UNIVERSITY OF ZIMBABWE

Department of Civil Engineering

Masters in Integrated Water Resources Management

Impact of Current Institutional Setup on Water Service Delivery: A Synopsis of Two Water Authorities in Botswana

Submitted By

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DECLARATION

I, Tshoganetso Tiroyamodimo, declare that this thesis is my own work and a result of my own investigation. All the sources that I have used or quoted have been indicated and acknowledged by means of complete references. To the best of my knowledge, this work has not been submitted before for any other degree at any other university.

Student; Tshoganetso Tiroyamodimo Date

ABSTRACT

The water sector in many developing countries in the world is characterised by inadequacies and inefficiencies in service delivery (Gardner-Outlaw and Engelman, 1997). These among other things are reflected by disrupted flow of water, frequent system breakdown, long waiting periods for connection, escalating unaccounted for water losses in the distribution networks, unsatisfactory customer relations and haphazard water projects' implementation and Botswana is no exception. The purpose of this study was to assess the impact of institutional arrangements on water service delivery at household level in villages of Botswana based on a case study of Kanye and Molapowabojang. Empirical data was obtained by employing qualitative approach from January to April 2007. Key informant interviews, focus group discussions and document review were the main tools for data collection. Three indicators of coverage levels, reliability of water supply and consumer satisfaction were used in assessing the efficiency of water service delivery.

Two main water supply sources are used by households in Kanye and Molapowabojang – public standpipes and private connections. However majority of the households in Molapowabojang depend on public standpipes mainly because private connections hardly pump out water. Despite this fact, most households prefer to have a higher level of service, the private connection for the convenience it offers, as it does not require walking out of the compound to obtain water. The study findings revealed that the current institutional set up to rural water service delivery at household level is relatively efficient in terms of water reticulation infrastructure provision, functioning sources, access to and use of water (time and distance) and to a very limited extent, willingness to pay to sustain existing service levels. Although there is water reticulation infrastructure in the two villages, there are short comings in their operation and maintenance as well the ability to meet user preferences. The efficiency of the approach is in doubt as communities are to a very limited extent involved in the planning, implementation, operation and maintenance and evaluation of their water supply systems. Responsibility for these activities is seen to rest with the Department of Water Affairs and the District Council which are seen as inefficient.

The study therefore is of the opinion that the current institutional arrangement is inadequately performing in the management of water supply schemes and service delivery at household level. This can be redressed by affording rural communities and private sector greater involvement in decisions relating to the water service delivery. There needs to be a reassessment and reorientation of existing institutional structures related to water supply. In addition, there is need for understanding the level of water development in the country. Though it is important to separate the roles of service provision from regulation and resource management, it is imperative to understand the level at which service provision is at. The water institutions in Botswana should be developed and empowered to successfully operate and maintain the infrastructure in place.

Key Words: Service Delivery, Water Institutions, Coverage level, reliability, consumer satisfaction, Botswana, village, Integrated Water Resources Management

DEDICATION

This thesis is dedicated to all those who have lived and will live to celebrate my success! Exaltation comes from the Lord.

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LIST OF ACCRONYMS

BIDPA	Botswana Institute of Development Studies
CSO	Central Statistics Office
DC'S	District Councils
DWA	Department of Water Affairs
GWP	Global Water Partnership
IWRM	Integrated Water Resources Management
MMWEWA	Ministry of Minerals, Energy and Water Affairs
MMEWR	Ministry of Minerals, Energy and Water Resources
NSP	National Settlement Policy
SADC	Southern African Development Committee
SDC	Southern District Council
SIDA	Swedish International Development Agency
SSA	Sub-Saharan Africa
UNICEF	United Nations
VDC	Village Development Committee
VWSP	Village Water & Sanitation Programme
WUC	Water Utilities Corporation
WHO	World Health Organisation

1 CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1 Introduction

Increasing water shortage and recurrent drought periods facing some of the southern African countries particularly Botswana, call for concerted efforts at both the local and international level to redress weaknesses in water governance structures for sustainable and efficient management of this finite resource. The SADC Revised Protocol on Shared Water Courses (2000), advocates for fostering closer cooperation for judicious, sustainable and coordinated management, protection and utilization of shared watercourses and for the advancement of the SADC agenda of regional integration and poverty alleviation. Mainstreaming these into water development would curb inefficiencies prominent in the water sector in the region. According to Global Water Partnership (GWP: 2000) water resources management is still dominated by sectoral approaches which lead to fragmented and uncoordinated development and management of the resource. Some scholars posit that current service delivery challenges in the water sector go beyond technical challenges as they are related to management and governance problems (see for example (Keen, 2003; Toepfer, 2004). Koudstaal et al., 1992, argue that improved performance of the water sector depends on institutional reforms rather than additional technological improvements. Similarly, Jonch-Clausen and Fugl, (2001) hold that flawed demarcation of responsibilities between institutions, inadequate coordination mechanisms, jurisdictional gaps or overlaps and failure to match authority and capacities remain a major impediment to successful water service delivery.

Water development in Botswana has been periodically undergoing reforms since the country's independence in 1966 (Rahm et al, 2006). The reforms were carried in piecemeal against transpiring water problems without coherent policy direction. The first regulation of water use came a year after independence with the passage of the Water Act of 1967 and the establishment of the Department of Water Affairs (DWA) in the same year (Sillery, 1974). DWA was subsequently placed in the Ministry of Mineral Resources and Water Affairs, now renamed the Ministry of Minerals, Energy and Water Resources (MMEWR). The MMEWR has overall responsibility for water policy and deliberates its activities mainly through the Department of Water Affairs (DWA). Other than groundwater investigations, protection and monitoring of resources, DWA is also responsible for surface water protection, water legislation administration and for the provision of water supply to all villages. DWA also plans and installs all village water systems, but only maintains and operates the water supply of the large villages, mostly district capitals. As a way of decentralizing responsibilities, District Councils which are under the Ministry of Local Government have been mandated with the water supply systems of the smaller villages as well as operation and maintenance of these village' water supplies through the Councils' water units (Government of Botswana, n.d.: 279-80). The District Councils water units' responsibility to provide water for smaller villages saw its origins in 1965 after the

establishment of the District Councils Act, 1965 which states that the councils have a statutory duty for rural water supplies. Nonetheless, the schedule is all embracing and does not distinguish the type of supply (Arntzen et al, 2000). In a nutshell, DWA provides water for the 22.5% of the population living in the 17 major villages while District Councils through the Ministry of Local Government are theoretically responsible for supplying water to 22% of the population living in rural villages. While decision making at the local level is less contentious than it is at the national level, the problem of limited and overlapping jurisdictions among concerned authorities in Botswana is depicted as a major impediment to smooth and rational water policy implementation (Rahm et al, 2006).

In this light, two questions that arise are, 'to what extent has the current institutional arrangement approach to water management contributed to the efficient water service delivery in the country and, 'to what extent has the IWRM principle which states that 'Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels' been mainstreamed into the current institutional framework governing water service delivery in Botswana?' It is against this background that this study seeks to assess the impact of institutional arrangement on domestic and institutional water service delivery in Botswana.

1.2 Statement of the Problem

The water sector in many developing countries in the world is characterised by inadequacies and inefficiencies in service delivery (Gardner-Outlaw and Engelman, 1997). According to Jonch-Clausen and Fugl, (2001) decentralization, clear demarcation of responsibilities between actors, coordinated jurisdictional mechanisms and the ability to match authority and capacities remain the mainstay to successful water service delivery in the developing world and Botswana is no exception. Botswana is plagued by fragmented institutional approach to water development, top-down management approach to water development, lack of skilled manpower and capacities in the local authorities as well as ambiguity in roles and areas of jurisdiction in spite of the country's water scarce situation which requires efficient service delivery parented by enabling institutional structures in place. Water development inefficiencies in the country among other things are reflected by disrupted flow of water, frequent water distribution system breakdown, long waiting periods for connection, escalating unaccounted for water losses in the distribution networks, unsatisfactory customer relations and haphazard water projects' implementation. However, there is little research and supporting documentation on the issue. This study therefore seeks to critically assess the impact of institutional arrangements on water service delivery at household level in the non-urban centres of Botswana.

1.3 Overall Objective

The main objective of the study seeks to assess the impact of institutional setup on water service delivery at household level in rural Botswana.

1.3.1 Specific Objectives

The specific objectives are to:

1. review the institutional structure of water authorities from country to community level in Botswana
2. assess the extent to which the current institutional setup adheres to the second principle of IWRM which states that '*Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels*'
3. identify and analyze the effects of the current institutional arrangements on the beneficiary communities and the service providers
4. assess water authorities perceptions about service delivery and stakeholder satisfaction *vis-à-vis* stakeholder opinion on the quality of water service delivery in the study area
5. make recommendations for institutional improvement in water service delivery basing on the study findings

1.4 Research Questions

The study attempts to answer the following research questions:

Objective 1: To review the institutional structure of water authorities from country to community level in Botswana

1. Which institutions are involved in water service delivery in Botswana?
2. What are the roles and responsibilities of the water institutions in Botswana?
3. Are there any gaps, overlaps and synergies in roles and responsibilities of water authorities towards water management?
4. What are the water service delivery difficulties faced by the institutions with regard to financing, project implementation and systems management?

Objective 2: To assess the extent to which the current institutional setup adheres to the second principle of IWRM which states that '*Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels*'

5. To what extent is water management decentralized?
6. How do stakeholders participate in water resources management in Botswana?
7. How are sector policies and strategies affecting user preferences of the level of service?

Objective 3: To identify and analyze effects of the current institutional arrangements on the beneficiary communities and the service providers

8. How has the current water management approach affected domestic users daily activities?
9. How is the current institutional setup affecting operational efficiency of water authorities?

Objective 4: To assess water authorities' perceptions on service delivery and consumer satisfaction *vis-à-vis* stakeholder opinion on the quality of water service delivery in the study area

10. What are the views of the stakeholders on water service delivery?
11. What are the views of water authorities regarding the strengths and weaknesses of the existing institutional setup?
12. Are there any obstacles impeding service delivery efficiency and responsiveness to users?

1.5 Significance of the Study

The study will contribute to better understanding of institutional structures and frameworks governing water service delivery in Botswana. In addition the research is expected to inform policy on structural and institutional reform towards IWRM and to shed light on the importance of stakeholder participation in water service delivery. Finally, the study is expected to result in a monograph on exploring the constraints and opportunities born by institutional set up on water service delivery in rural and urban villages of Botswana.

1.6 Definition of concepts

Some of the terms used in this study may have varying definitions depending on the context in which they are used. However, it is worth noting that the concepts have been defined within the scope of the study.

