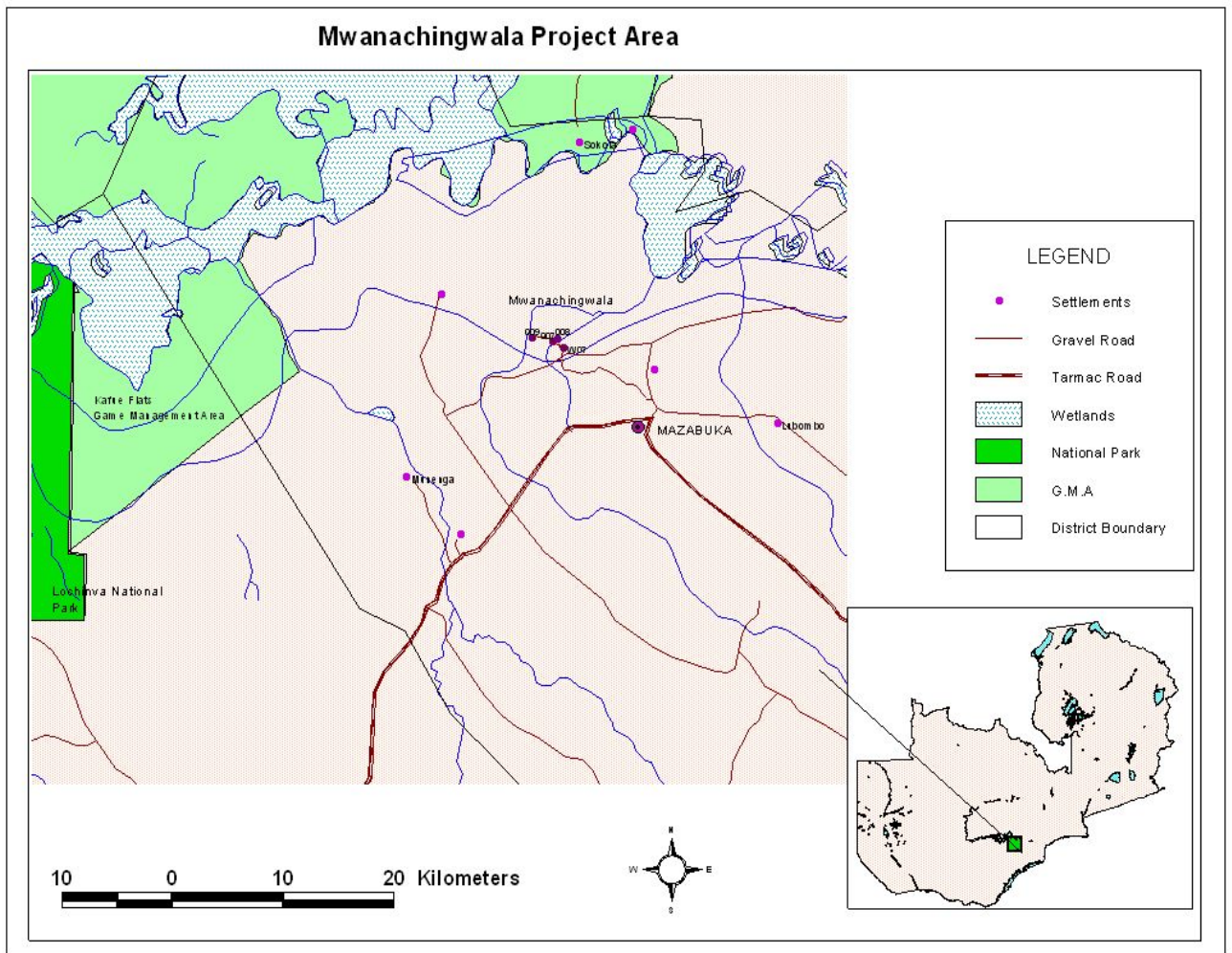


Figure 2: Map of the study area in the Kafue Flats

The purple dots in the Mwanachingwala area was where the study was carried out.

The wetland has a vast expanse of floodplains, grasslands and woodland zones of high biodiversity in a complex pattern of lagoons, oxbow lakes, abandoned river channels, marshes, and levees. The site supports many endangered and endemic species such as the

endemic kafue lechwe (*Kobus leche kafuensis*), wattled crane (*Grus carunculatus*), and sitatunga, amongst others, and it hosts migratory birds such as the white pelican (*Pelecanus onocrotatus*) and the cattle egret (*Bubulcus ibis*), as well as 67 fish species (Chabwela, 1995). The site possesses natural filtering and storage abilities, thus providing clean and plentiful water and acting as a natural sink for nutrients and other micro-elements. The inhabitants of the area earn a living from fishing and pastoral grazing of livestock. The site is also of traditional and religious value to the Ila people of the Central Province and is of archeological and historical interest owing to the Gwisho hot springs and Sebanzi hills in the Lochinvar National Park (WWF3, 2000).

The Kafue Flats in Zambia is a thinly populated plateau to the west of Lusaka. According to the 2002 census, these districts had a total population of around 1.3 million with the largest proportion residing in the basin (CSO, 2004). At least 21 chieftaincies are located within the Kafue Basin subcatchment of the Kafue Flats (Marchand et al, 1983). A good account of the number of ethnic communities directly inhabiting the Kafue Flats was provided by Lehmann (1977) and Rennie (1980) indicating that the Tonga and Ila tribes make up the largest ethnic groupings in the area. The Ilas practice cattle rearing, the Twa lean toward fishing. Mazabuka district has a total population of 240,116 (CSO, 2000) made up of 44,033 households out of which 49.73% and 50.27% are males and females respectively.

According to Chabwela and Mumba (1998), settlement patterns show distinct arrangements of the Tonga people occupying the Kafue River levees in the chieftaincies of Mwanachingwala, Shakumbila, Mungaila, and Muwezwa. However, major population settlements are located in the southern part of Kafue River in Namwala, Monze, and Mazabuka districts.

Mixed farming of the southern plateau system by the Tonga tribal community primarily involves livestock rearing and the cultivation of maize, cotton, and groundnuts production at a semi-commercial scale in the high grounds of the subcatchment. The Kafue Flats in contrast are left for cattle grazing during the dry season when water and grazing are most limited. At least three quarters of the nearly 250,000 head of cattle are driven into the area to graze for six months. (Chabwela and Mumba, 1998) This tradition has been followed by many generations of these inhabitants. The number of farm holders was estimated at 7,120 (Food Security Project, 1998) out which 80% and 19% representing small scale and medium farm holders respectively while only 1% of farm holders was for large scale. Male farmers head 89% of farm holdings and female farmers head a 19% of farm holdings with a mean small-scale farm holding of 2.2 hectares.

There are several factors that are attributed mass movements of human populations. First, the vast growth of human and cattle populations required much land for settlement and grazing. By 1990, human population in the region had grown from 96,000 to 946,400, while the cattle population had expanded to more than 250,000 (GRZ, 1982). A sharp land use conflict inevitably resulted, which at one time require the establishment of the Commission of Inquiry in a land matters dispute in Southern Province in 1982. Second,

the location and expansion of the Nakambala Sugar Estate affected cattle movements into the Kafue Flats in the Chiefs Mwanachingwala and Sianjalika communities. Third, the construction of the hydroelectric dam at Itzhitezhi raised serious concerns: people in the area relied on regular flood patterns for improving the quality of the ranges used by their cattle. Fourth, these years had very little rainfall. Areas such as Choma and Kafue recorded mean rainfall of less than 800 mm (Tiffen and Mulele, 1993).

Current population movements into the area follow the increase in fishing and the improved market for fisheries products. While only the Twa people fish in Southern Province, large populations of migrant fishermen have moved into the area from the Western, Luapula, and Northern provinces of the country. They have established semi-permanent villages in the flood plain in the Luwato, Nyimba, Wanki, and Namalyo areas (ZAWA, 2005).

3.1.4 Location of Mazabuka

According to Hamazakaza and other authors(2002), Mazabuka district has an altitude of 900 –1200 m.a.s.l with a plateau and Kafue polder as its major physical features and a general slope ranging from generally flat to undulating landscape. The main drainage system for the district is the Kafue river basin and is endowed with two rivers namely Kafue and Magoye.

The district lies in agro-ecological region IIa with an average annual rainfall of 800 mm. The district has a growing season of 90 days, with drought frequency and frost occurrence rating 9 high and 2 high respectively. The relative humidity is at 63 percent with mean minimum and maximum temperatures being 12°C and 27°C respectively and the sunshine hours estimated at 8 per day.

3.1.4 Mwanachingwala Ward

The people of Mwanachingwala are mainly engaged in agricultural and pastoral activities in rural areas. The study was done in the Mwanachingwala Ward of Mazabuka, which is adjacent to the Kafue River in the wetland. Figure 2 is a representation of the study area. Chief Mwanachingwala represents the interests of some 60,000 subjects who have contributed approximately 40,000 hectares of community land to the Conservation Area authority.

The average household size for the Mwanachigwala ward is 6, though some households have up to 13 members. The highest educational level attained is Ordinary Level. The majority of these households' members are below twenty years of age with some of them going to a primary school 15km away, and the others are too young to walk that distance. The bulk of the older people have since left the villages to seek fortunes in the urban areas if not that they have passed on especially from the HIV/ AIDS ailments hence more children.

3.1.5 Water Institutions in Mwanachingwala

Community level institutions for the management of natural resources have always been in existence in Mwanachingwala. Other researchers refer to them as customary law,

traditional informal practices or indigenous institutions for the management of natural resources (Cleaver 2000, Chikozho and Latham 2005). Traditional nested levels of governance start at the village level headed by an appointed village head. The village headman is appointed by the Chief at the recommendation of the Headman. Immediately above the village level is the Headman, who presides over several (25-30) villages. The Chief appoints the Headman and he presides over 3-5 Headmen. Chikozho and Latham (2005) claim that this traditional institutional arrangement (chieftainship system) is the only robust and observable form of management in the grassroots communities. Hence it is the ambit where local common/communal resources management falls (Chikozho and Latham 2005).

3.2 Materials and Methods

3.2.1 Research design

This study is mainly qualitative and the methodological framework guiding this study was based on tools derived from the social sciences. The study used a case study method which was selected because it served as a basis for providing the nuance data necessary to understand the complex water resources management institutional structures and rural livelihoods (Sithole, 2003).

Selecting the study sites was done in a number of steps. Firstly, this is one of the areas in the jurisdiction of the researcher's formal employment; some basic information about the socioeconomic activities of the community in the Kafue Flats was hence highlighted. Using this information, the possibility of research was discussed with the principal supervisor and deciding on which parameters were needed to be analysed. A plan of preliminary visit to the site was then designed to be carried out from the 15th to 17th December, 2006. Arrangements including contact with local community members to confirm the date and length of visits were made. Since the purpose of the study was to give a broad perspective and guidance to the organization structure of water resources management in Zambia and the impact of it on rural livelihoods, it was decided at the outset that the Kafue Flats be the focus because of its status of a wetland of international importance.