1.6.1 Rural areas and village water supply in Botswana

The National Settlement Policy, (1998) and the Town and Country Planning Act, (1967) of Botswana define a rural area or a village as a settlement in which not less than 75 per cent of the potential labour force is engaged primarily in agricultural activities, in addition to a population threshold of 5000 people (MFDP, 2003). Rural water supply is the provision of water by any means to non-urban settlements to meet their daily demands (Toepfer, 2004). The Water Act, 1967 of Botswana is the statutory instrument defining rural water supply. According to the Act, any settlement with a population of more than 150 persons qualifies for reticulated water supply (MFDP, 2003). According to the National Water Master Plan Review, 2006, rural water supply in Botswana is categorized into major/urban villages, rural villages and minor settlements. The

term major villages is applied to 17-gazetted villages with a population above 5000. The Department of Water Affairs is responsible for the supply of water to all these. Although designated as *villages* a number of these settlements have populations above 20 000. Rural Villages are defined as a group of about 480 villages with a population of less than 5000 that have been gazetted as such by the Ministry of Local Government and Lands which, through the District Councils, is responsible for their water supply. Both major and rural villages have reticulated water supply. All remaining groups of dwellings such as remote area dweller settlements, lands area, cattle posts are referred to as minor settlements with a population of 150. These are usually not served by any water authority even though the district councils are allegedly their service providers (MMERW, 2006).

1.6.2 Institutions

Jepperson (1991) cited in Bandaragoda (2000) states that an institution is an "organized" established procedure. These procedures are represented as constituent rules of society, or rules of the game. Institutions set the ground rules for resource use and establish the incentives, information and compulsions that guide economic outcomes. Institutions can be both formal and informal. The key characteristics of institutions are that they are patterns of norms and behaviours which persist because they are valued and useful (Merry, 1993). Institutions are a combination of:

- Policies and objectives
- Laws, rules and regulations
- Incentive mechanisms
- Accountability mechanisms
- Norms, traditions, practices and customs

Most water-related rules are meant to constrain the socially undesirable behaviour by individuals or groups. Some water-related institutions such as those governing water user associations are designed to promote organized behaviour and equity and provide various opportunities for individual and group advancement, thereby serving to liberate human action. The institutional framework serves to reduce the uncertainty of human actions, and therefore they have a stabilizing effect on society. However, the rise of institutions may have a legal pluralistic effect on the society whereby the modernised institutional structure is superimposed on the existing societal culture hence the stifling of the local ability to govern (Ntsebedza, 2002). In most cases the constitutional recognition of the hereditary "institution of traditional leadership" is without any clarity as to its roles, functions and powers (Mamdani, 1996).

1.6.3 Water Governance

Water Governance refers to the range of political, social, economic, and administrative systems that are in place to develop and manage water resources and the delivery of water services at different levels of society. It compromises the mechanisms, processes, and institutions through which all involved stakeholders, including citizens and interest groups, articulate their priorities, exercise their legal rights, meet their obligations and mediate their differences (http://www.undp.org/water/about_us.html). Gupta (1996) states that water governance includes "*all legal phenomena; institutions, laws and policies*". Good water governance exists where government bodies responsible for water establish an effective policy and legal framework to allocate and manage water resources in ways responsive to national, social and economic needs and to the long-term sustainability of the available water resources (GWP, 2000). In a nutshell, water governance entails an interactive network of different institutions private, public, public-private and community.

2 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Potable water is becoming one of the world's scarcest resources and as population and economic activity increase pressure on potable water allocation and management will increase leading to an increase in the value of water (MMEWR, 2006). It is estimated that more than 2 billion people are affected by water shortages in over forty countries, 1.1 billion do not have sufficient drinking water and 2.4 billion have no provision for sanitation to date (WHO/UNICEF, 2000). At present many developing countries have difficulties in supplying the minimum annual per capita water requirement of 1,700 cubic metres (m3) of drinking water necessary for active and healthy life for their people. In addition, predictions show that by 2050 at least one in four people is likely to live in countries affected by chronic or recurring shortages of freshwater (Gardner-Outlaw and Engelman, 1997). African governments, like most countries in the developing world, face a daunting task in their attempts to provide efficient and adequate public services. Poor quality and lack of widespread availability of services like electricity, water and sanitation, and roads are quite common in some Sub-Saharan African (SSA) countries, and the average for the region is well below others. According to the UNDP's *Human Development Report (2001)*, in the year 2000, the population's access to safe water in SSA was only 44%, while the average for countries in East Asia and the Pacific (EAP) stood at 67% and in Latin America and the Caribbean was reported to be 65%[3]. Furthermore, it is amply clear that the challenge of providing basic water and sanitation persists as not much improvement has been made since the early 1990s. Even where water supply systems and sanitation facilities have been installed, they are still often inadequate, unsafe and in disrepair.

According to data provided by UNICEF and WHO, only 62% of the African population has access to improved water supply, with the worst conditions existing for rural populations which only have 47% coverage. Sanitation coverage is also very low compared to other regions, with only 60% of the population with improved sanitation. Again, the situation is poorer for rural populations, with only 45% coverage. Private connections for water in urban SSA remain very low, with only 2-7 connections per 100 people. These water problems are associated with weak or missing institutional arrangements needed to efficiently supply water and to regulate equity in resource use. This state of affairs has led many experts to question whether the emphasis on centrally managed schemes needs to be re-evaluated and a new approach taken to the provision of rural water supply (McCommon, Warner and Yohalem, 1990).

Extensive efforts to remedy the situation date as far as the 1960's with increased emphasis since the inauguration of the United Nations' International Drinking Water Supply and Sanitation Decade in 1981 (Briscoe and de Ferranti, 1988).

The United Nations (UN) Millennium Declaration (2000), called upon all members of the UN '*to stop the unsustainable exploitation of water resources by developing water management strategies at the regional, national and local levels which promote both equitable access and adequate supplies'*(The World Water Crisis, 2002:5). Significant advances were made by several countries, and the estimated number of rural people without access has been reduced from about 80% of the rural population of developing countries in the 1960's to less than 60% in 1988 (Briscoe and de Ferranti, 1988). However the pace of progress has fallen short of that hoped for by most governments, donors, and unserved communities with widespread inadequate maintenance and unsustainability of water projects undercutting the gains (Briscoe and de Ferranti, 1988).

Current approaches to water management are highly fragmented, focusing on technical improvements and sectoral solutions without sufficient attention to the social and sustainability goals. Recent research has shown that shifting the emphasis to the social base has major implications for strategy and the technologies employed. More technology is not always better (Green and Baden, 1994). Indeed the water crisis in the world has been said to be one of poor water governance (Toepfer, 2004). GWP (2000), states that the water crisis is often a crisis of governance, a failure to integrate policies and practices related to the management of water resources. Good water governance exists where government bodies responsible for water resource management establish an effective policy and legal framework to allocate and manage the resources in ways responsive to national, social and economic needs and to the long-term sustainability of the resource base. The same is valid for international, sub-national and local levels. Among other things, actions to make water governance effective include global water initiatives such as a shift from the bureaucratic paradigm through institutional reforms and mainstreaming IWRM to suit local needs. The concept of IWRM is widely accepted as the starting point for water policies. Partnerships between different stakeholders at all levels (international, national and local) are stressed in new policy approaches, with the recognition that solutions to water problems cannot be achieved by one organization or even one segment of society. In particular, the inclusion of civil society organizations and of local community groups is emphasized (The World Water Crisis, 2002).

2.2 The Concept of IWRM

The term IWRM implies an inter-sectoral approach, representation of all stakeholders, all physical aspects of water resources, and sustainability and environmental considerations (Savenije and van der Zaag, 1998). The definition of IWRM that came to be popularly known, however, was the one given by the Global Water Partnership (GWP), which embraced the two broad conceptual bases of improved water resources management formulated in the international conferences, namely, "integration" and "sustainability". Accordingly, IWRM is seen as "a process, which 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). It should be noted that, as it has been defined, the concept of IWRM demands a specific institutional arrangement such as the river basin organizations. Central to this definition also is the coordination and integration leading to a holistic cross-sectoral approach to water management. The concept of IWRM stemmed from, among other things, the realisation that water policy and water management were often too fragmented to address issues of sustainability, competing water uses, conservation and productive use of water at local, national and regional scale. In addition, it was recognized that with the prevailing increase in demand and water supply costs, technical supply measures are no longer sustainable. IWRM also stresses the need for decentralization and participatory approach to water development. Furthermore, IWRM advocates for sound institutions and policies coupled with the development of the requisite organizational capacity and skills for enforcement and regulation with the following tenets:

- demarcation of roles, rights and responsibilities of the various actors in the water sector
- promotion of new forms of partnerships for investment, operation and maintenance of facilities and creation of an enabling environment
- Participation of stakeholders at all levels and scales and emergence of financially self-reliant service delivery organizations that are responsive and accountable to water users (GWP-TAC, 2000) (See Box 1).

While recognizing the need for a central mechanism to safeguard national economic and social interests, the fundamental principle in any situation is that water resources should be managed at the lowest appropriate levels (Jonch-Clausen and Lundquist, 1994). The contention is that there is need for institutional arrangement and legislative framework that harmonize socio-political and hydrological management structures (ibid).

IWRM concept is anchored on the notion that water is a finite and vulnerable resource on which ever increasing demands are being placed. It is argued that, in turn processes of population growth and the expansion and intensification of common activity generate these demands (Green and Baden, 1994).

Box 1: The IWRM Dublin Statement

Principle No. 1 – **Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment**. Since water sustains life, effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems.

Principle No. 2 – **Water development and management should be based on a participatory approach, involving users, planners and Policy makers at all levels**. The participatory approach involves raising awareness of the importance of water among policy makers and the general public. It means decisions are taken at the lowest level, with full public consultation and involvement of users in the planning and implementation of water projects

Principle No.3 – **Women play a central role in the provision, management and safeguarding of water**. This pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programmes, including decision making and implementation, in ways defined by them

Principle No. 4 – **Water has an economic value in all its competing uses and should be recognised as an economic good.** Within this principle, it is vital to recognise first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources

Source: Bos (2001)

The rationale for IWRM arises out of the conceptualisation of water as a finite and vulnerable resource on which ever increasing demands are being placed. It is argued that, in turn processes of population growth and the expansion and intensification of common activity generate these demands. Furthermore, Manzungu and Marimbe, (2002) contend that fuller participation can never be realised unless preconditions and practical steps underpinning good governance are carried on board (Box 2).

Box 2: Preconditions and practical action in governance of water resources

Preconditions

• Transparency and accountability through participatory mechanisms appropriate to local realities, needs and wishes

• Government agencies allocating and managing water resources on the basis of legitimate policies, laws and efficient administration

• Mobilising and coordinating the many social players involved

• Responding to citizens' long term needs by ensuring sustainable management of the resource

• Reforming and developing institutional frameworks

Practical steps

• Making participation meaningful to the participants, with clear measurable impacts

• Setting realistic participation objectives

• Realising that participation involves high transaction costs in terms of financial, human and time resources

• Acknowledging power differences between the different stakeholders, which ultimately determine who effectively participates in what

• Factoring in social and cultural aspects, which may hinder participation of some stakeholders, say of women and the poor

• Recognising that participation is a process and not an event

• Appreciating that communication, and not just information dissemination, is important

Source: GWP (2000); Marimbe and Manzungu (2002).

2.3 The Bureaucratic Paradigm

The bureaucratic paradigm refers to the traditional approach in which public sector organisations are managed (Hood, 1991; Lane 1994). This approach is based on complex hierarchical rule based systems and top-down decision making processes which become increasingly distant from public expectations (Yamamoto, 2003). Consequently, the progressive inflexibility and organization oriented staff rather than customer oriented plague the system. According to this approach, public sector organizations are permanent and stable organizations with a strong procedure-based approach in which efficiency is achieved by following transparent and explicit procedures of the organization (Peters, 1996; Larbi 1999). However, the main criticism against this model is that it has led to inefficiency of service delivery as well as rigid procedural daily activities (Metcalfe and Richards 1990; World Bank 1997). Parallel to this, Shirley and Xu, (1997) posit that government owned water authorities are characterised by more bureaucratic

managements impeded by government intervention and without accountability for results, hence a call for decentralization and flexible approach to water service delivery.

2.3.1 Decentralisation in Water Service Delivery

The trend towards decentralized management of water institutions is part of the effort to debureaucratise the public services as well as reducing concentration in hierarchy levels within the system. Decentralisation is defined as the transfer of authority and responsibility for public functions from the central government to intermediate and local governments or quasi-independent government organisation and/or the private sector (The World Bank 2001). In theory, decentralized water services should improve governments' ability to treat water as an economic good and assess user charges that will create incentives for efficient water use as well as finance improved service delivery. Lower level institutions closer to the beneficiary population, have an informational advantage in identifying citizens' preferences as well as the flexibility to respond to local conditions. As local institutions act on this information to improve quality, reliability, and variety of services, consumers will be willing to pay more for services (World Bank Group, 2004). Decentralised organisations are more flexible and can respond quickly to the dynamic needs of users (Hope, 2002). Decentralisation stimulates innovation since innovative ideas tend to develop from lower levels than being sent down by management (ibid). Furthermore, Labri, (1999), holds that decentralisation is meant to decongest the centre and speed up operational decision making and implementation by minimising the bottlenecks associated with over-centralisation of powers and functions at one or two points in the hierarchy. In a nutshell, decentralisation seeks to increase service provision and regulatory autonomy leaving broad policy guidelines to be worked out at the centre (Hope, 2001). In addition, decentralization is said to occur when powers and resources are transferred to authorities that are "downwardly accountable to local populations" (Agrawal and Ribot 1999). The aim is to increase public participation in local decision-making. Advocates of this kind of arrangement believe that locally accountable representatives with real public powers and greater community participation will increase efficiency and equity in the use of public resources. This notion of decentralization often leads to decentralisation of despotism.

Worldwide, failures of centralized water service delivery, exacerbated by a decreasing supply of water in some regions created considerable pressure for decentralization. Three of the four new principles, "The Dublin Principles," were issued by the International Conference on Water and the Environment, held in Dublin in 1992:

- The "Ecological Principle" requiring holistic water management,
- The "Institutional Principle" requiring participatory water management including devolution of responsibility "to the lowest appropriate level" and greater involvement of NGOs, the private sector, and women, and

- The "Instrument Principle" requiring that water should be managed as an economic resource (World Bank Group, 2004).

In view of this, three main trends in decentralization of water services have emerged according to World Bank Group, (2004); Bayliss, (2002): private sector participation (PSP), delegation, and devolution. PSP refers to a spectrum ranging from full privatization to contracting out for services. Nonetheless, PSP has proven successful in urban areas as compared to rural. Under the delegation model governments transfer water management to public or semi-private water companies. Delegation may not necessarily be an improvement on public provision, for public and semi-private companies; however, these are frequently plagued by the same inefficiencies and incentive problems (such as lack of profit motive) of other government agencies. Devolution on the other hand refers to handing over responsibilities to local institutions. Local institutions might focus more on interacting with communities while relying on central government staff for technical support. The approach pays dividends for both governments and communities; communities get what they need, and governments are relieved of the long-term operation and maintenance (O&M) burden. User groups, referred to as Water Users' Associations (WUAs) or Water and Sanitation Committees (WSCs), are common in irrigation and rural water supply and sanitation (World Bank Group, 2004). It is important to recognize that decentralization can itself increase the opportunities for community participation (Litvack and Seddon 1999).

Decentralization also foresees devolution of planning and decision-making at the local level, with standard setting, quality control and expert technical cooperation remaining functions at higher levels (Hope, 2001). In many countries, the period of transition is characterized by problems related to lack of adequate capacities at the local level and resistance within the system against the change imposed. The World Bank (1997) holds that weak administrative or technical capacity at local levels may result in services being delivered less efficiently and effectively in some areas of the country. In some instances, the actual decentralization is hampered by the fact that major resource decisions continue to be made at the national level, leaving little room for local centres to adjust their programmes to local needs (The World Water Crisis, 2002). Furthermore, The World Bank (1997) points out that the decentralization process may not be efficient for standardized, routine network based services. The process may lead to loss of economies of scale and control over scarce financial resources by central government. Manor (2001:2) posits that studies of democratic decentralization point out three essential conditions for decentralisation to work best: substantial resources (especially financial resources) from higher levels of government; substantial powers to be devolved to local authorities and mechanisms to ensure that bureaucrats are accountable to elected representatives, on the one hand, and mechanisms to ensure that elected representatives are accountable to voters, on the other hand.

2.3.2 Institutional Reform

Institutional reforms are pivotal to successful implementation of IWRM tenets and a paradigm shift from bureaucracy to an inclusive management approach (GWP-TAC, 2000). There is a

need for supportive policy, legal framework, reporting & accountability structures and a platform for negotiations that empower the lower levels of authority (McCommon, Warner and Yohalem, 1990). Local governments and communities need professional support from the government in order to implement their water supply programmes effectively (ibid). In addition, governments should formulate clear legislation and regulatory systems that will give guidance and confidence to all partners, especially to private operators working in the sector, to determine their own policies and plans and to protect their financial interests and property rights (North, 1990). Devolution of authority over water supply services and operational responsibilities from national to local governments and communities should be encouraged as an efficient means to improve the service standards and accountability (ibid).

2.3.3 Demarcation of Roles

Clearly defined roles for key stakeholders and water authorities are the key ingredients to successful service delivery. Current 'best practice' in water sector governance arrangements is to assign clear roles for the regulator, water resources manager and service delivery agencies so as to avoid conflict of interest between them (World Bank Group, 2004).

2.3.4 Community Participation

Community participation is regarded as a means or a 'catalyst' in the process of empowering communities to actively partake in decision-making processes related not only to water supply but also to other basic developmental needs. According to Mayo and Craig (1995), 'community participation' and 'empowerment' have become vital and yet more overtly problematic than ever in the current global context. They state that in the face of deepening poverty resulting from international recession and restructuring, international agencies and national and local states have demonstrated increasing interest in strategies to promote community participation as a means of enhancing the development process. This has led to increasing emphasis on the need to find alternative grass-root approaches to development starting from the empowerment of local communities. Sustainable development can be achieved through the decentralization of ownership and control of resources, empowering individuals and communities to take charge of their own lives (Okonski, n.d). By actively involving members of the community at the early stages of project implementation development projects can be rendered responsive to community needs and priorities. This would ensure technical, social, environmental, institutional and financial efficiency of facilities provided. Decentralisation can contribute to efficient and effective service delivery, accountability to and of beneficiaries, plurality in decision-making, better allocation of resources to meet felt needs of the people, effective utilisation of funds (Klugman, 1994). Optimal decision-making at the lowest scale and level through the full participation of communities in the decision making process related to service delivery is another perceived contribution of decentralisation. However the extent to which optimal decisions can be

made will depend on the level of community awareness and their willingness to participate in the project.

The vital requisites of genuine participatory mobilisation in development are that people should identify a project that satisfies a felt need and feel that they will be the beneficiaries of their work and that the product will be theirs (Raditloaneng, 1991). Indeed people should help define the goals of the project and be involved in its planning. Whilst fundamental changes in Government policy are unlikely, there are a number of measures, which if adopted, could facilitate efforts towards participatory mobilisation despite constraints in the overall socio-economic set up. One of these is to find ways of widening popular participation in the national and district planning processes. Another is to promote genuine decentralisation of power to the district councils and to extend devolution of elected authorities in the Major 'villages', if not even smaller villages, and to provide not only freely negotiated grants but means of auto-financing (van Rensburg, 1986).

Fiszbein, (1997) found that community participation increased demands for effective local governments and forced government accountability in Colombia. Participation made local authorities more accountable to citizens by increasing the political costs of inefficient and inadequate public decisions. As a result, local governments started changing their personnel to make them more effective. Putnam's (1993) study of Italian regional governments also found that governments that were more open to constituent pressure managed and delivered services more efficiently. The community-based approach is argued to have three benefits: it provides means to better tailor the services to users' needs and preferences by involving users in service design; it enables the use of local resources (such as labor and materials) by involving users in construction and service management, thereby alleviating fiscal pressures on government; and it increases transparency and accountability in resource use by increasing the flow of information and interaction between users and government (Korten 1986, Isham and Kähkönen 1998). However, community participation is often used for control purposes since governments often perform acts of decentralization as 'theatre' pieces to impress or appease international donors and NGOs or domestic constituencies (Agrawal and Ribbot, 1999).

2.4 Water Service Delivery Institutions' Performance in Other Countries

The global call for good governance and resource mobilisation in the water sector underpins the ongoing water service delivery reforms taking root in many countries through out the world. The Zambian National Water Supply and Sanitation Council (2004) assert that the country's water sector reforms were aimed at redressing the poor performance of institutions charged with responsibility of water service provision. According to the council, a number of issues such as unclear roles and responsibilities of water institutions, low investment in the sector, low cost recovery and overstaffing with personnel not adequately qualified underlie poor performance in

the water sector. Among other things, the following key challenges faced Zambia's water sector prior to reforms:

(i) Lack of Comprehensive sector policy or strategy to guide sector organisations in their task performance

(ii) Unclear roles and responsibilities for the water sector lading either to duplication of efforts or gaps in some areas

(iii) Continued deterioration of water supply and sanitation infrastructure due to poor maintenance and lack of new investments with most of the investments being provided by external support agencies

(iv) Erratic and insufficient funding through government with little impact of government institutions on the ground

(v) Inadequate or lack of stakeholder involvement and ownership by consumers and users

(vi) Inefficiencies by central governments and service providers in maintaining the water supply and sanitation systems

(vii) Non-existence of comprehensive legislative framework for managing water

It is worth noting that the above problems are not unique to Zambia. Lesotho experienced a similar situation before the new water policy reform. Lesotho government is the custodian of water resources in the country. The water resources activities in the past were carried out in an uncoordinated manner. Each government ministry, department, and parastatal with interest in water planned for its own needs in isolation of the needs and objectives of others. This fragmented planning in the Water Sector led to:

(i) Poor allocation of water to meet current and future demands,
(ii) Conflicts in management of the resource,
(iii) Duplication of efforts and to some extend negligence leading to environmental degradation
(iv) Poor allocation of public investment for water resources development,
(v) Poor conservation of water resources

Namibia also experienced problems due to uncoordinated institutional arrangements. Namibia is the driest country in sub-Saharan Africa and the country's water resources are extremely fragile. These are compounded by the inheritance of a water management regime designed in the pre-Independence era in 1991 to serve the political, economic and social priorities of those then in

power, and underpinned by a Water Law suited to a water-rich environment. The policies pursued by the apartheid era government created an unequal society in the world. The richest – exclusively white – 10% of the society received more than 65% of the income, leaving only 35% for the remaining – entirely black – population. The same biased distribution of the benefits of resources applied to water services. Until Independence, the water needs of commercial farmers, key municipal centres, mines and industrial centres were accorded a high priority in public spending, whilst the farming and domestic needs of the country's majority black population, especially the 70% living in rural (communal farming) areas primarily in the north, were ignored. In 1990, it was estimated that only 50% of the rural population had access to a reliable source of safe drinking water. The existing law (effectively the South African Water Act of 1956) and the regulatory regime it underpinned similarly reflected a policy of support to the same elite social and economic interests. Ownership of land was regarded as conferring the right to 'free' exploitation of water resources located on or under such land. The development of these water resources were largely unregulated by the state. The entire institutional framework for the development and management of water resources and the provision of water services, including the functions of licensing, pricing and subsidy provision, served the same set of priorities, hence, negligence of service in other areas. As a way of reformation after independence, all water-related activities have been positioned within specific Ministries – the Ministry of Agriculture and Water Resources Development (MAWRD), the Ministry of Health, the Ministry of Local Government, the Ministry of Mines, and the Ministry of Environment and Tourism. Most of the responsibilities for developing and managing the resource, including the construction and maintenance of dams, pipelines, pumping stations, boreholes, treatment plants and sewerage systems have been located in the Department of Water Affairs within the MAWRD. Various water-associated functions have been distributed between a number of the Ministries mentioned above, as well as to autonomous entities (principally NamWater) and municipal authorities. Under these circumstances, management of the resource and of water services has tended to be influenced by the interests of the different institutional structures. As the management and utilisation of the resource in all its applications needs to be planned in a co-ordinated fashion, all sectoral strands have been interwoven. However, pre-independence consequences of institutional arrangement are still being felt (CABLE, 2002a; Jaglin, 2000).