This survey was carried out in Mwanachingwala Ward of Mazabuka. The sampled villages are Nkabika, Chipepo, and Kaleya. However, because of the comparative aspect of this study, Kawama was also included as a place with less water resource endowment. The sample size of 72 was used with 19 of these being key informants while the remaining 55 were from households as indicated in Appendix I.

Prior to the study a reconnaissance survey was conducted in the Kafue Flats. Existing records and documents on the research area were used to provide more information especially to augment data collection from key informants on background of the water resources management institutional setup and historical issues.

3.2.2 Data Collection Techniques

Various data collection methods were used in combination to achieve the objectives of the study. Document review, key-informant interviews, direct observation, dialogue and "informal discussions" played an important role in data collection. Qualitative methods were used because:

“...human behaviour is principally determined by the codes of meaning which are socially negotiated and transmitted through culture, and these processes cannot be properly analysed by aping the methods of the natural sciences, nor by borrowing their constructs and categories” (Hurst 1987 :69 cited in Manzungu, 1999).

3.2.2.1 Document Review

Useful materials of this nature included a number of documents on the Water Resources Management Institutional Framework in the Zambia at national, provincial, catchment, and local level, and comparing this framework to other states in the SADC region. Some of the documents reviewed were the Zambian Water Act and National Policy, other policies such as Agricultural Policy and Wetlands Policy; Water and Sanitation Act, Public Health Act, Local Government Act and other acts outlined in the findings from the different ministry offices. Some of the reports on the Water Sector in Zambia reviewed were IWMI/IUCN reports on livelihoods, NWASCO annual reports, WWF report on the Kafue Flats from the different offices.

3.2.2.2 Household Interviews

Unstructured interviews were carried out in the three selected villages. Interviews were held with heads of households, village headmen and the chief of the area. The sampling technique used to select households to be part of the sample population was a purposive sampling.

The interviews which formed the foundation of the data collection phase were conducted with the aid of an interview guide (Appendix II). The use of an interview guide enabled the researcher to be systematic about asking questions and not to leave out certain issues. These interviews were done between the 3rd of January and 2nd February, 2007. A total of 55 households were interviewed. Each interview started with a broad introduction to access to water, which included an overview of the sources of water and uses, followed by information on rules of access, organizational structures of institutions, and benefits from the access to water in monetary terms. This helped the researcher to get information on the type of sources and potential yield from sources, allocation and possible conflicts.

3.2.2.3 Focus group discussions

Focus group discussions were used for cotton farmers, fishermen and small garden owners. A focus group discussion guide was used in these discussions. (Appendix III). The groups comprised of 5-6 people each. From these discussions, the researcher was able to gather more information about the community's activities to sustain their livelihoods. Group discussions were also used to obtain information on the main activities contributing to the livelihoods of the community. This method was chosen because it is relaxed, comfortable and enjoyable for participants as they open up about their ideas and comments in a discussion. However, this method also draws a limitation in that some group members may dominated the discussion.

3.2.2.4 Key informant interviews

Key informant interviews were undertaken with extension officers from the DWA and Agriculture Department, Chief Mwanachingwala, NWASCO officials, DISS officers and the Water Board. These were conducted by developing a check list that served as a guide in order to maintain the direction of the interview. The guideline indicated the major issues to be covered in the interview and was referred to frequently during the process of the interview (Appendix IV). The interviewee was allowed to put forward his/her views on the particular issue and the role of the interviewer was to listen and maintain focus and

direction to prevent the conversation from going off on a tangent. The data collected using this technique was mainly to do with water allocation procedures to the rural communities, sources of water and different users sharing a particular water source in the study area.

Data on water management and institutional arrangements was obtained through interviewing the Rural Water Supply and Sanitation Unit and extension workers. Some key informants such as the Chief and head men of the community were consulted to obtain information on the history and background of the community.

3.2.2.5 Direct Observations

Direct observation was used as a crosscutting method throughout the field work. Important information was yielded especially pertaining to the socio-cultural patterns, customs and local behavior of the community. This technique was valuable for checking the difference between what interviewees said and their actual practices; in as far as water resource management is was concerned. From the field visits, interviews and informal chats, the researcher developed an understanding of the socio- cultural issues in water management.

3.2.3 Data Analysis

The content of the interviews was extracted and analysed using thematic analysis. First the interviews were transcribed and from the transcription a content analysis was done. This technique can be used for making interference by systematically and objectively identifying specified characteristics of messages. This procedure can create quantitative indicators which indicate the degree of attention or concern devoted to conceptual units such as themes, categories or issues (Frankfort-Nachmias and Nachmias, 1996). The rules of this inferential process vary with theoretical and substantial interests of the investigator. A central idea to content analysis is that many words of the text are classified into much fewer content categories. Each category may consist of one, several and many words. Words, phrases or other units of text classified in the same category are presumed to have similar meanings. The five major recording units which were used in content analysis are: words or terms, themes, characters, paragraphs and items. In this study the recording units used has been the theme, which is recommended to use when studying attitudes, perceptions and values. Eventually, recording units were classified and coded into categories.

The contents of some of the data obtained from the unstructured interviews and informal chats form the narrative of this study. Quantitative data collected was analysed using Excel Spreadsheets to generate Frequency and Percentage Tables. Data was presented in form of frequency allocation tables.

CHAPTER 4: RESEARCH FINDINGS AND DISCUSSION

4.0 Introduction

This chapter describes and summarises the main results of the data collected. It combines the results collected from the informal interviews with the key informants and the data collected by focus group discussions. The chapter presents the general set-up of the water management in the study area; with in and across the three villages in the study area. This institutional set up was further viewed from the key informants point taking into consideration officials from different spatial level from local to national levels It covers aspects such as the livelihood strategies, the rules surrounding the water resources in the area, handling of offenders, dispute and conflict management, the roles and responsibilities of the various relevant authorities and the people's water resources conservation approaches.

4.1 Sources and Uses of Water

In an effort to understand the association between the people and their water resources institutions, and the livelihood strategies practiced, the respondents were asked to list the sources of water they use for the various purposes, the proximity of these water sources from their homesteads and their reliability of the sources of water. Proximity of water source in this context refers to the distance of the water source from the particular household. The reliability of a water source in is taken to mean how dependable the water source for that particular water use is; that is the ability of the water source to provide water for a given year (Munamati, 2005).

4.1.1 Domestic Water

Respondents were asked about their sources of water for domestic purposes. The responses indicated that they access different sources for the different purposes as indicated in Table 1. Most of the households in the Nkabika, Mungule, Chipepo, Mambo and Kaleya villages accessed water for domestic purposes from hand-dug wells; some times individuals get water from sources such as ephemeral and perennial streams; and waste water from the Zambia Sugar Estate canals. The findings show that the hand dug wells are the most common source of water for domestic water use across all three villages

Table 1: Sources of Domestic Water in the Mwanachingwala Ward

| Source of water | Name of Village/ Compound | | | |
|-------------------------------|---------------------------|---------|--------|--------|
| | Nkabika | Chipepo | Kaleya | Kawama |
| Shallow well | 3 | - | - | - |
| Hand dug well | 10 | 9 | 2 | - |
| Maleende stream (annual) | 6 | - | - | - |
| Lusanga stream (annual) | - | 5 | - | - |
| Kaleya stream (perennial) | - | - | 8 | - |
| Zambia Sugar Wastewater canal | 8 | - | - | 3 |
| Borehole | - | - | - | 11 |
| Tapped water | - | - | - | 5 |

Household interviews revealed as indicated in Table 1 that wells are the most common source of domestic water though this different for Kaleya where the common source is the stream while in Kawama the community depends on boreholes. This is because of the fact that Mazabuka district municipality does not provide tapped water to this area, and neither has there been water development programmes in Mwanachingwala community. Hence, community members take their initiative and dig their own wells since they believe ground water is cleaner for domestic purposes.

4.1.2 Wells

A few of hand dug wells; streams and the river are communal while most of the wells are largely privately owned. Only two of the eight wells are communally owned. Most of the wells are not protected. Fig. 3 shows a communal well which is one of the two that the Mwanachingwala community access. This particular well was dug to provide water for the primary school but because there is presently no teacher at the school the rest of the community depends on it for water for washing, bathing and laundry purposes. The well is about 7km from most of the households and is in the premises of Kawama Primary School. The well was dug long back in 1984 when the school was being constructed. During dry spells when most of the private wells have dried up, most households fetch water from this communal well. However, the well is not protected so this compromises the health of the people getting water from it. For hygienic reasons the communally owned wells are rarely used for domestic purposes except when the privately owned ones dry up. Interviewees indicated that some people would rather walk long distances to the communal well than be persecuted for illegally accessing the water from the estate's canals. The community also believes that water from wells is safer to drink than water from the canals.

In all five villages, informants interviewed indicated that wells are usually dug by individual households through mobilizing their own labor, hired labor or with the

assistance of neighbours. In some cases the wells are inherited from parents or other relatives together with fields. To dig a well hired labourers charge an average of ZMK 20,000 per metre. The figure is much higher if the walls of the well are lined with stones to stop it from caving in. The depth of wells ranges from 4 to 15 metres, depending on the depth of the water table.



Figure 3: A communal well at Kawama Primary School used for domestic purposes

Source: Field survey

Although a well may be privately owned, other households also have access to the water from such wells. Wells are shared with relatives, neighbours, church colleagues and friends, such that eventually everyone in and outside the village has access to almost a well within reach. A narrative of how individuals of influence affect other peoples' access to water is given below.

Case 3

Mr. Z is a businessman aged 38 who lives in Nkabika village. He grows cotton and maize for sale. Last year his cotton yield was 50 bags of 50 kgs which sold to the cotton ginnery. He has a grocery store at his premises. He has dug a deep well that is well over 15m deep and during dry spells is the only one with water especially for domestic purposes in Nkabika village. He usually only allows people access to the water if they buy merchandise from his shop. During the interviews he clearly stated, "Nothing is for free in this life, if people want to draw water from this well, then they better pay by buying grocery from my shop however expensive." He also attributes his restricting people access to this well because he spends huge sums of money to chlorinate the water.

Source: Field data

Based on the norm and practice of sharing, access to drinking water extends to wells and wells are dug for principally private use. The duty to share water resources is usually left to the discretion of the individual who owns the property but individual ability to allow others access their wells decreased during drought periods. Such sharing cut across kinship and village borders. When considering a well from which to seek permission to

collect water, one usually considers nearness of the well, how close they are to the well owner, and whether or not they had assisted with the digging of the well

The furthest household from the communal wells is 7km with an average of 600m in the villages; about half of the households were within proximity of 1km from the water source whereas quarter are within 1-2.5km. Comparing this with the WHO recommendations, most of the households have basic domestic water access, while less than 15 per cent (those having it beyond 1km) have poor access (WHO, 2005). Women collect about half of all domestic water and a good portion of the day (3hours) is spent drawing water. A lot of time is spent fetching water partly because the water sources are far and partly because of the large volumes of water collected-for domestic use and irrigation. This puts a lot of pressure on women who are already overburdened with other household chores such as cooking, minding children and working in the fields.