A study on service delivery efficiency conducted in Khorixas, Namibia by Jaglin, (2000), indicated high water losses as a result of poor maintenance of several public premises that do not fall under the responsibility of the municipality but under respective government departments. When the supply of water to schools, hospital, and sports ground was closed off, the night time flow fell to 50 m3/h indicating that 50 m3/h was flowing to these premises. Since hardly any legitimate use of water occurred during the night on these premises, it was obvious that almost all of this flow was wasted. To make the situation even worse for the municipality, only a fraction of this wastage was metered by consumer water meters and consequently billed based on

real consumption (Pietilä, 2003). As a consequence of the high levels of unaccounted-for water, many municipalities owe money to NamWater. In extreme cases, NamWater no longer supplies water for 24 hours a day but just for a couple of hours a few times a day, as in Khorixas (Barnard, 2003; CABLE, 2002a; McClune, 2004). Intermittent water supply further discourages users from paying their water bills because they do not get the service they expect.

In addition to the water loss, there is also lack of qualified and experienced staff that prevents several Namibian municipalities from managing their water services in a cost-efficient way. With the exception of some of the larger towns, the technical departments of municipalities suffer from poor logistical facilities: Vehicles and tools are broken or inappropriate, workshops not well equipped, maps of built infrastructure are either nonexistent or outdated, and spare-part acquisition and budgeting procedures are not well established (CABLE, 2002a; Jaglin, 2000).

2.4.1 Rural Water Supply Technologies

Other than provision of reticulated water, hand pumps, boreholes and hand dug wells; rural water supply is unique to most countries. The water supply methods were adopted depending on the cultural value-system of the regions and were carefully maintained, appropriately located and constructed with simple, yet excellent, engineering techniques (Taleyana, 2002). Studies from Kenya revealed the '*fanya juu'* structures for capturing the runoff in the agricultural fields. In India, water has been harvested since antiquity, with many water-harvesting structures and water conveyance systems specific to the ecoregions. Such examples from India included the *Tankas* (small tank), which were underground tanks, found traditionally in most *Bikaner* houses, the *khadin*, also called a *dhora*. This *dhora,* harvested surface runoff water for agriculture and its main feature was a very long (100-300 m) earthen embankment built across the lower hill slopes lying below gravely uplands. Sluices and spillways allowed excess water to drain off. The *khadin* system was based on the principle of harvesting rainwater on farmland and subsequent use of this water-saturated land for crop production. (See www.rainwaterharvesting.org). In most countries, rural water provision is the responsibility of local authorities which are usually plagued by inefficiencies and inadequate distribution of water supply services (Onjala, 2002).

Rural water supply has not been without challenges. In Kenya, the reality of limited water availability is coupled with the need to balance not only between urban and rural, but also between competitive users within urban areas. These factors introduce complexity in the institutional arrangement required to manage water service delivery. Onjala, (2002) argues that there was overemphasis on organizational changes rather than institution building. Similarly, two thirds of Namibia population living in villages or rural areas experience inefficient service delivery. Water services in rural areas are provided by regional departments of line ministries, whose target aims to establish self-administrative local authorities. The progress is slow and

seriously hampered by the lack of qualified and experienced civil servants. In some cases, the progress of decentralization has even reversed when the ministry has been forced to take over the duties already decentralized to the local authority (McClune, 2004).

2.5 Rural Water Supply in Botswana

Over the past three decades, Botswana has experienced rapid economic growth through mining activities matched with liberal government economic policy and prudent spending hence, an increase in per capita income (Rahm et al, 2006). The latter resulted in increasing demand for basic facilities especially water and sanitation (SMEC, 2001). The Government of Botswana, with assistance from the Swedish International Development Authority (SIDA), has provided safe reliable supplies of drinking water with reasonable access to 80% of rural villages. Botswana has focused on an engineering solution (supply-side): the sinking of boreholes near villages and piping the water to several standpipes evenly distributed around the village (Simpson-Hebert, 1993). It is estimated that the current use of groundwater is 76 x $10^6 m^3$ per annum, representing 64% of the total water consumed in Botswana. The quality of groundwater in most areas of Botswana is within the acceptable limits specified by the World Health Organisation (Bockarie, 1997). There are two main policy themes in the water sector: firstly, to provide the entire population with reasonable access to a safe water supply and, secondly, to provide water supplies to facilitate the achievement of the Government's broad objectives of rural development and employment creation.

The first village water supply programme with the first objectives was introduced in 1972 for 10 of the existing major villages such as Kanye, Serowe, Molepolole & Ramotswa and 50 of the existing rural villages such as Molapowabojang, Ranaka, Tutume & Ntlhantlhe. By 1988, the original programme had expanded to include 354 villages, of which 17 were major villages. With growing village population and/or increasing development in villages, water "demand" is growing at an increasing rate, resulting in new villages being included in the programme, as well as demand for rehabilitation and expansion of original schemes (MMRWA, 1988). As the rate of rapid development slows down, Botswana is still faced with a mammoth task of maintaining and sustaining the performance of the achieved development. Even with the decentralization of the provision of water supply services in rural areas to the district councils, operation and maintenance of these services has not been without problems (MMEWR, 2006). There is currently lack of regulation to report system losses and water thus underestimating the importance of water conservation strategies. The systems managed by the DWA and Councils in particular are aging rapidly and although the data is not available it is likely that pipe bursts and major maintenance are also escalating. The DWA quote an average system unaccounted for water loss of 27% and a range from 6% at Letlhakane to 48% in Kanye, Ramotswa and Maun (MMEWR, 2006).

This section outlines the existing situation with regards to the provision of water supply services to rural areas in Botswana. It also describes the legal and policy environment, approaches to the implementation of water projects and their impact on service delivery efficiency.

2.5.1 Institutional Framework

Water provision in Botswana involves a mixed approach, where central and local government share responsibilities for services (Rydtun, 1994). The water sector is covered by three organisations, Water Utilities Corporation (WUC) supplying consumers in six urban/mining centres and others designated areas except for Orapa which is supplied by a mining company (NDP 8, 1997-2003,Taleyana, 1994), Department of Water Affairs (DWA) supported by the Department of Geological Surveys is responsible for groundwater investigations, protection and monitoring of resources, water supply development in rural areas, for surface water resource investigation and development and for overall water resources planning (NDP, 8). The District Councils, under the Ministry of Local Government, Lands and Housing are responsible for water schemes in medium and small rural villages. To secure and improve water supply in rural villages, all District Councils have established separate Water Departments. Water development projects in the DC's however, are rarely subcontracted to private contractors because DWA acts as their consultants for water projects. Powers of subcontracting, however, lie with the DLGD.

The rest of the population living in thinly populated settlements mainly cattle posts, land areas etcetera do not have a reliable source of water. They are dependent on water supply from privately owned boreholes, hand dug open wells or hauling water from major villages or towns. The WUC is a parastatal organisation operating on commercial lines while the DWA and Rural Councils are Government Departments. Each of these three institutions has different organisational structures. The objective of all these organisations is to supply potable water in adequate quantities at an affordable cost (Taleyana, 1994). Water supply provision is officially limited to villages at least 5 years old, with a minimum of 100 households or 500 inhabitants and having been under the control of a continuous recognised traditional authority. These conditions are not being met as many smaller villages and settlements are becoming eligible for water supply programmes. Extended water supply provision has, nevertheless, been constrained by the need to rehabilitate existing schemes (Rydtun, 1994).

The Botswana National Master Plan Study examined some of the strengths and weaknesses of the situation in Botswana with respect to establishing sustainability in rural village water supplies. These were summarised as:

<u>Strengths</u>

- Well-established local institutions

- Traditional structures conversant with management of local level affairs
- Locally elected councillors/MPs able to influence Government and District Council administrative decisions

Weaknesses

- Lack of genuine community involvement in decision making and setting priorities
- Extensive central control over local management (institutional and financial)
- No community commitment required towards construction of future operation and management, hence community choice illusory (BNWMP, 1991)

2.5.2 Village Water Development in Botswana

A formal programme of rural water supply was launched in 1972 under a Swedish Aid Programme and the Government of Botswana. This began with the construction of water supplies in 17 major villages with between 4,000 and 30,000 people in each village. Subsequent programmes covered medium and then smaller sized settlements. By June 1988 the cumulative 16-year figures kept by the DWA showed that 273 water systems built under the SIDA financed programmes had supplied 282 rural villages, in which lived some 283,000 people or about 30% of the 1988 rural population of 958,000 with potable water. A further 250,000 people, or about 26% of the rural population were served by the Major Village Water Supply Programme (VWSP). At the end of the fourth VWSP, 1980/84, SIDA decided that the major village schemes were no longer eligible for SIDA funding. In 1988, 68 water systems covering a further 72 villages during VWSP VI (1988-92) were constructed. These systems included an estimated population of 27,000, which represented an average of 380 people per village (Ahlberg *et al*., 1988). SIDA funding however, crippled the community's ability to sustain themselves and rid them of the spirit of self-reliance giving birth to overdependence on handouts.