4.1.3 Boreholes

The main source of domestic water in Kawama on the other hand is boreholes. There are 3 boreholes in Kawama serving an area of about 9km² and are spaced to serve at least 25 households each. Donors such as the Japanese International Cooperation Agency (JICA) funded the sinking of the three boreholes in the Kawama such as the in Fig 4 below. This area does not have piped water because it is not supplied with piped water by the municipality.

The boreholes are used by all households from Kawama. However, occasionally persons from other areas have to firstly seek permission from the committee of Village Water Sanitation, Health and Education (V-WASHE) before they collect water from the boreholes. Water from the boreholes is largely used for domestic purposes and watering gardens. In drought situations livestock from the social community can be watered at the boreholes. The elected committees are responsible for overseeing the way the boreholes are used and take turns in monitoring the activities at the borehole. In addition the committees also collect user fees from households that use the boreholes. An annual user levy of ZMK24, 000 per household is charged to every household that fetches from the borehole. The money is used to repair the hand pumps when they break down. The donors who funded sinking of the boreholes and ratified by the Kawama community suggested this amount.



Figure 4: One of the boreholes sunk by JICA in Kawama

Source: Field data

For individuals that work for the Zambia Sugar Estate this yearly contribution is affordable but for the households that are into running their own private businesses and those that depend on relatives else where to provide them with money to sustain their livelihood, this is not affordable. Below is a case which highlights how access to water can be influenced by institutional arrangements.

Case 1

Mrs. X is 54 year old retired maid servant. She lives in a two roomed house in Kawama. She used to work as a maid for several Indian nationals. After her husband's death and retiring she started selling dry fish (kapenta) at the main market in Mazabuka. The market is about 9km away from her house. She had six children of whom three are now deceased. Following this bereavement, she now takes care of her five orphaned grand children who are between ages two and eight years old. She gets very little help from her living children. Most of her income comes from her kapenta sells and occasionally from sales of vegetables. She also has a small garden for her vegetables but at times, the crops dry up because of lack of water.

When the township was provided with boreholes, a committee was formed to manage the boreholes. The committee agreed that each household had to pay K2, 000 every month for the maintenance and operational cost of the borehole. It was agreed that households that fail to contribute to the fund would not be allowed to fetch water from the borehole. Unable to pay the money, Mrs. X is denied access to the borehole and as a result she has to get water from Ziah Township.

Mrs. X is not an isolated case. When the V- WASHE committee inspects the borehole to ensure everyone has paid up, she is usually a victim of discrimination. At such times she and her grand children have to walk 1.5km away to a neighboring township Ziah where she is allowed to draw piped water.

Source: Field data

With regards to access and use of water by the individuals who depended on common sources, it was found that exclusion of disadvantaged and marginalized individuals

(women and men) who are entitled to equitable access to water because of the institutions in place denied some people from accessing water hence compromising their livelihoods.

4.1.4 Reliability of domestic water sources

When asked about the reliability of their water sources for domestic water, the respondents said that generally people across all three villages had reliable domestic water all year round. However, this depended on whether there was no drought that particular year then the hand dug wells would not completely dry up between months of September to November. Some of the respondents said the reliability of their water for domestic use depends on 'others' implying that it depends on the functioning of the other wells. Alternatively they had to resort to other sources like the Zambia Sugar wastewater canal.

For the community in Kawama that depend on boreholes for their domestic water, the water was available all year.

4.2 Major livelihood strategies

On average across the five villages, more than half of the respondents practiced both livestock rearing and crop production, while 20% who practiced livestock production only with 17% practiced crop production only. Other sources of income at household level included fishing (as indicated in Table 2). Casual laboring at the Zambia Sugar Estate, trading (in vegetables and livestock), and remittances from employed relatives and informal employments from the cities are some of the livelihood strategies that the community depend on.

Table 2: Average yields for 2006 in Mwanachingwala area

| Crop | Yield in 2006 (50 Kg bags) | Quantity sold (50 Kg bags) | Value of sales (ZMK) |
|------------------|-----------------------------------|-----------------------------------|-----------------------------|
| Maize | 75 | 40 | 1,520,000 |
| Cotton | 50 | 50 | 2,250,000 |
| Vegetable | Yield in 2006 (Crates) | Quantity sold (Crates) | Value of Sales (ZMK) |
| Rape | 45 | 30 | 600,000 |
| Tomato | 70 | 65 | 3,055,000 |
| Onion | 30 | 24 | 1,320,000 |
| Cabbage | 32 | 30 | 1,350,000 |
| Okra | 12 | 9 | 108,000 |
| Banana | 90 | 86 | 3,268,000 |

| Fish species | Yield in 2006 (kgs) | Quantity sold (kgs) | Value of Sales (ZMK) |
|---------------------|----------------------------|----------------------------|-----------------------------|
| Tilapia niloticus | 210 | 200 | 3,000,000 |
| Tilapia kafuensis | 250 | 230 | 4,600,000 |
| Claris spp | 375 | 350 | 4,200,000 |
| Haplocchromis spp | 77 | 35 | 350,000 |
| Labidochromis spp | 40 | 22 | 264,000 |

The average crop yields for maize and cotton were calculated from the interviews that indicated the annual returns; while the vegetable min yields were obtained as monthly yields for the months between April and November when small holder farmers concentrated on vegetables as source of income; and fish yield were obtained from monthly catches for months between April and November when the fish ban is lifted.

The response to sources of water for productive purposes indicated rainwater, streams, Kafue River and the Zambia Sugar Wastewater Canal. Households that had access to productive water used it to irrigate their small gardens of vegetables, bananas and brick making; the survey also revealed that people rely on other wetland resources for services such as fish, grass for construction, firewood, reeds for construction, and bird hunting as indicated below. Also included are services derived from wetlands such as, residence, livestock grazing, and rain making ceremonies.

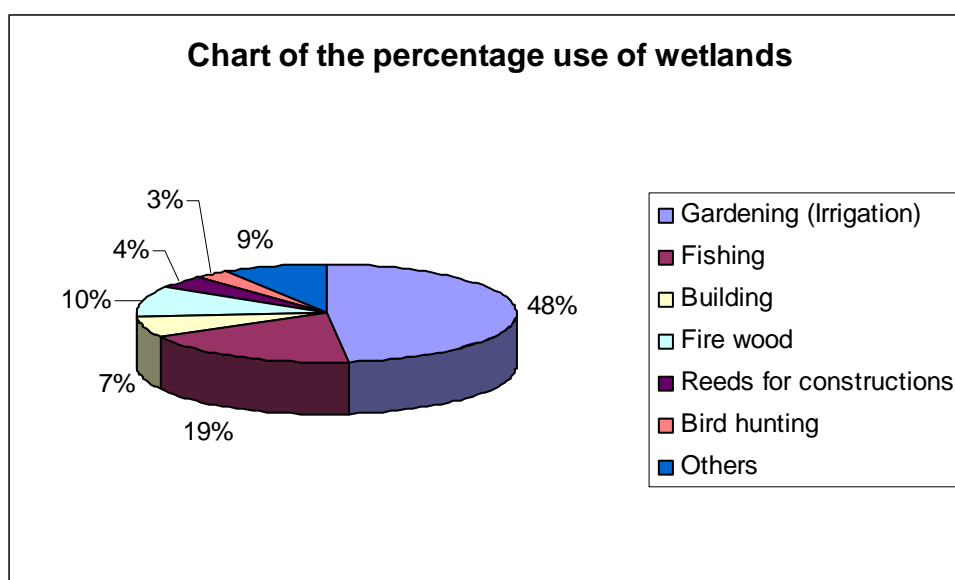


Figure 5 : Percentage use of wetlands in Mwanachingwala

4.2.1 Small gardens

Across the five villages, streams are the most popular source of water for water for small garden watering (Figure 6). However, those that irrigate their gardens with water from the Zambia Sugar Estate canals do so at their own risk.

Case 2

Mrs. Y wife is a small garden owner. Her garden is next to the estate canal. She grows vegetables from this garden which she later sales at the main market in Mazabuka. She grows tomatoes, onions, rape and okra in her garden illustrated in Plate 4.3 below. She irrigates her garden with water from the estate canal. She depends on water from the canal because it is closer to her homestead as the nearest stream for irrigating crops is 5km away. She also irrigates her vegetable with water from the estate canal because no water resource developments have taken place in this area for as long as she can remember. To access the water from the canal she passes through a hole that has been made on the estate fence. However, the estate considers this as illegal as it is trespassing on the property. Occasionally, estate guards come round to stop the garden owners irrigating their gardens with this water source. In worse situations, individuals found irrigating with this water are even arrested.

Source: Field data

Since these small garden owners do not have access to streams which are ephemeral at certain times of the year, they illegally access water from the estate canals. The small garden owners pointed out was because the modern institutions involved in water resources development have no consideration of this community. There is a need to emphasize that the sustainable access to water resources for agriculture is necessary to realize the right to adequate food to improve livelihoods hence an issue for serious government consideration.



Figure 6: Small vegetable gardens grown next to the estate canal

Source: Field data

A number of other individuals in the community are also into irrigating their gardens using the water from the canal. Individuals who work for the estate are sometimes victims of harassment because of their indulgence in these activities. During the wet season, the community focus on rain fed agriculture particularly growing maize and cotton and so do not spend time in their smaller vegetable gardens.

For more than 85% of the respondents across all five villages, water for irrigation was available for only eight months, saying that mostly towards the end of the winter season, the water would have dried up in the streams and so resort to the Estate wastewater canal. During the rain season, the small gardens are usually abandoned to concentrate in growing cash crops such as maize and cotton.