Since 1985, plans have been put in place to cope with the large volume of expensive rehabilitation, upgrading and expansion work as a result of the rapid population growth and rising public expectations in the villages including major villages, whose water systems were built in the 1970's and are now running at or beyond full capacity. During VWSP V, a need emerged for rationalisation and for choices to be made between the resource demands articulated by the district councils for (a) creating new supplies in ever-smaller villages and (b) rehabilitating and augmenting existing supplies. The second choice has however been given priority by councils, MLGL and DWA, and this has led to a reduction in the number of new water supply systems (Ahlberg *et al*., 1988). Even while the need for forward-looking institutional and legislative arrangements appears obvious, there are several challenges to be faced in achieving them. An important one is dealing with the perceptions of personnel currently in the workforce at all levels in organisations with a role in water, and particularly in the service

delivery divisions of the DWA. The employees of DWA can be justly proud of their achievements in providing clean water to some half a million people in the 17 Major Villages in a relatively short time. Few organizations, especially in countries with similar socio-economic characteristics, could boast of such an achievement. However, this same self-esteem could make it difficult for the DWA to proceed to the next stage of its evolution as the country's "national water resources manager".

2.5.3 Components of Water Supply in Botswana

Unlike many rural water supply schemes in other countries, the technical aspect of rural water supply in Botswana is quite complex and consists of three main components – Management, Operation and Maintenance and Financial aspects.

Management

The design has led to a successful implementation of rural water supply through the formulation of a design manual. The manual addresses basic design criteria, technical requirements and design procedures. Its use has led to the successful standardisation of components of the rural water supply schemes. The second factor is construction management. This factor involves the community in the construction of rural water supply schemes through the provision of direct labour from the community. Payment for labour is a significant variation from other countries where communities' participate freely without pay in rural water supply projects. The third concerns private sector involvement in partnerships and innovations in the rural water supply (Bockarie, 1997).

Operation and maintenance

This mainly relates to local authority/district council capacity building. District councils are currently operating and maintaining 460 village water supply schemes (Bockarie, 1997). This figure grows by 5 to 10 percent every year. The capital investment and running costs (in present value) of one scheme is approximately P135, 000 per year based on present techniques and management structures (Hagos, 1994). The running cost is met by the District Council from money disbursed to them as revenue support grant by the Central Government (Bockarie, 1997). This implies that District Councils need a minimum of P60.7 million a year only for their water supply service sector. Given the insignificant direct revenue collected by the councils and the fact that 95% of the total water supply service costs originate from Central Governments, the sustainability of the present financial arrangements is highly uncertain.

Financial Component

The financial component of these schemes includes development, operation and maintenance costs and tariffs. In relation to tariffs, since the government's policy is to provide water for basic needs free of charge, water provided through standpipes remains free of charge to users (Bockarie, 1997) although plans are underway to stop the provision of and use of standpipes and to encourage household connections especially in urban areas. It costs about P2200 to connect a supply system to a private consumer. The fee charged today is only P500 implying that the District Councils subsidise about P1700 per private connection (Hagos, 1994). An incremental tariff system is used for rural water supplies where a low concessional rate applies to the first tier of water consumption aimed at covering basic needs. Hence the tariffs structure is such that the first $5m^3$ is highly subsidised, the next $15m^3$ is subsidized but to a lesser extent, wile the additional consumption is charged at the rate, which allows the District Councils to cross-subsidize the consumption in the first two bands (Bockarie, 1997). These subsidise are according to Garn (1998) based on the desire to assure that the poor have access to reliable water supply. However evidence from other countries especially in Latin America such as Ecuador, have shown that cross subsidies discourage utilities from collecting payments (Garn, 1998). The current tariff structure however allows for 47% of recurrent costs to be recovered (Bockarie, 1997). Problems with low collection rates are rooted in ill-conceived policies, which subsidise utilities, regardless of performance, unrealistically low rates, which discourage collection, and lax regulatory practices. Although most of the analysis on the subject of demand responsiveness in water supply focus on the consumers willingness to pay and ways to find appropriate and affordable delivery systems, such analysis do not take into consideration that sustainability depends not just on customer willingness to pay, but also on the utility company's willingness to charge (Yepes, 1999).

2.5.4 Community Participation in Rural Water Supply Services in Botswana

Community participation has traditionally been an integral part of village life in Botswana where before the inception of the VWSP. Though achievements in VWSP have been impressive, what has been less impressive has been the minimal amount of community respect for the schemes. Operation and management are carried out by District Councils whilst DWA provided the water supply scheme. As it is District Councils often cannot maintain a sufficient level of service to many of their water points, criteria for supply are not always met and community welfare is reduced as a result (Andrews, 1992).

The Government of Botswana has time and again reiterated its commitment to ensuring that people are involved in development efforts. Government believes that efforts involving people have greater chances of success and long term sustainability. Botswana has made remarkable

progress in creating the necessary institutional machinery for effecting this popular participation. This is particularly true at district level, where institutions such as the District Development Committee (DDC), local councils, Village Development Committees (VDC) are aimed at facilitating community participation at the village level and also to give community participation meaning and content (Ahlberg *et al.,* 1988). However, little has been achieved in involving local people in both the planning and implementation of water development programmes. Barriers to community participation have among others been attributed to the weak organisational structures characterising water supply authorities both at the district and village levels which lack the capacity to carry out their functions, personnel problems, political factors as well as socio-economic factors such as settlement patterns, migration and drought (Ahlberg *et al.,* 1988).

According to Andrews (1994), it is doubtful that the latter two strengths can be counted upon as positive aspects of the institution. Much development today is beyond the scope of management of local level affairs that the "traditional structures" were once conversant with. The ability of locally elected councillors and members of parliament to influence Government and District Council administrative decisions is also much of a weakness as a strength depending on the degree of genuine community will that the official chooses to represent.

Participation in development by the poor majority essentially means mobilising their labour, as only a few of them have much to give in terms of material resources. If ever there were voluntary labour contributions in the past that kind of self-reliance has largely disappeared today. Most people expect to be paid for their work in projects even when these projects clearly benefit them. An individual might build the family home, carry their water and firewood and plough for them. But as soon as a community dimension is injected, people expect cash payments (van Rensburg, 1986). However, historically in Botswana, the concept of "free" water has not existed without a significant element of community participation. Traditionally, water was free in the sense that people were not charged a fee for using it. But they were often required to contribute labour, capital or cash to the development (and maintenance) of the water source itself. Public participation was also required in the continued maintenance of water point, and ensuring discipline in its use. Though community participation has been an integral part of village life in Botswana even long before the inception of the Village Water Supply Program, the element of community spirit has withered due to the minimal amount of community respect for the schemes that were bestowed upon them. For example with regard to the operation and maintenance of standpipes and hand pump water sources in the Okavango, the North West District Council realised that there was little respect of water points by users. Over the last 20 years new water supply schemes and upgrades have arrived out of the blue with little or no involvement of community members. In essence, the community was given water without attaining an

appreciation of its worth. Water was consequently devalued and village population as become dependent on the council in every aspect of source maintenance (Andrews, 1994).

Similarly, Gumare village where completion of the first standpipe took place with (unpaid) community participation has given renewed optimism to the North West District Council based on community appreciation of rural village water supplies, which have been promoted through Kgotla meetings. An initial Kgotla meeting was held to inform the villagers that NWDC would give priority to constructing stand-pipe extensions in areas of the village that demonstrated a will for community input. Eight months later word reached the Water and Wastewater Department that community members were ready to dig and a few days later, water was flowing in the neighbourhood. Following this successful activity, people from other parts of the village expressed interest in organising their local community for similar exercises (Andrews, 1994).

2.6 Conclusion

This chapter has demonstrated that institutional setup is central to efficient and adequate rural water service delivery. It has elaborated on the importance of decentralization and community participation in realizing IWRM principles and sustainable development. Where decentralization has been adopted, there is lacking a framework of implementation and supporting mechanisms for effective service delivery at lower levels of authority. As a result most rural water supply and sanitation facilities have fallen into disuse or disrepair and this has led to ineffective use and maintenance (Amusa, 2005). This led to a poor willingness to pay among the consumers which on the other hand translates into a financial crunch for the utility making any improvements in day to day O&M very difficult. In Botswana, local authorities like district councils are finding it increasingly difficult to cope with the operation and maintenance of existing and new water supply schemes. In addition, sect oral coordination is still a lacking phenomenon in the water sectors especially in the developing world. Thus this research has been undertaken to reveal some water service delivery discrepancies resulting from institutional arrangements.

3 CHAPTER THREE: PROFILE OF THE STUDY AREA

3.1 Introduction

This study was carried out in Botswana in the Southern District in the villages of Kanye and Molapowabojang. Botswana is a semi-arid and landlocked country covering an area of about 582,000 km2 between latitudes 18° S and 27° S and longitudes 20° E and 29° E in the centre of Southern Africa. The population is estimated at about 1.4 million with a fast growing rate of 3.4% per annum (Falkenmark, 1991). The increases in population are exerting more stress on its scarce water resources (Arntzen 1986, 1994; Falkenmark 1991).

In Botswana, rainfall varies between 650 mm per annum in the extreme north to 250 mm per annum in the south-west. Much rainfall occurs in the hot summer period between December and March. In the eastern high-veld areas, the rainfall typically ranges between 450 to 550 mm. Evaporation is about 2000 mm, that is four times, the average annual precipitation, and this creates an endemic water deficit especially when rainfall is very erratic and patchy. It is common to experience dry spells during the wet season (MMEWR, 2006).

Botswana currently utilizes ground and surface water, roughly in the ratio of 2:1 (Botswana National Water Plan, BNWMP 1992). Groundwater is only partly renewable. The average recharge is 3 mm per annum, but as highlighted earlier, there are relatively large inter-annual and spatial fluctuations. There is virtually no recharge in the western parts of the country (ibid). Groundwater mining is common during drought periods and around the mining centres. Surface water, in principle, is renewable if rains do not fail and the storage capacity is being maintained. Therefore, there is a need for more coordination, careful planning and management of water resources at the national and regional level in order to meet the ever-increasing water demands in the country examples of which are shown in Table 3.1 below

.

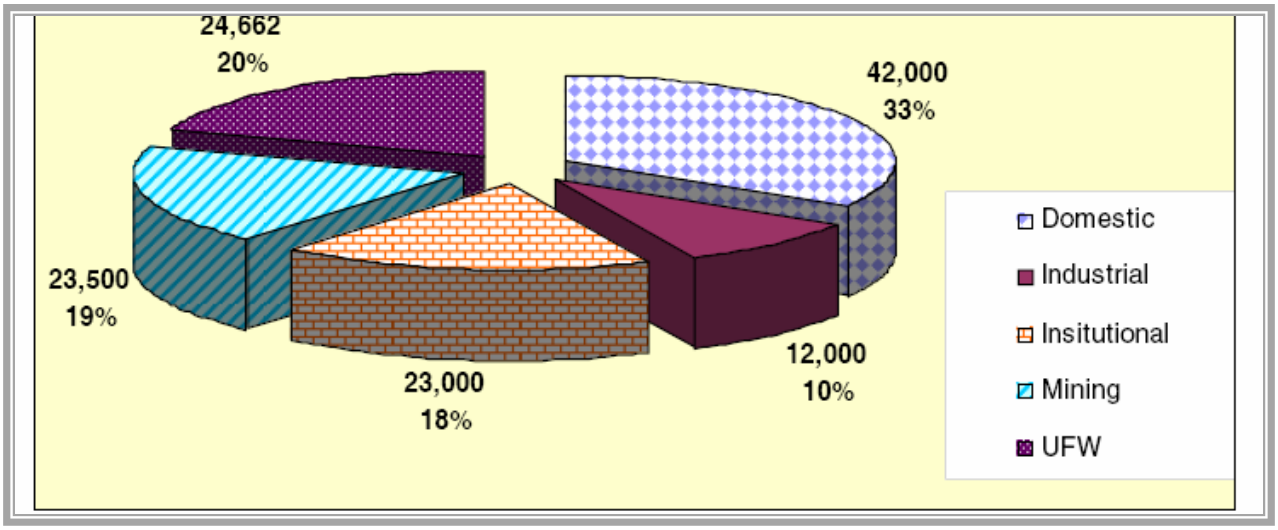
Table 3.1: Total Urban Water Demand in 2004/2005

Sector	ML
Domestic	42,000
Industrial	12,000
Institutional	23,000
Mining	23,500
UFW	24,662
Total	**125,162**

Source: MMEWR, 2006

Other water uses in the country include Agriculture; Rural Water Supply; Tourism; Wildlife and Livestock or the Environment. The Major village water demand is shown in figure 3.1.

Figure 3.1: Major Village Water Demand in Botswana 2005 (ML/year)



Source: MMEWR, 2006

3.1.1 Botswana's Macro Economic Situation

After 40 years of independence Botswana has emerged with diversified economy from agriculture with a high GDP growth rate, considerable infrastructure improvements and an incomparable per capita income in the rest of the continent (MMEWR, 2006). Much of the country's economic growth has been due to the discovery and effective management of diamonds, accompanied by good governance, prudent macroeconomic management and accelerated investment in the provision of basic services (Anderson, 2005; AFDB/OECD, 2004). These investments have led to substantial improvements in health and nutrition, life expectancy and personal incomes. Annual per capita GDP, expressed in 1994 prices, increased six-fold from P1, 682 at independence to P9, 793 in 2000 (Government of Botswana and United Nations, 2004). By 2002, per capita GDP was calculated at P10, 508 (Government of Botswana, 2003). Although much of the economic growth has been due to the discovery and production of minerals, particularly from the period after the mid 1970s, there are indications that the contribution of mining to the GDP is declining as the economy becomes more diversified. It is reported that the highest share of the mining sector to GDP was 52.6% in 1983/84 but by 2000/2001 it had dropped to 36.5% (Government of Botswana, 2003). Other sectors such as finance and business, trade and tourism as well as the public sector have become more prominent. In his 2005 budget speech the Minister of Finance and Development Planning reported that the economy continued to record strong growth during 2003/04 but at a slower pace than the previous year: Product (GDP) at current market prices increased to P39.9 billion in 2003/2004. In real terms, this represented a growth rate of 5.7%, a slower performance compared to the 2002/2003 growth rate of 7.8%. The slower growth rate in 2003/2004 was largely due to lower output growth in the mining sector, at 6.9% compared to 10.3% in the previous year. The non-mining sectors also recorded lower real growth of 5.1% in 2003/2004, compared to 6.4% in

the previous period. The overall growth rate of 5.7% in 2003/2004 is slightly higher than the projected annual average real growth rate of 5.5% for the NDP 9 period, but, however, still short of the 7% required to achieve the [Millennium Development Goals] and the Vision 2016 target growth rate of 8% (BIDPA, 2005).

3.2 Geographical Location and Demography

Kanye village, which is one of the largest villages in Botswana, is situated in the Southern District of Botswana, about 100km South West of Gaborone, the capital city and 45km North West of Lobatse. In terms of spatial area coverage, the village of Kanye covers an area of approximately 29,000 hectares, an area less than 1 percent of the district's land area which stands at 26876 km^2. With regards to the population size, a total of about 40,628 persons live within the village. This represents 35.7 percent of the total population of the Southern District. Kanye has been declared a Primary Centre according to Botswana's National Settlement Policy. The village serves as the regional or district headquarters for most central government ministries, departments, parastatals and private sector organizations. This has led to a very high percentage of the total district's population residing within Kanye.

Molapowabojang is located in the Southern part of Botswana within the Southern District Council jurisdiction. The village lies 15km west of Lobatse town and 30km east of Kanye village along the Kanye-Lobatse road in the Southern District (Southern District Council, 2003). The village is accessed by a tarred road from both Lobatse and Kanye. According to CSO, (2001) Molapowabojang has a total population of 4869 and 1049 households.

Administratively, the two villages have community chiefs who are responsible for decision making at community level. However, the decisions do not necessarily influence the infrastructure development because such powers lie with political leaders such as councillors and members of parliament. Other local institutions include churches and community based organisations which are often subject of external donor agencies objectives.