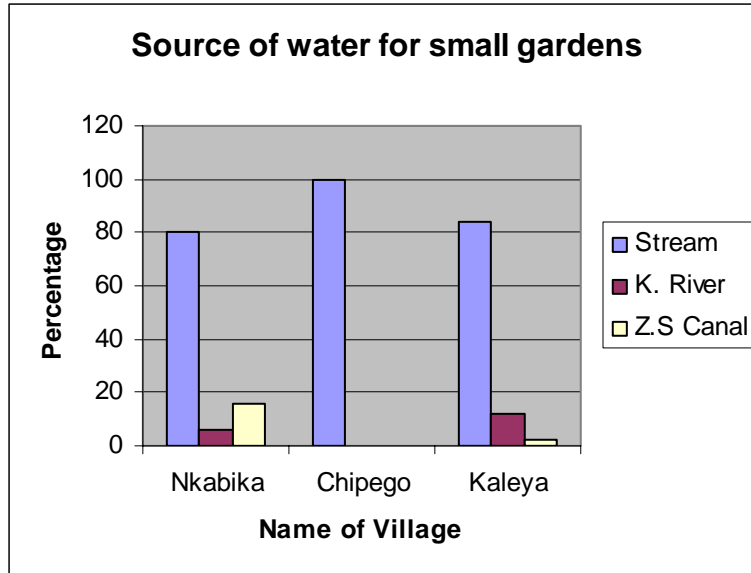


Figure 7: Sources of water for small gardens irrigation

Fig 7 shows the most common source of water for irrigation is streams which are unfortunately are annual hence get to dry up between August and November. The reason why the Kafue River is not used to irrigate small gardens is because of the long distance between the households and the river.

Family gardens are usually the main responsibility of the women. The crops which are grown include vegetables of rape, onions, tomatoes, beans, ground nuts, okra, cabbage and maize. There are also fruit trees including bananas, papayas (pawpaw), and mangoes. They are mainly irrigated by women and children using water from nearby streams, the estate wastewater canals and the Kafue River. Some of respondents interviewed indicated crops grown in these gardens generated income that paid for children's education, food, clothing and farm equipment and provides vegetables for household consumption and nutrition. In times of drought and economic hardship the produce from women's gardens is an essential source of livelihood. In one of the villages, Kaleya village, everyone interviewed stated they had obtained the headman's approval to access land for gardens on or close to Kaleya stream. Chief Mwanachingwala said the gardens were important sources of livelihood and self reliance. The gardens are often situated on land that is either seasonally flooded or holds water from the rainy season long into the dry season.

4.2.2 Livestock watering

Through out the five villages, streams are the major source of water for livestock watering. This could be because water from the wells is considered for domestic use as the primary use since it is safe water. This leaves the streams as the most reliable water source for livestock watering. However, other common sources of water for livestock watering include the pools that fill with rain and Kafue River.

4.2.3 Fishing

Fishing constitutes the second most important economic activity in the study area as indicated in Figure 8. It contributes significantly to employment and nutrition. It is typically labor intensive with catches as small as 2kg per day on bad days and 15kgs per day on good days and employ mostly men. Respondents who took part in the group discussion indicated that fishing practices change over the course of the annual flood regime and open fishing season. Conversely, respondents revealed that fishing is at a peak in September, as the floods in most areas recede. At such times, one fisherman Matthias Mweemba said that one September 2002 morning he found one of the streams, Magoye stream, dried up and was literally picking the fish and caught close to 25kgs of a variety of fishes that day with the bulk of them being *Clarias* species.

On what type of fishing gear the fishermen used, the response was that fish baskets were normally constructed from locally, abundant materials particularly for the giant fish species of *Tilapia* while funnels were constructed as illustrated below in Figure 9 for smaller fishes that women caught in streams. When their financial status was good, they used the modern type seine nets which provided for huge catches as much as 20kgs per day.



Figure 10: The conical funnel fishing gear used to catch small size of fish.

Source: Field data

Fishing represents an important source of income for the households. However, two exceptions were observed one is the limited involvement of females headed households and women in fishing activities. On what numbers of women are involved in fishing, it was indicated that very few of the people fishing in the Kafue River are women, and less than 2% of the fishing households are female headed. A second observation is the type of fishing unit which is not household based namely groups of young men from surrounding villages. Almost all fishing (70%) produced in Mwanachingwala is commercial as indicated in Table 4.2. No fish funnel catches among women and children were for sale during the survey. However, children and their mothers especially those households that

are female headed go to fish and sell their catches in order to realize money for books and whatever other small requirements they have.

4.3 Informal Institutions in Mwanachingwala

4.3.1 Institutional Background

Chief Mwanachingwala revealed that in the urban areas, the European settlers ruled directly, among others, by establishing a formal state apparatus protecting their interests. In rural areas, however, they ruled indirectly by vesting state powers in allies under the chiefs, who exercised autocratic control over 'their' tribal subjects through nested governance structures down to the headmen. The direct power of chieftaincies as custodians of the community's resources, in particular land, was also consolidated by the colonial regimes, which, thus, exercised indirect rule.

4.3.2 Rules of access to water

The community has drawn a list of rules that guide it in the way the water users collect and manage water. Respondents revealed that under traditional laws and customs the construction of irrigation furrows is controlled by the chief, and, although a single individual could tap water from a stream for his purpose without first consulting the chief, the latter could prohibit the construction or use of any such furrow. Once constructed, a furrow is the exclusive property of the people who constructed it until they abandon it, and then it reverts to the chief. Over time, this tribal law has undergone some changes. Still one needs a right in order to use water for irrigation nowadays, but there are two ways of obtaining such a right. For the indigenous/traditional irrigation one obtains the right as defined in customary regulations which are administered in the various levels where customary law operates (local water committees, councils of elders, village authorities, etc.). The formal water rights, on the other hand, are obtained by applying to the recognised authorities though these are obtained mostly for large scale irrigators.

Respondents were asked how water is allocated from the streams among the irrigators. The respondents indicated that water is allocated through rotation, whereby they irrigate every other day in summer but during the rain season they hardly irrigate the crop. For those farmers who irrigate using the same stream, they give each other turns. Asked about the person responsible for distributing water close farming land close to the streams, respondents indicated that the headmen through the chief are responsible for distributing land that was in close proximity to the streams.

Informal interviews with key informants indicated that there were rules pertaining to small scale gardening which included; no fetching water for small garden watering from the hand dug wells, and no one is allowed to get water from a neighbour's well without permission. Since the major source of water for small garden watering was unprotected wells, which were dug by individuals, this could explain the ignorance about these rules by government officials. This is because it is not easy to realize the existence of any society rules pertaining to such 'privately owned' water sources. This was the same scenario for rules pertaining to water for brick making.

Other rules on use of domestic sources of water in Mwanachingwala and Kawama are that no laundry, washing, bathing or brick moulding close to the wells and boreholes. These rules ensure hygienic standards are maintained around these water sources. It is also believed that water spirits punish anyone who violates standing tradition on how to use wells. At the moment communally dug wells are used for watering livestock, crops and brick moulding. In times of water shortage, volumes of water collected is regulated with emphasis on water for basic needs as a priority. During that period watering fruit trees is not allowed so is brick moulding. Rules on water use and management are enforced more vigilantly during these times of water scarcity.

Respondents were asked on the rules and regulations that the community observed with regard to other services that the community derives out of the wetlands. Access to wetland gardens is accompanied by some obligations. Individuals have to fulfill these obligations in order to acquire ownership over the gardens that are close to the stream or communal wells. Figure 9 shows that, overall, 37.5 percent of the households received the gardens with obligations, while 62.5 percent had no obligations to fulfill. The most common obligation is that households should cultivate their plots every year (14%). Lesser obligations include the need to respect local leaders (2.3 percent) and paying tribute to local leaders. This tribute is paid in form of agricultural produce of maize or vegetables. In cases where an individual does not keep an obligation, these plots are then allocated to other individuals.

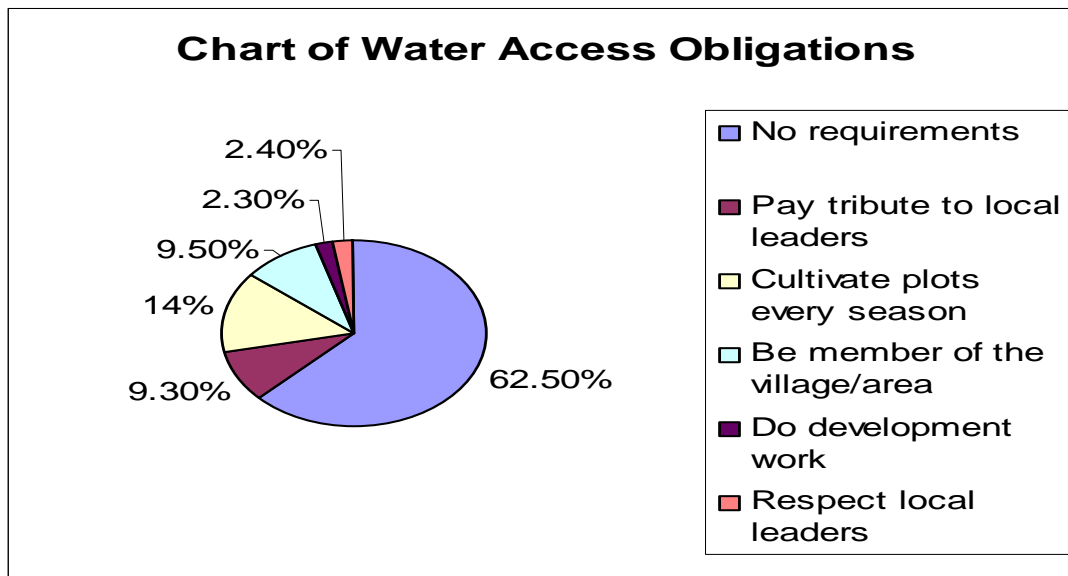


Figure 11: Water Access obligations

4.3.2 Penalty for offenders

On what punishment is given to those people caught breaking the rules, or to those who failed to contribute towards any matter as required responses were as below (Table 4.4).

Table 3: Punishment of offenders

| Fate of offenders | Percentage (%) |
|--------------------------|-----------------------|
| Pay a fine | 72 |
| Denied access to water | 3 |
| Warned | 22 |
| Not punished | 3 |
| Total | 100 |

Table 3 shows that the punishment for any people who are caught breaking the rules of access to water and those who fail to contribute as required is fining. This fine could be a goat, or cash. The fine was said to be as high as ZMK 5,000. The goats from fining people are slaughtered and the meat is shared amongst the villagers, while the money is kept for maintenance purposes of the water points, and sometimes used to pay the village head and the spirit medium. Respondents also revealed that offenders are continually warned, while a few said the offenders sometimes went scot-free. This shows that the rules governing the water resources are flexible and open to negotiation. Interviews with key informants revealed that once the neighborhood police or the community members identify a culprit, the village head is informed. It is the duty of the village head to warn this culprit and if this culprit does not heed, the village head will either fine the individual or take up the issue through the traditional hierarchy.

4.3.3 Main institutional actors

Complexity in institutional structures operates at many scales and levels. A multiplicity of agencies, institutions and social arrangements exist within Mwanachingwala, with responsibilities covering the whole range of resource management responsibilities. Bureaucratic agencies comprise the sectoral ministries and local government, with tiers of responsibility extending from the national level to the district, and, in the case of local government down to village and hamlet. According to Cleaver (2001), socially-embedded institutions likewise comprise a complex array of institutions operating at the local level and focusing on large range of different activities and responsibilities, from local self-defence militias to choirs.