Figure 3.2: Map Showing Kanye and Molapowabojang

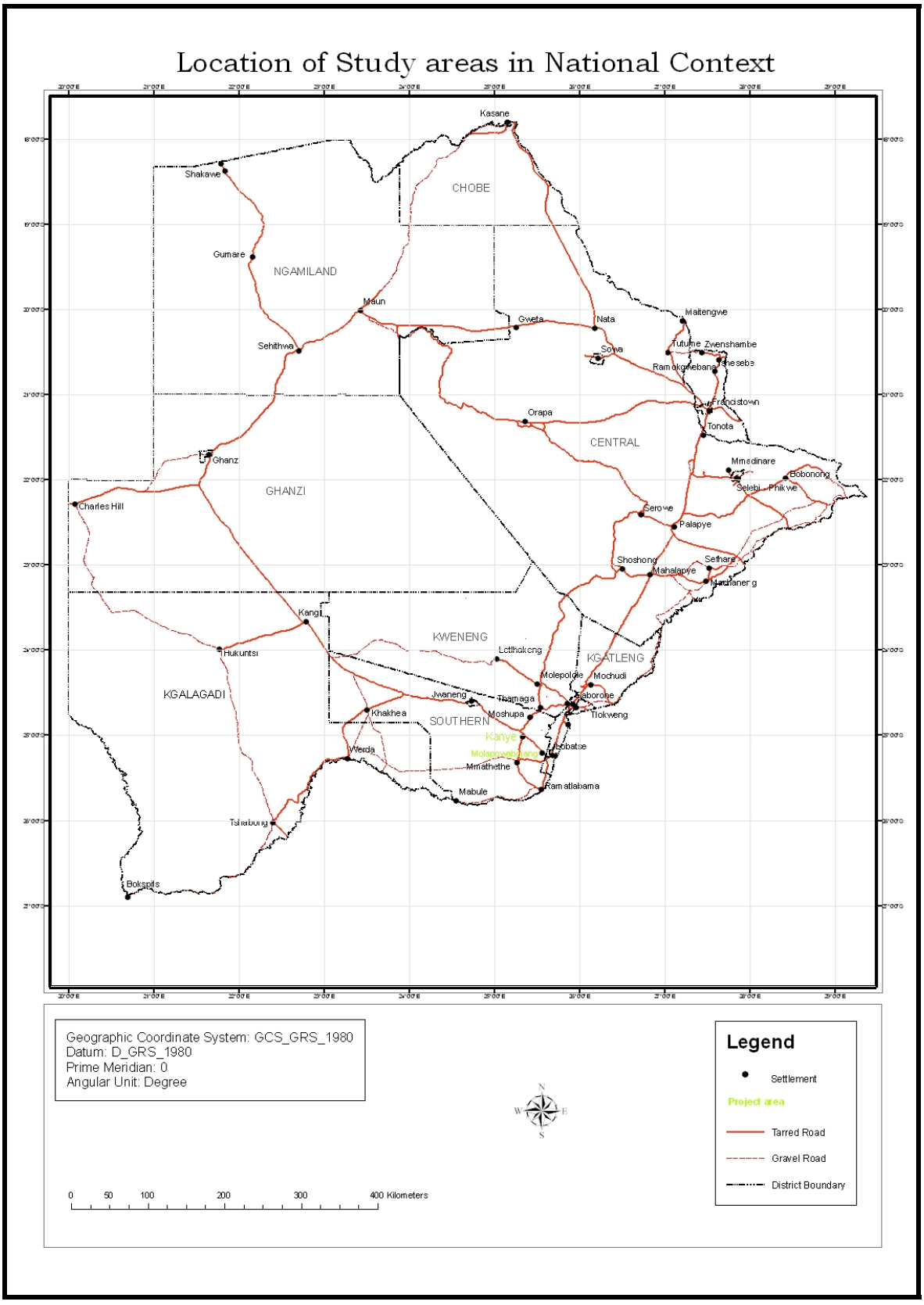


Figure 3.3: Kanye Village Water Reticulation Map

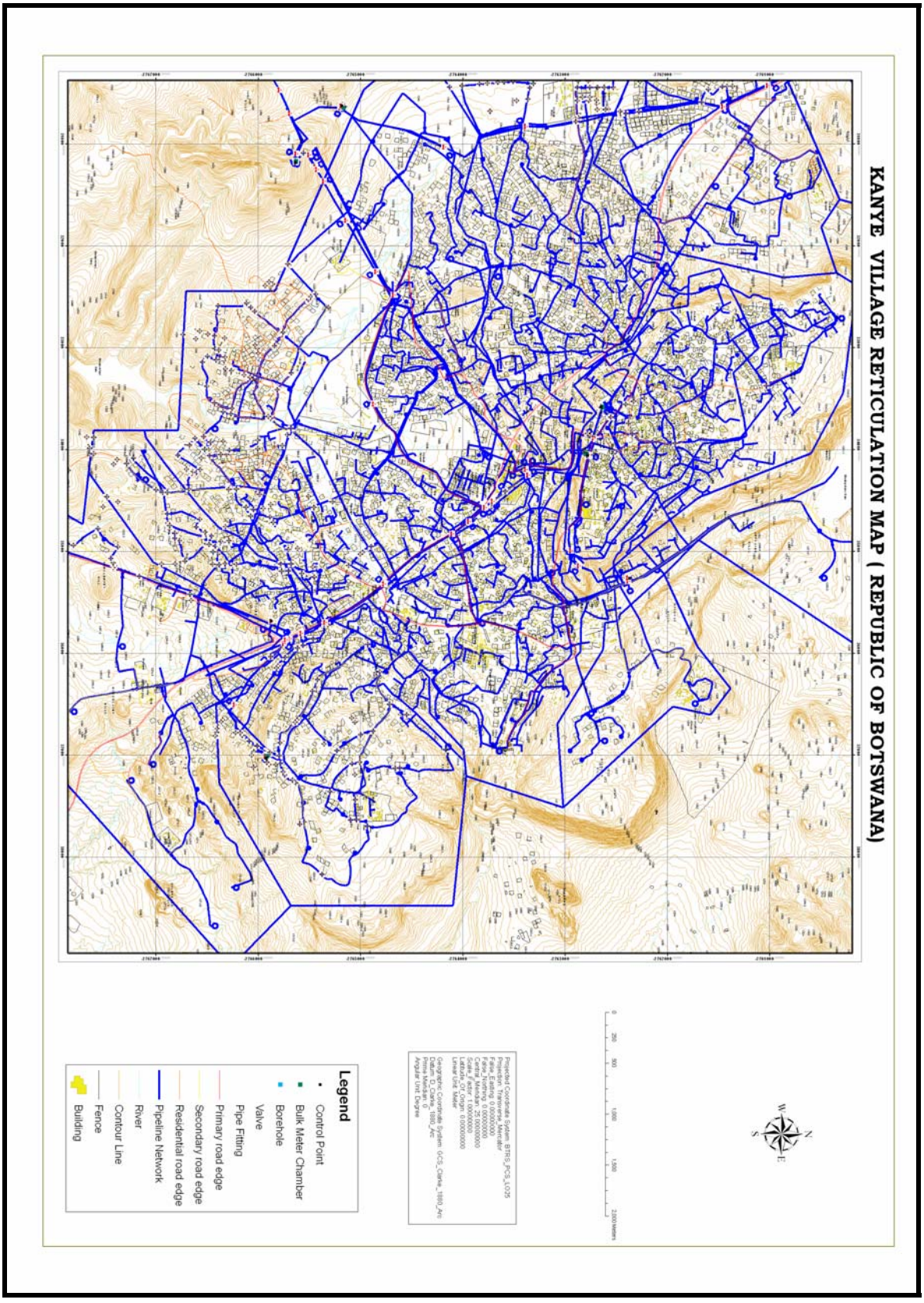
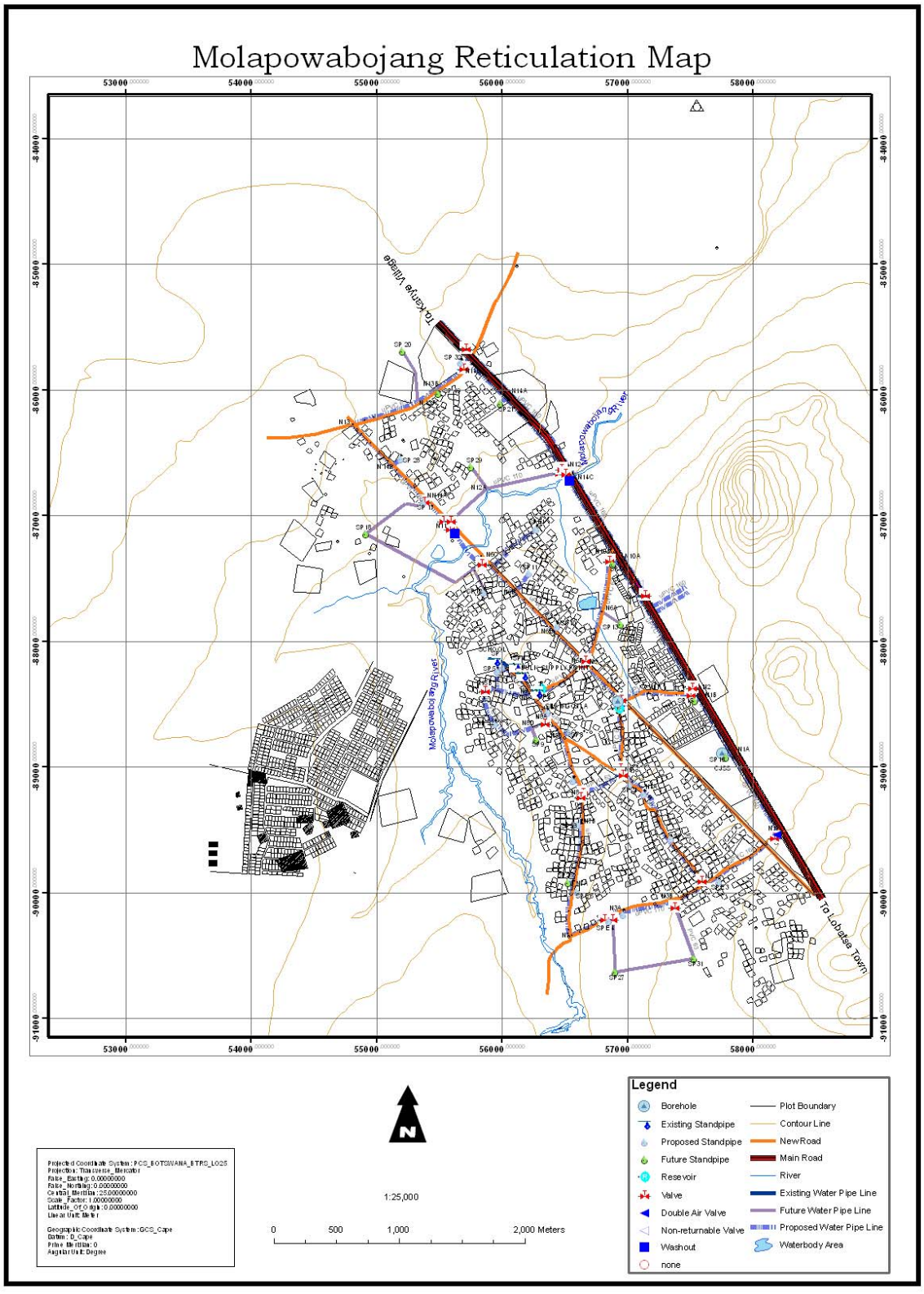


Figure 3.4: Molapowabojang Village Water Reticulation Map



3.2.1 Socio-economic Situation

The 2001 Population and Housing Census revealed that the proportion of Kanye and Molapowabojang population which is classified as 'economically active' i.e. individuals aged between 12 years and 64 years was 29,609. This showed an increase of 20 789 additional people getting jobs as compared to the 1991 figure which stood at 8820. About 79 percent of the project area's population is employed in the formal sector and 5 percent in the agriculture sector. This also saw an increase of 21% in the formal sector and 4% in agriculture sector, which stood at 58% and 9% respectively in the 1991 Population and Housing Census. The dominant economic activity of settlements within the environs of Molapowabojang is agriculture. This is probably due to favourable climate and prevailing soil conditions as well as the lack of commercial and industrial activities in the area (SDC, 2003).

3.2.2 Background to Water Supply in Kanye and Molapowabojang

Kanye village is within the jurisdiction of Department of Water Affairs because of its classification as an administrative centre for the district and a total population above 5000 whilst Molapowabojang is under the Southern District Council jurisdiction. Figures 3.3 and 3.4 show the water reticulation network for the two villages. According to the Southern District Development Plan 5: 1997-2003, there are three water authorities responsible for water provision in the district namely, Water Utilities Corporation (WUC) which is responsible for Jwaneng, Department of Water Affairs (DWA) which is responsible for major villages like Kanye. Rural villages are the responsibility of Southern District Council. The main water source in the study area is groundwater procured through boreholes and wells. The potential for potable groundwater and its spatial occurrence within the district are likely insufficient for a sustainable water supply (Southern District Council, 2003). Kanye currently consumes an equivalent of 5000 cubic meters per day. Similarly, the National Master Plan Review, Vol. 5 indicates that borehole yields in Kanye have been declining and some have even dried up and as a result, twenty four hour pumping was introduced and is still being practiced. In the medium term, the emergency Works Water Supply Project was introduced. Table 3.2 below shows household accessibility to water supply in the case study areas.

Table 3.2: Household Access to Reticulated Water Services in Kanye and Molapowabojang

Village	Population 2001	Households 2001	Piped indoors (Households)	Piped outdoors (Households)	Communal Stand Pipe (Households)
Kanye	40628	10636	1788	5962	2885
Molapowabojang	4869	1049	99	347	603
Total	**45497**	**11685**	**2318**	**8957**	**5053**

3.2.3 Justification of the Study Area

As the district capital Kanye provides the study with an opportunity to assess the extent to which decentralisation has been taken into consideration in light of ongoing district water supply activities. The village is served by the Department of Water Affairs and plans are underway to augment the village supply by connection to North south Carrier pipeline which is the responsibility of Water Utilities Corporation. Molapowabojang was selected for the study because plans are currently underway to rehabilitate and augment the village's current water supply system after being in water shortage for more than 10 years.

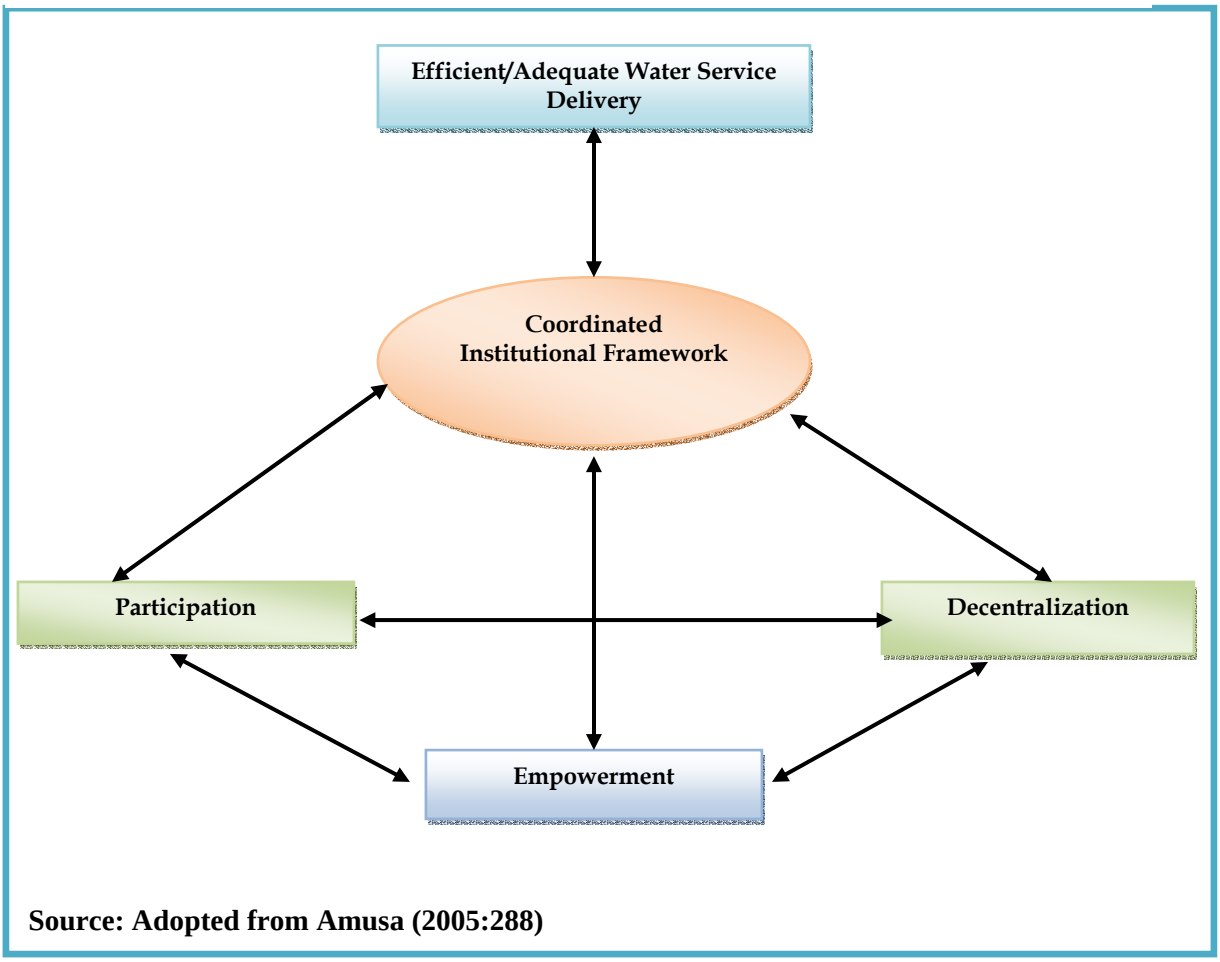
4 CHAPTER FOUR: RESEARCH METHODOLOGY

The study employed a qualitative case study method. This method was used because of its ability to use many different sources of evidence for data collection (Yin, 1994), hence drawing out data through an in depth study.