4.3.3.1 Small garden holders

Small garden owners have very low levels of representation on decision making bodies in Mwanachingwala, and probably even lower influence on the decisions made. Respondents interviewed indicated that small garden owners are often perceived by the politically and numerically dominant agriculturalists to be illiterate and therefore ineligible for full participation in decision making. Prejudicial attitudes against small garden owners (mostly women and children) are often perceived as intransigently backward and also militate against their full incorporation into decision making.

In Mwanachingwala women and children often have little or no direct representation on decision making bodies, despite being the managers in use of many water resources.

Where women are represented in public decision making bodies they often claim that they go just to listen, and that they don't 'have the words' to articulate their concerns at these fora. Examples of women and children being the users of water resources but having little involved in public decision making about them include their use of irrigation water both for productive and domestic purposes but their almost total absence from irrigation committees.

4.3.3.2 Traditional leaders

The traditional hierarchy concerning water management comprised the chief being at the top; and below him is the headman. The spirit medium is another traditional leader who is solely responsible for communicating with the ancestors, especially for rain-making purposes at the Maleende. The Chief is the head of all the traditional leaders, but in cases where the chief is too far from some villages, a headman is put in position to be the immediate representative of the chief. However, if the headman fails to handle some issues, he can then pass them on to the chief. The headman handles matters at village level, each village having about 9-11 households. Table 4 below gives the detailed roles of the traditional leaders as regards the water resources, but is not exhaustive

Table 4: Functions and roles of the traditional leaders with regards to the water resources

| Category | Functions and Roles |
|----------|---|
| Chief | <ul style="list-style-type: none"> -Overseeing all issues concerning water -Ensuring availability of water to everyone, through planning for the water resources -Linking community to others for water -Resolving conflicts and disputes -Informing people about the date for the rainmaking -Warning and punishing culprits caught breaking the rules -Ensuring maintenance and protection of the water sources -Supervising the headmen and spirit media |
| Headman | <ul style="list-style-type: none"> -Represents the Chief / Acts as the Chief where chief is far -Ensure maintenance and protection of the water resources -Ensuring peace in times of conflicts; 'ensure that people do not fight at the wells' |

| | |
|---------------|---|
| | <ul style="list-style-type: none"> -Maintaining and protecting the water resources -Setting laws for the water sources, together with the chief, and enforces them -Taking issues up to the chief -Identifying the areas of the water resources that need to be developed and how they can be developed |
| Spirit medium | <ul style="list-style-type: none"> -Predicting rain - Leading the team going to Maleende for the rain making ceremony |

Source: Field data

Of the three villages, Nkabika’s headman was having a misunderstanding with Chief Mwanachingwala as a result of a difference about reintroducing wildlife species and turning the area into a conservancy without the subjects’ consultation. However, while discussing with the key informants (extension workers); the researcher was informed that there were no clashes among the roles of the traditional leaders, only there was lack of communication between the Chief and some of his headmen.

4.3.4 Community’s Views about Formal Institutions in Water Resources Management

In an effort to establish the extent of operation of formal institutions in water resources management in Mwanachingwala area, the respondents were asked about their knowledge of the newly introduced IWRM-driven methods of water management. They were asked whether they had heard of DWA or met someone from there, whether they had heard of the new institutions of water resources management, the D-WASHE and the V-WASHE. The respondents were also asked about their knowledge of the new Water Act of 1998. Their responses across all five villages are presented in the figure 10 and figure 11 for Kawama township.

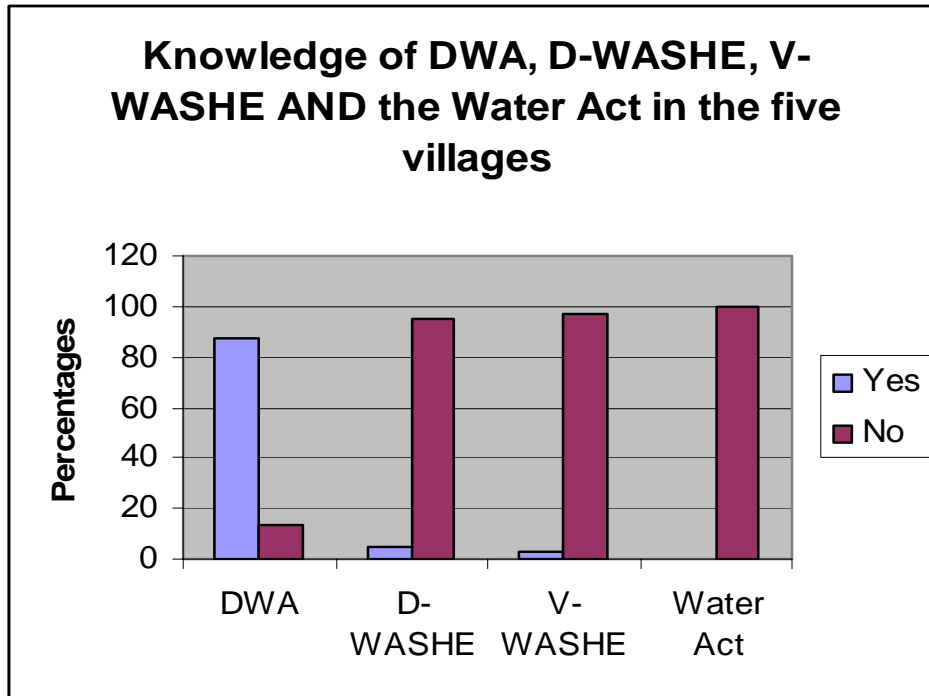


Figure 12: Knowledge of DWA, D-WASHE, V-WASHE and the Water Act in the five villages in Mwanachingwala.

While a majority of 60% of the respondents said to have heard of or met someone from DWA, however, this comprises majority of the people who had have access to borehole water in Kawama. When these were asked what they know about DWA, they revealed that they were not fully aware of its responsibilities as an authority through which the government manages water (as described in the Water Act of 1948) except that the officers occasionally came round to collect information on rates of water. During discussion with the respondents, one of them remarked ‘we do not know about those DWA officers, but we have government officials who are very inactive and inefficient’.

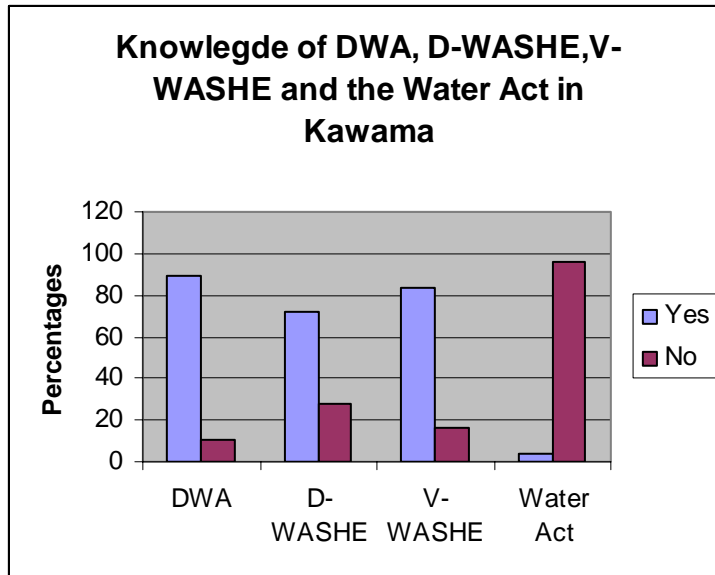


Figure 13: Knowledge of DWA, D-WASHE, V-WASHE and the Water Act in Kawama.

In such areas, customary law governs the natural resources like water presided over by the traditional leaders. However, with the introduction of the new IWRM-driven institutions, it is still not clear how these traditional leaders and administrative boundaries merge with the newly introduced hydrological boundaries. The process of the water reform was supposed to be participatory, involving the lowest possible level. However, the findings expose that this was not the case as regards the rural stakeholders. Researchers reveal that the consultations leading to the water reform focused more on the major water users; the large scale commercial farmers and the urban water users, neglecting the rural water users (see Kujinga, 2002; Dube and Swatuk, 2002; Latham, 2002).

4.3.5 Discussion

As the findings revealed, the management of the water resources across the three villages was informed by customary practices, under the leadership of the traditional leaders. The traditional water management in this area spanned the entire spectrum of issues: overall water use and access including the rules and regulations; conflict management and handling of offenders; handling of water development issues, and issues pertaining to water resources conservation. Such practices, namely; chieftaincy; jurisdiction over natural resources; customary rules governing the distribution of water; and the procedures for initiating development programmes, are “traditional” or “indigenous” institutions, also described as “customary” institutions of governance, and are common practices which have been revealed all over the world (see Katerere and van der Zaag, 2004; Maganga *et al.*, 2003).

The water management in this area is similar to other rural Africa societies. Similar research has been done in rural parts of Africa, including in Zimbabwe, reveal that people still rely on their traditional practices to manage their water resources despite the water

reforms (see also Sithole B., 2001; 2001, Twikirize, 2005). Furthermore, these villages represent a typical rural Zimbabwean set-up, where the people are still loyal to the chief, upholding him as the key to most of their social and natural resources issues. The chief still has jurisdiction over the natural resources. It is clear from the findings that IWRM-driven structures are still quite alien to the people, who are, in spite of everything, still dependent upon customary law for the management of their water resources. This is in spite of the country's statutory law for water management, that is, the Water Act of 1948, which is undergoing review. Other related such cases have been revealed, especially around Africa (Boesen *et al* 1999).

4.4 Rural water supply representation in Legislation and Policies

4.4.1 Legislation

There is no single comprehensive legislation that covers all aspects of water management as well as issues of rural water supply in Zambia. Aspects of these are to some extent covered under various pieces of legislation. Table 5 below gives the various legislative instruments which apply to the aspects mention with a summary of how the instruments relate to institutions responsible for the provision of water for the rural communities.

Table 5: A summary of the legislative framework at the national level as it applies to institutional roles in providing water for rural communities.

| Legal instrument | Summary of how it relates to institutional roles in providing water for rural communities |
|--|---|
| Water Act, Cap 132 of 1948 | Provides for the control, ownership and use of the water resource (surface only) excluding water that is part of international boundaries |
| Water Supply and Sanitation Act, No 28, of 1997 | Provide for the establishment, by the local authorities, of water supply and sanitation utilities |
| Public Health Act, Cap 535 of 1930 | Requires local authorities to prevent nuisances and maintain their districts in a clean and sanitary condition. This requires that the water sources are protected from pollution and thus rendered clean for human consumption |
| Environmental Protection and Pollution Control Act No 12 of 1990 | Establish water quality and pollution control standards; determine conditions for the discharge of effluents into the aquatic environment |
| Local Government Act, No 22 of 1991 | Stipulates local authority's responsibilities in the provision of water supply and sanitation services and conservation of natural resources including water within local areas |
| Natural Resources Conservation Act, Cap 315 of 1970 | Enhances sustenance of the resource through preservation of the catchment areas |

Importantly pointed out by the principal hydrologist is that the Water Act of 1948 requires a complete review. Meanwhile, the Water bill has not yet been approved by parliament and still undergoing changes which have been spearheaded by WRAP.

4.4.2 Policies

4.4.2.1 National Water Policy of 1994

Since the adoption of the National Water Policy of 1994, a number sector reforms initiatives and developments have taken place, including the establishment of the RWSS unit in 2003. The Water and Sanitation Act of 1997 largely ignored the rural water sector

and the sector is faced with unclear roles and responsibilities of the involved government authorities. According to the principal hydrologist at the Department of Water Affairs (head office), in order to develop and provide water resources for rural communities the following sections have been outlined.

- Ensuring that RWSS Programmes are Community based;
- Developing a well defined investment programme for sustainable RWSS
- Promoting appropriate technology and research activities in RWSS
- Developing an emergency and contingency plans to mitigate impacts of drought and flood in rural areas
- Developing a cost recovery approach as an integral part of a RWSS which will ensure sustainability
- Development and Implementation of well articulated training programmes

This policy clearly points out a number of issues in rural water supply that need attention however; it is silent about the implementing agencies of the different functions stated above. This has led to no particular department taking up rural water development and supply full time because these functions are simply tasked to the ministries. Many of the key policy drivers have been multilateral and bilateral donors, as indicated above and hence have the discretion of choosing where they develop water resource.

Other problems with the lack of tasking government departments to facilitate rural water provision in the policy is the lack of lower level legal structures capable of accounting for government money, as well as a political culture which can prevent effective ‘bottom-up’ demand-driven development.

4.4.2.2 The Agricultural Policy (Final Draft), 2000

This Final Draft Agricultural Policy recognises the importance of irrigated agriculture in enhancing food production in the country. To that end, it seems to promote small-scale irrigation schemes to supplement the unreliable and risky rain-fed farming. However, to be implemented, the policy will require a sound legal and institutional framework currently not provided for in the Agriculture Land Act of 1960. Once implemented, the policy will have implication on IWRM with respect to its surface and ground water demands.

4.4.2.3 National Policy on Wetlands Conservation, 2000

The overall goal of this policy is to promote the conservation and sustainable use of Zambia’s wetlands in order to sustain their ecological and social-economical function for the benefit of the present and future of the people of Zambia. Guiding this overall goal is the policy principle that wetlands have significant hydrological, ecological, socio-economic, cultural, aesthetic and ethical values and as such require be understanding, valuing and using sustainably for present and future generations. The policy also provides for:

- Institutional and legal arrangements of wetlands conservation,
- Promotion of public awareness and education and increasing the participation of local communities in wetland conservation programmes,
- Activities for conservation of wetlands and biodiversity.

The wetland conservation policy has some relevance in promoting provision of rural water through the careful and sustainable use of wetlands, which serve as sources of water, and by addressing some of the social water resource management instruments such as public awareness and education.

4.4.3 Formal Institutional Actors

As a result of the aforementioned legislation and the evolution of order in society there are a number of authorities, agencies and setups to ensure and manage water resource allocation in the rural communities (Table 4.6). In the survey conducted most of the authorities and agencies operating in the study area where asked about their enabling acts and responsibilities. In the survey it became evident that water resource management is very fragmented at a local level, for instance the active extension worker in the district is under the Department of Water Affairs and focuses only on hydrological data. He however lives in Monze almost 65km from the study area.

Agencies tend to focus on specialised areas like agriculture for micro projects in agriculture and ZAWA for the wildlife conservation; this implies the general integrated approach is not followed. Some form of horizontal coordination is seen in the rural district development committee which is chaired by the two authorities in the district and most agencies and stakeholders are part of it and their responsibilities are as tabulated below (Table 6). This committee might have been important in the management of the water but due to lack of capacity it is lacking in most facets. The town clerk pointed out that as much as he would like to take some action about water resources developments and management in rural areas, government lacks the capacity to do so in terms of man power and financial resources.

Table 6: Authorities and agencies responsible for water resources management at local level.

| AUTHORITY/ AGENCY | RESPONSIBILITIES | COMMENT |
|------------------------------|--|---|
| District Commissioner | <ul style="list-style-type: none"> • Overall authority at district level • Supervision of all other agencies in the district | <ul style="list-style-type: none"> • Limited legislative power and resources for complete supervision • Need for capacity building |
| Rural district council | <ul style="list-style-type: none"> • Planning authority • Monitor activities in the district | <ul style="list-style-type: none"> • Cannot attract the required manpower • Lack of resources to monitor activities in the district |
| Department of Water Affairs | <ul style="list-style-type: none"> • Maintain hydrological database of water resources • Development of water resources in rural areas | <ul style="list-style-type: none"> • Local office is not active |
| Micro projects unit | <ul style="list-style-type: none"> • Protection of agricultural land • Implementation and monitoring of | <ul style="list-style-type: none"> • Limited resources |

| | good farming practises | |
|---------------------------|--|---|
| Zambia Wildlife Authority | <ul style="list-style-type: none"> • Protection of wildlife inclusive of forest, soil, water and wildlife resources • management of water catchment & wildlife on protected land | <ul style="list-style-type: none"> • shared and in cases limited authority in communal lands • lack of man power and resources |
| Police | <ul style="list-style-type: none"> • Ensure that local activities abide to law and are registered • To avoid any illegal activities | <ul style="list-style-type: none"> • Fines to illegal operators to low • Needs full cooperation from all other agencies • Limited manpower and equipment |
| Ministry of health | <ul style="list-style-type: none"> • monitor drinking water quality | <ul style="list-style-type: none"> • Lack of proper equipment and irregular monitoring |
| Local authorities | <ul style="list-style-type: none"> • Allocate communal resources • Manage and monitor local resources | <ul style="list-style-type: none"> • Sympathy with local people • Limited legal authority |

4.4.4 Narratives of Formal Institutional Actors on roles in the provision of water for the rural areas

The other relevant authorities mentioned in Kawama area where they had access to boreholes with regards to water resources during the interviews were the Village- Water, Sanitation Health and Education Committee(V-WASHE) comprising of the Chair, Secretary and Treasurer and Village Health Workers. These are involved in the day-to-day management of the water resources. Their role as regards water resources management also included, to a certain extent, to report issues like any need for development of the water resources to the government; this could be the need of a borehole or the site for a new borehole. The committee may also intervene in solving some extreme conflicts, but this is only at the invitation of the municipal officer. The role played by the village health workers is to ensure that the water quality of the dam and the boreholes is good for consumption, and is thus good for people’s health.

A local authority – namely the Mazabuka District Council – is a key stakeholder. They view their roles ‘as users of water, sellers of water, facilitators, and implementing agencies of water development in their respective areas.’ A council official interviewed about the function of the municipality in insuring water service provision for the deep rural community revealed that since the functions of WSS had been decentralised, the professional service providers were left to decide how far they could go in terms of rural water. The Rural District Council gets water from government or rivers and boreholes, and then sells it to Southern Water and Sewerage Company (SWASCO) that supplies water to residents as well as to industries such as the Zambia Sugar Company. When asked about funds from DISS office that when channeled to the rural water supply unit through the municipality office to the villages, the official expressed ignorance in the whole matter stressing the fact that when water development monies only came in through NGOs who usually pass through this office mostly to seek the final go ahead to

go on with whatever project they would be interested in. Municipalities used to host the D-WASHE unit until 2000 when their functions were handed over to the council officials and have since stopped meeting. It was revealed that the D-WASHE meeting that used to be held every other month included officers from SWASCO, Agriculture department, the Wildlife Authority, chiefs and ward councilors. In addition, the D-WASHE used to view itself as the agency responsible for ensuring district food self-sufficiency by establishing irrigation schemes in communal areas of the district. From this backdrop, the municipality state that they have a right to access and use water to meet the developmental goals of the district. As a regulator of water, local authorities are seen as institutions to be consulted by NGOs involved in water. The Town Clerk of Mazabuka District Council stated, 'NGOs come to council first if they have a water development project for the district'. All water development activities come through the V-WASHE units.

The Department of Water Affairs (DWA) extension officer in the district indicated that in getting hydrological data in the study area, he is made aware of the water situation in Mwanachingwala, especially the fact that no water development efforts have been made in the area except at the Chief's premises. He insisted government does not have the resources to finance rural water in every place in Zambia. Individual in his opinion should take the initiative to dig their own wells that are deep enough to provide them with water even during the dry spells or alternatively sink boreholes with the proceeds that come from their sales of crop. He further stated that if the people in Mwanachingwala could afford gadgets like cell phones, solar panels and televisions, then they might as well afford the sinking of common boreholes which costs K15, 000,000 to develop. Asked about DWA's responsibility to develop rural water in accordance with laid down policy, his response was that all he was only aware his department keep a data base on boreholes sunk in the area but no that the department is tasked to develop rural water.

According the DISS officer interviewed government exercises these responsibilities at the local level either directly through their staff seconded to the district tier of local government or in close association with local government in some form of dual responsibility. For example, the Village Land Act devolved the management of land resources to the village level of local government. The Ministry of Lands and Surveys retains national responsibility for land resources. The various agencies provide for monitoring of resource availability and use, they have legal powers to impose regulations on resource implementation, and they can sanction those who transgress the regulations through the court system. However, this study revealed contradiction with the observations made at local level since many development interventions are based around the existing local government system, focusing on the district, but extending only in theory to the village, or its lowest level.

4.5 Discussion of gaps in formal Institutions

Local government has a pivotal role to play, and forms an important point of contact for many local resources users. However, local government is often ill-equipped, in terms of structure and resources, to perform effectively in this role (Larson, 2002). In the case of

Mazabuka, it was noted that village governments had legal responsibility for management of natural resources at the local level but that most members of these governments had no clear idea of these responsibilities and little capacity to discharge them. Many local government officials at the district level are primarily concerned with provision of physical infrastructure (roads, schools and clinics) and the generation of revenue for this district, rather than natural resource management for their areas, and they are in any case often very short of human and financial resources. In addition the lack of alignment of administrative and natural boundaries means that procedures for exercising their authority can become very cumbersome. For example disputes between neighbouring villages over water in Mwanachingwala can in theory and in practice require resolution of the problem through the relevant district centres laying some 32 km from the villages

A more immediate problem is that there are certain 'gaps' in the framework: things that do not fall easily into one category or another. For example, power, politics and empowerment issues are not explicitly addressed in the Organisational structure of the water sector in Zambia (Appendix VII), though they are critical in defining the livelihood options available to people.

There is a danger that the national water policy framework, legal framework and institutional framework will focus on the urban sector water and provision of water rights to the more affluent Zambian communities. So-called grassroots institutions and norms are excluded from policy formulation. At the grassroots level most Zambians see water in terms of survival and a basic human right which is not the view at national level, or legislatively speaking. At national level the drive is to maximise the economic potential of water resources. Human rights are currently impossible to legislate within systems of governance regardless of scale (i.e. from the World Bank to a small fishing or agricultural community).

The problems besetting the sector upon analysis is that the institutions at national level do not stream down to local level. There is no representation of water user groups on the D-WASHE committee and in areas where water resources have not been developed, informal institutions exist but unfortunately have not link to formal institutions

Conclusively, the findings revealed that there is still more which needs to be done if livelihoods of the small holder farmers in rural areas are to be improved. The various actors involved showed that there are different problems they encounter depending on circumstances as well as different ways of solving them. A main task for analysis is to identify and characterize differing actor strategies and rationales, the conditions under which the strategies arise, their viability or effectiveness for addressing issues or solving specific problems, and their structural outcomes, (Sithole, 2003). For smallholder irrigation to achieve equity and efficiency in water allocation and management there should be integration of the technical, institutional dynamics, social and political factors from planning to implementation of projects.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Access to water is still defined legally, through the issuing of a permit in the Water Act Cap 132 of 1948. There are however, different means by which small holder farmers in the rural areas secure water to sustain their livelihoods. This access to water is dependent on the institutional routes that have been laid down being either formal or informal. This research examined the impacts of operations of institutions on livelihoods of small holder farmers in Mwanachingwala, Zambia. Based on the results and findings of this study the following conclusions are drawn:

- The common source of water for domestic purposes is ground water while for productive purposes particularly for irrigation; streams and canal are the most access means of water. However, the only limiting factor was the scarcity of water resources in the area, which becomes more acute in the dry season.
- The water management in most rural areas, as is the case in Mwanachingwala is still predominantly governed by traditional systems, based on customary law under the major leadership of traditional leaders.
- These customary practices include; the rules governing the water resources, the planning regarding the water resources, management of conflicts, and the rain-making ceremonies.
- The customary practices described in this study have been able to sustain both the food production and the rural livelihoods, which are all water dependent. In addition, the fact that these people have relied on these customary practices for managing their water resources for such a long time implies the sustainability of these practices.
- The research established that there is a national legislation framework for water management however the implementation of roles and responsibilities of different players is unclear and hence not being applied at the local level. This is mainly due to lack of capacity and resources of local authorities and agencies
- Also noted is the lack of involvement of local communities in policy making in water reforms. Some of their significant sources of water especially for irrigation are illegal. This generates more negative impacts on their ability to sustain livelihoods.

5.2 Recommendations

Based on the findings of this research, it is recognized that lack of clarity in institutional roles of water resources management impacts negatively on livelihoods of small holder farmers in Zambia, particularly in Mwanachingwala. This is further accentuated by lack of subsidiary and capacity together with resources of local water management authorities and agencies. To reduce the impacts of such activities and promote sustainable development the following is recommended:

- The government should find a way of providing water resource development in the rural areas to facilitate irrigation for small holder farmers.
- There is need to communicate the water reforms to all the stakeholders, through consultations, including the rural stakeholders so that they acquire knowledge about the Water Act and understand how stakeholder institutions such as WASHE committees councils operate
- There should be coordination if not centralisation of water resources management at the local level. This will allow for improved efficiency in water resource management, capacity building and injection of resources
- Continuation of the current preliminary study on the current informal water institutions to at least cover the whole Kafue Flats wetlands. It should also be extended to other wetlands in the country

REFERENCES

- Adato, M and Meinzen-Dick R. 2002. *Assessing the Impact of Agricultural Research on Poverty using Sustainable Livelihoods Framework*, International Food Policy Research Institute, Washington.
- Ashley, C and Carney, D. 1999. *Sustainable livelihoods: lessons from early experiences*. London: Department for International Development.
- Ashley, C and Hussein, K. 2000. *Developing methodologies for livelihood impact assessment: Experiences of the Africa Wildlife Foundation in East Africa*. London. Overseas Development Institute.
- Bandaragoda. D. J. 2000. *Stakeholder Participation in Developing Institutions for Integrated Water Resources Management: Lessons from Asia*. Working Paper 96. Colombia. Sri Lanka. International Water Management Institute.
- Bartram, J. Lewis, K. Lenton, R. Wright, A., 2005. *Focusing on improved water and sanitation for health. Millenium Project*. Lancet 2005; 365: 810–12
- Boesen, J., Maganga, F. and Odgaard, R., 1999. *Norms, Organizations and Actual Practices in Relation to Land and Water Management in Ruaha River Basin, Tanzania*, in T. Granfelt (ed); *Managing the Globalized Environment*, London, Intermediate Technology Publications.
- Booth, D. Holland, J. Hentschel, J. Lanjouw, P. and Herbert, A. 1998. *Participation and combined methods in Africa poverty assessment: Renewing the agenda*. DFID Issues. Social Development, African Division. London: Department for International Development
- Botes, A. Henderson, J. Nakale, T. Nantanga, K. Schachtschneider, K. Seely, M. 2003. *Ephemeral rivers and their development: testing an approach to basin management committees on the Kuiseb river, Namibia*. Physical and Chemical of the Earth 2, 853-58
- Chabwela, H. and Mumba, W. 1998. *Integrating Water Conservation and Population Strategies on the Kafue Flats*. Water and Population Dynamics. Lusaka. University of Zambia.
- Chenje, M. 2000. *State of Environment Zambezi Basin 2000*. SADC/IUCN/ZRA/SARDC. Maseru/Harare/Lusaka
- Chileshe, P. Trottier, J. Wilson, L. 2005. *International workshop on African Water Laws Plural Legislative Frameworks for Rural Water Management*. Newcastle, University of Newcastle.

Cleaver, F. 2000. *Moral Ecological Rationality, Institutions and the Management of Common Property Resources. Development and Change*. Vol.31, No 2, March, pp 361-383.

Crow, B. and Sultana, F. 2002. *Gender, Class and Access to Water: Three Cases in a Poor and Crowded Delta*. *Society and Natural Resources*. 15: 709-724, 2002

CSO (Central Statistics Office Zambia). 2004. *Census Report 2004*. Government Printers.

Derman, B. Mulwafu, W. Gonese, F. Chavulu, G. Ferguson, A. Peters, P. 2001. *Institutional Dimensions of Water Policy Reform in Southern Africa: Addressing Critical Water – Land Intersections in broadening Access to Key Factors of Production*. BASIS CRSP II Proposal.

Drinkwater, M. and Rusinow, T. 1999. *Presentation on CARE's Livelihood Approach*, Paper for NRAC '99.

Dube, D. and Swatuk, L. 2002. *Stakeholder participation in the new water management approach; A case study of the Save Catchment, Zimbabwe*. *Physics and Chemistry of the Earth*, 27. 867 – 879.

FAO (Food and Agriculture Organisation), 1997. *Preliminary Report on National Water Resources Laws and Institutions in Tanzania*. Water Law and Advisory Programme-GCP/INT/620/NET

Frankfort-Nachmias, C. and Nachmias, D. 1996. *Research Methods in Social Sciences*. 6th Edition. New York. Worth Publishers.

Ghai, D. and Vivian, J. (Eds.). 1992. *Grassroots Environmental Action: People's Participation in Sustainable Development*. London. Routledge for UNRISD.

Ghai, D. (ed.). 1994. *Development and Environment: Sustaining people and Nature*. (special issue) *Development and Change* 25 (1).

Gleick, P. 1993. *Water in Crisis: A Guide to the World's Fresh Water Resources*. New York and Oxford: Oxford University Press.

Gleick, P. 2001a. *Safeguarding our water*. *Scientific American*. Oakland. Institute for Studies in Development.

GRZ (Government of the Republic of Zambia). 1982. *A Report of the Commission of Inquiry into Land Matters of Southern Province*. Lusaka: Government Printer.

GRZ (Government of Zambia). Economics and Finance. 2000. *An example from Zambia of the financial decisions necessary for the sustainable management of water resources*. Lusaka. Ministry of Finance and Planning.

GRZ (Government of the Republic of Zambia). 2004. *National Policy on Environment*. Lusaka. Government Printers.

GRZ (Government of the Republic of Zambia). 1994. *National Water Policy*. Lusaka. Government Printers.

GRZ (Government of the Republic of Zambia), 1948. Water Act Cap 132 of 1948.

GWP (Global Water Partnership). 2006. *Integrated Water Resources Management Tool Box*. Pretoria GWP.

GWP-TAC (Global Water Partnership). 2000. *Integrated Water Resources Management*. Background Paper no 4. Stockholm. GWP.

Manzungu, E. 1999. *Strategies of smallholder Irrigation Management in Zimbabwe*. PhD Thesis. Wageningen University. The Netherlands.

Kabudi, J. 2005. International workshop on 'African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa', 26-28 January 2005. Johannesburg.

Katerere, J. and Van der Zaag, P. 2004. *Untying the Knot of Silence”: Making Water Policy and Law Responsive to Local Normative Systems* [online] Available at: <http://web.africa.ufl.edu/asq/v5/v5i3a7.htm> (Accessed March 28, 2007).

Keohane, R. and Nye, J. 1993. *The United States and International Institutions in Europe after the Cold*.

Kujinga, K. 2002. *Decentralising Water Management; An Analysis of Stakeholder Management of Water in the Odzi Sub-catchment Area, Save Catchment*. *Physics and Chemistry of the Earth*, vol. XX, no. 1 2004

Lawrence, P. Meigh, J. and Sullivan, C. 2003: *The Water Poverty Index: International Comparisons*. Keele Economic Research Papers 2003/18 and Centre for Ecology and Hydrology (CEH). Wallingford.

Lehmann, D. 1977. *The Twa: People of the Kafue Flats: In Development and Ecology in the Lower Kafue Basin in the Nineteen Seventies*, eds. 41-46. Lusaka. University of Zambia.

Maganga, F. P., Kiwasila, H. L., Juma, H. I., And Butterworth, A. J., 2003 *Implications Of Customary Norms And Laws For Implementing IWRM: Findings From Pangani And Rufiji Basins*, Tanzania 4th Waternet/Warfsa Symposium: Water, Science, Technology & Policy Convergence And Action By All, 15-17.

Institutional Implementation of IWRM In Rural Livelihoods

Marchand, M. Wisse, E. and Drijver, C.A. 1983. *Land Use Possibilities on the Kafue Flats, Zambia*. CES Report, NR 10. The Netherlands: State University of Leiden.

Mehta, L. Leach, M. and Scoones, I. (eds). 2001. *Environmental Governance in an Uncertain World*. IDS Bulletin Vol.32, No4, October.

Mtisi, S. 2002. *Livelihoods and water reforms: Emerging issues for stakeholders. International workshop on 'Processes and Dynamics of Catchment Management in Zimbabwe*. Harare.

Munamati, M. 2005. *Cultivating Livelihoods: An assessment of water allocation and management practices in small scale irrigation schemes – a case of Mzingwane Catchment*. Masters Thesis. Harare. University of Zimbabwe.

Nelson, R.R. 1995. *Recent Evolutionary Theorising About Economic Change*. *Journal of Economic Literature*. vol XXX111. March 1995. pp480-90.

Nicol, A. 2000. *Adopting a Sustainable Livelihoods Approach to Water Projects: Implications for Policy and Practice*. London. Overseas Development Institute. Working Paper 133.

Nsemukila, B. 2003. *Addressing the data requirements for the Poverty Reduction Strategy: The Case of the Zambia Statistical System*. Lusaka. Central Statistics Office.

NWASCO (National Water Supply and Sanitation Council), 2004. *Water Sector Reform in Zambia*. NWASCO. Lusaka

Nyambe, I. Mwasambili, R. Mate, L. Lungu, C. Kambole, M. Maseke, C. 2002. *Water Demand Management in Zambia: Towards Promotion and Adoption*. Lusaka. University of Zambia.

Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.

Regional Strategic Action Plan (1999-2004). Development in southern Africa

Rennie, J.K. 1980. *Traditional society and modern developments in Namwala District, In Proceedings of the National Seminar on the Environment and Change: The Consequences of Hydro-Electric Power Development on the Utilization of the Kafue Flats*, Lusaka,

Scoones, I. 1998. *Sustainable Rural Livelihoods: A Framework for Analysis*. Working Paper 72, IDS. Sussex. University of Sussex.

Seabright, P. 1993. 'Managing Local Commons: Theoretical Issues in Incentive Design.' *Journal of Economic Perspectives*. vol.17, no.4, pp113-134.

- Sithole, B., 2001. *Participation and Stakeholder Dynamics in The Water Resources Process in Zimbabwe; The Case of The Mazowe Pilot Catchment Board*. African studies quarterly 5, no. 3. [Available online] URL <http://web.africa.ufl.edu/asq/v5/v5i3a2.htm> (Accessed on 10th June 2005)
- Sithole, P. 2002. *Planning and Practice at The Crossroads: A case of the Dande Irrigation*. Harare. University of Zimbabwe.
- Swatuk, L. 2000. *Political Challenges to Sustainably Managing Intra-Basin Water Resources in Southern Africa: Drawing Lessons from Cases*. Gaborone.
- Swatuk, L.A. and Rahm, D. 2004. *Integrating Policy, Disintegrating Practice: Water Resources Management in Botswana*. Physics and Chemistry of the Earth., 29, in press.
- Tiffen, M. and Mulele, M.R. 1993. *Environmental Impact of the 1991-2 Drought on Zambia*. Zambia Country Office, Lusaka: IUCN.
- Tushaar, S. and van Koppen, B. 2006. *Is India ready for Integrated Water Resources Management? Fitting Water Policy to National Development Context*. Economic and Political Weekly
- Twikirize, D. 2005. *An Assessment of Traditional Water Management Practices and their Implications for Improved Water Governance in the Limpopo Basin: A case of the Sibasa Dam in Mzingwane Catchment, Zimbabwe*. Master Thesis. Harare. University of Zimbabwe.
- UNESCO (United Nations Educational, Scientific Cultural Organisation). 2003. *Water for People – Water for Life – The United Nations World Water Development Report*. Paris, New York, and Oxford: UNESCO and Berghahn Books.
- UNCED. 1992. *Rio Declaration and Agenda 21. Report on the UN Conference on Environment and Development*. Rio de Janeiro. 3-14 June 1992. UN doc A/CONF.151/26/Rev.1 (Vols. I-III)
- Uphoff, N. and Wijayarathna, C. 2000. *Demonstrated benefits from social capital: the productivity of farmer organisations in Gal Oya, Sri Lanka*. World Development 28(11), 1875 – 1890
- Williams, G.J., (1977). *The Kafue Hydro-Electric Scheme and its Environmental Setting: In Development and Ecology in the Lower Kafue Basin in the Nineteen Seventies*, eds. G.J.Williams and G. W. Howard, 13-27. Lusaka: Zambia: University of Zambia
- WHO (World Health Organization). 2003. *Right to Water*. Health and Human Rights Publication Series; no 3, WHO.

WHO (World Health Organisation). 2005. *Water sanitation and health*. http://www.who.int/water_sanitation_health/diseases/en/ (accessed Jan 18, 2007).

Wolfe, S and D B Brooks (2003): *Water Scarcity: An Alternative View and Its Implications for Policy and Capacity Building*, *Natural Resources Forum*, 27(2), 99-107.

WWF3 (World Wide Fund). 2000. *Partners for Wetlands, Kafue Flats, Zambia*, Partners for Wetlands Quarterly April 2000. Issue No. 1. Page 2 & 6 – 7. Sabah. Partners for Wetlands.

WWF (World Wide Fund for Nature). 2005. *Fresh Water and Poverty Reduction: Serving People, Serving Nature*. WWF- International August 2005.

Yachiyo Engineering Co. Ltd (YEC), 1995 – National Water Resources Master Plan Zambia State of the Environment, 2000

Zambian Human Development Report. 2003. *Eradication of Extreme Poverty and Hunger in Zambia: An Agenda for Enhancing the Achievement of the Millennium Development Goals*. Ndola. Mission Press.

ZAWA (Zambia Wildlife Authority). 2005. *General Guidelines for Conducting Ecological Assessments for the Establishment and Management of Game Ranches in Zambia*. Chilanga. ZAWA.

ZAWA (Zambia Wildlife Authority). 2006. *Assessment of Traditional Fishing and Associated Socio-Economics in Kafue National Park*. Chilanga. ZAWA.

APPENDICES

Appendix I: Table showing the sample breakdown by homestead

| Respondent's attribute | Total number of homesteads visited |
|-----------------------------------|---|
| Chiefs | 1 |
| Headmen | 5 |
| V-Washe Chairpersons | 3 |
| Municipal Officers | 2 |
| Agriculture Extension Officers | 1 |
| DWA Extension Officers | 1 |
| NWASCO officials | 2 |
| RWSSU officials | 1 |
| DWA headquarter officers | 2 |
| Water Board officials | 1 |
| Dejure female headed households | 17 |
| Defacto female headed households | 24 |
| Defacto male headed households | 11 |
| Total number of homesteads | 71 |

Appendix II: Household Interview Guide

1. How many people per household?
2. Assess the diversity of customary laws pertaining in the area
3. Tribal/Community composition of the villagers
4. Current governance system: Whether the Village is under Village/ Government/ Ward/ Chief
5. Identify the main sources of water (identify streams, rivers, dry river valleys running with water during the dry season)
6. Domestic? Productive?
7. Rainfed or irrigated agriculture?
8. Access to water: Water resources whether abundant or scarce?
9. Who is responsible for the protection of water quality and equitable access to water: rules of protecting water source, who is responsible for the protection of water quality and equitable access to water and how is violation of these rules handled and where appropriate punishment?
10. What is the general availability of water today?
11. Impact of reforms on water and land tenure systems
12. How do the rules governing water abstractions, use or access vary with the type of land? eg. river valleys, closeness to road, good or poor soil?
13. What principles/rules (if any) govern water management and allocation procedures?
14. Whether ownership established by digging well or canal or by proximity to a source
15. How is ownership/accessibility to water lost now? How was it lost under the traditional system in the past
16. Can an individual pledge his/her access to water in exchange for credit or loan?
17. Any arrangements between villagers, families etc over water sharing
18. Whether villagers are aware of (Water Law, Water Policy, initiatives of water reforms)
19. What role should the village play under new law to: resolve conflicts, protect water sources, fair allocation of water?

Appendix III: Focus group discussion guide

1. Territorial extent of village land
2. Assess the diversity of customary laws pertaining in the area
3. Tribal/Community composition of the villagers
4. Rainfall pattern/environment/ climate and general availability of water
5. Current population
6. Main source of livelihoods for (men, women, old, young, local, strangers)
7. How many of people are cash crop farmers? Small garden farmers? Fishermen?
8. How much money do they earn from these activities?
9. Impact of nearby or far off urban centre on village/community/locality
10. Economic activities- predominant modes of production [pastoralists? Agriculture? Subsistence
11. Identify the main sources of water
12. Agriculture: rain-fed irrigation or irrigation from stream, well or canal?
13. Identify and describe technologies on: traditional systems of irrigation; new innovations or technologies
14. Who controls irrigation, fishing (community?, water users? Committees?)
15. What principles/rules (if any) govern water management and allocation procedures?
16. Any arrangements between villagers, families etc over water sharing

Appendix IV: Key person interview guide

1. Previous traditional governance
2. Current governance system
3. Who controls irrigation (community? Water Right holder? Water Committee?)
4. Who is responsible for day to day/ general management of canals?
5. Who handles/manages/resolves matters pertaining to competitions over water resources (e.g. between and amongst local users? between and amongst pastoralists and agricultural communities? Between upstream and downstream users? Between and amongst commercial/large scale users and other users? between and amongst farms etc)
6. Narrate pre-colonial, colonial and post colonial water and land tenure systems
7. Social, economic, political, cultural and legislative issues underpinning the pre-colonial

Appendix V: Responses to questions about knowledge of water reforms in Mwanachingwala

| | Yes | No |
|-----------|------------|-----------|
| DWA | 87 | 13 |
| D-WASHE | 5 | 95 |
| V-WASHE | 3 | 97 |
| Water Act | 0 | 100 |

Appendix VI: Responses to questions about knowledge of water reforms in Kawama

| | Yes | No |
|-----------|------------|-----------|
| DWA | 89 | 11 |
| D-WASHE | 72 | 28 |
| V-WASHE | 84 | 16 |
| Water Act | 4 | 86 |

Appendix VII: Table of percentage use of wetland

| Uses of Productive Water | Percentage |
|---------------------------------|-------------------|
| Gardening (Irrigation) | 48 |
| Fishing | 19 |
| Building | 7 |
| Fire wood | 10 |
| Reeds for constructions | 4 |
| Bird hunting | 3 |
| Others | 9 |

Appendix VIII: Table of percentage of obligation to access land in the wetland

| Requirement | Percentage |
|-------------------------------|-------------------|
| No requirements | 62.5 |
| Pay tribute to local leaders | 9.3 |
| Cultivate plots every season | 14 |
| Be member of the village/area | 9.5 |
| Do development work | 2.3 |
| Respect local leaders | 2.4 |

Appendix IX: Table of Sources of water for small gardens.

| Name of Village | Source | | |
|-----------------|--------|----------|--------------|
| | Stream | K. River | Z.S Canal |
| Nkabika | 80 | 6 | 16 |
| Chipego | 100 | | |
| Kaleya | 84 | 12 | 2 |

Appendix X: Organisational Structure of the Water Sector in Zambia