4.1 The Conceptual Framework of the Study

The conceptual framework adopted for this study is shown in Figure 4.1. These characteristics include sustainable water provision and infrastructure, decentralisation (shift in the role of government), participation (user involvement in decision making, planning and implementation) and empowerment (effective means of ensuring adequate participation in the decision making process).

Figure 4.1: The Conceptual Framework of the Study



Source: Adopted from Amusa (2005:288)

The framework highlights the interaction between decentralization, empowerment and participation. Through decentralization, community participation can be facilitated and this can

lead to improvements in project design and implementation. The extent to which communities will participate in water supply projects will depend on the type of decentralization that is implemented. In Botswana, the provision of rural household water services including their operation and maintenance rests with District Councils and Department of Water Affairs, thereby limiting the scope for community involvement in service provision. Advocating for either a devolved, deconcentrated or delegated approach to decision making in the rural water supply sector would however demand an assessment of the financial, political and administrative conditions prevalent in the country. It is worth noting that coordinated institutional framework underpins effective participation. However, there is no best institutional model since institutional requirements vary according to the water development phase of each country. The contention is that an important feature of a well-functioning set of water management institutions is the ability to adapt to changes (Gardner-Outlaw and Engelman, 1997). Although the approach seeks to encourage self-mobilization, prescribing a mode of participation in water development projects would also require an assessment of the existing institutional set up which could either impede or facilitate the process of achieving sustainable service delivery.

4.2 Data Collection Methods

Though the study is based on primary and secondary sources, data contained in this report were mainly based on unpublished reports on water resources management, published government archival reports and materials. The study adopts a qualitative approach to establish the relationship between the institutional set up and efficiency of service delivery at household level. Documentary analysis served as a backbone for the approach as part of the wider interpretation of the voiceless evidence. Indicators (see Appendix 3) employed from the World Bank study on setting targets for Water Utilities were used for benchmarking and performance indicators of the water authorities studied.

4.2.1 Review of Literature (Secondary Data Sources)

A review of published and unpublished relevant documents was carried out to assist in achieving the research objectives. Documents for analysis were drawn from:

- Water development publications from the library
- Village local reports, DWA reports, working reports addressing water issues
- Legislation
    - Water Act, National Water Master Plan Review, Southern District Development Plan No.6, National Development Plan 6 to 9
- Public documents on water resources management

- Media and internet (these were used with caution and verification with the responsible authorities)

4.2.2 Focus Group Discussions

A total of 5 Focus Group Discussions were conducted in the study area. Given the varying sizes of the villages, there were two focus group discussions for households in Molapowabojang and three in Kanye to supplement analyses of secondary data. Each group was made up of a total of 8 participants with representatives of youth, male & female water users and business residents and village extension workers under the category of 'private connections' and 'communal stand pipes'. However, since availability of private connection is a measure of income level in Botswana, participants with a tap in yard were not combined with those using communal stand pipes to avoid over dominance of the latter by the former. Issues of discussion included level of water supply coverage, accessibility, cost of service provision, general satisfaction of service delivery (with regards to interruptions, attendance to faults, water quality, and availability of service information) as well as possible causes of the unsatisfaction if any. The focus group discussions were held at the respective village wards with the researcher playing the role of a facilitator. The discussions took an average of 90 minutes. A research assistant to minute the proceedings and take photographs was engaged through out the period of data collection.

4.2.3 Key Informant Interviews

An interview is simply defined as a conversation with a purpose to gather information (Berg, 1989). This study employed a semi standardized interview approach which involves the implementation of a number of predetermined questions. Though the questions are asked in a systematic and consistent order, the interviewer is allowed to digress and probe beyond the answers the get (Berg, 1989). One interview tool used in this study was the key informant interview. An advantage of using this approach is that it allows the interviewer to clarify some questions in case there is a problem and ease of following up the answer. According to Bell (1993:282), 'In an interpersonal encounter, people are more likely to disclose aspects of themselves, their feelings; thoughts and values than they would less human situation'. Interviewees for this study were selected basing on their position of responsibility in the water authorities and contribution to water policy development and implementation. Key informants were interviewed once but others like the Principal Water Engineer in the SDC and DWA Station Manager were contacted for clarification on two occasions. Heads of divisions from the Department of Water Affairs, Department of Local Government & Development and Southern District Council head quarters were interviewed face-to-face to obtain their views on water service delivery and the current institutional set up. Other key stakeholders interviewed are councillors and Village Development Committee chairpersons within the various wards. The entire key informants were positive towards the study interview. However, there were some

delays in setting appointments with them because of their office commitments. Some did not have enough information about roles of their departments because they were newly appointed.

4.2.4 Field Observations

The study also employed field observations to verify responses obtained from the focus group discussions participants. The observations were carried out in two households that have and do not have tap in yard and were part of the focus group discussions in each of the study areas that is two in Kanye and two in Molapowabojang. The following things were observed: at water points the method which participants fetched water (for example, household could connect a hosepipe at the public standpipe to fill their water tanks at home) and at household level observations focused on how water is stored and used. The researcher visited the households each day for a period of 10 days to observe their daily pattern of water management. The researcher would go to the tap with the household members and record the amount of water collected, how it was stored in the house and how long it took for the water to finish. For those who did not store, the research recorded the number of times the household visited the water source and how much was used for a particular activity. The presence of the researcher in the field assisted in reducing costs of travel to collect data as well as allow more time to study the two communities.

4.2.5 Ethical Issues

Informed consent was sought from the participating households before participation in the focus group discussion. Households were informed of the purpose of the research and were assured that individuals would not be identified by name in the report/research document. Participants were also made aware that there would be no financial rewards or any other incentive for participating in the study. However, the study could help shape policy on water service delivery that could benefit them in the long run.

Table 4.1: Participants who informed the study

Key Informants	Focus Group Discussions	Field Observations
Head of Division; Operations and Maintenance	Participants with private water connections	Tshweneyagae Ward-Molapowabojang
Head of Division; Design & Construction, Water Bowser drivers	Participants using communal stand pipes	Sethunya Ward-Molapowabojang
Director, Department of Local Government and Development	Village Development Committee	Mahikana Ward-Kanye
Principal Water Engineer, Water Unit-SDC, Water Bowser drivers, Nurse, Molapowabojang Clinic, Head Mistress, Pitsonyane Primary School-Molapowabojang		Sebako Ward-Kanye
Station Superintendent, DWA-Kanye		Goora-Sebego Ward, Kanye

4.3 Data Validation

Data validation is defined as the extent to which the research findings correctly represent what is happening in a situation (Hussey & Hussey, 1997). Validity is concerned with the soundness and effectiveness of the measuring instrument. For purposes of this study, elimination of bias and generalisation of conclusions from the findings were minimised by cross checking with the relevant authorities and available publications.

4.4 Data Analysis

Though the study is purely qualitative, content analysis was used to reduce qualitative data to semi-quantitative terms for analysis of some ranked responses. According to Smith (1975) and Uwe (2002), Content Analysis can be employed to examine virtually any type of communication. As a consequence it may focus either quantitative or qualitative aspects of communication messages. There are two types of content analysis namely manifest and latent.

Manifest content analysis concerns itself with elements that are physically present and countable, whilst latent content analysis is extended to an interpretive reading of the symbolism underlying the physically presented data (Berg, 1989). Both analyses were employed in the study. As a complement to the latent content analysis elaboration analysis was also used to explain the causal relationship of institutional arrangement and water authorities' service delivery. Elaboration analysis enables the refinement of the understanding of the means by which a variable (X) affects another (Y) (Vaus, 2002). This assisted the researcher to explain the links discovered between institutional arrangement and the quality of water service delivery.

Data analysis for the study was carried out at three levels – policy, institutional, household and community level. At the household level, the researcher made some observations relating to various aspects of the service use. An assessment of the observations was made based on the following parameters:

- Water point collection and handling
- Water use
- Water storage

At the community level, an assessment of issues surrounding water supply services was carried out using aggregate scores. Qualitative data from focus group discussions and key informants were coded into key categories of investigation. A checklist was developed based on the research questions, objectives and the concept of IWRM. Depending on the number of options a question has, each response was scored on a scale of zero to five and the total for each score for each sub indicator is calculated by combining these scores and converting it to a ten point scale, indicating low, medium and high scores to rank participants views on issues surrounding water service delivery in their area. Focus Group participants were assisted by the facilitator to add up all the scores for each sub indicator to arrive at aggregate scores. This assisted the researcher to source out possible solutions for the issues raised by the participants. Some graphs were also drawn using Microsoft Excel to illustrate some findings.

5 CHAPTER FIVE: STUDY FINDINGS

5.1 Introduction

This chapter presents the main findings of the research. It outlines the general institutional set-up of water authorities in Botswana; and the water management structure in the specific villages in the study area as well as roles and responsibilities of water service delivery authorities, synergies and inadequacies of institutional setup. In addition, the chapter gives the effects of institutional arrangement on consumers, communities coping mechanisms and possible solutions as perceived by communities and water authorities.

5.2 Existing Institutional Setup on Water Service Delivery

The Botswana water institutional setup is shown in Appendix 4. The constitution of Botswana recognises the importance of water in the country and spells out that it is the right for every *Motswana* to have access to safe and potable drinking water. Like other development projects, all water development projects are debated first in the national assembly hence the need to acknowledge the parliamentary contribution to the institutional arrangement in water service delivery.

5.2.1 Line Ministries

Line ministries are responsible for overall policy development and operational matters pertaining to their sectors. The ministries exercise a monitoring and a facilitation role. The Ministry of Minerals, Energy and Water Resources is the custodian of water resources. The ministry works through the Department of Water Affairs (DWA), Water Utilities Corporation and the Department of Geological Surveys. DWA in turn works with the Department of Local Government and Development (DLGD) in the Ministry of Local Government whose overall responsibility s to oversee water and sanitation development in the rural areas. The DLGD works through District Councils. The analysis shows that MLG is expected to work under MMEWR which is a difficult scenario. This situation may have affected the overall performance of the water authorities in the study areas.

5.2.2 Village Development Committees (VDCs)

Village Development Committees serve as a link between communities and the government. In essence they are supposed to represent community interests. These are placed under the Department of District Administration. For water development authorities to involve them in the decision making process about their water services, liaison with this department through the District Commissioner should be sought. The study attempted to establish the level of VDC

participation in water service delivery. According to the Molapowabojang VDC chairperson, VDCs are not fully involved in the water sector development except for public stand pipe siting. The chairperson reported that the committee and the society as a whole are not involved because infrastructure development has always been the Botswana government responsibility. The society has always been put on the receiving end of the government hand outs. When asked how the VDC involvement could be improved, the chairperson mentioned that they should be allowed to choose the type of water facility suitable for their village. Where the government cannot afford, the community is willing to contribute towards the improvement of their required service level. Reports from the DWA satellite office and SDC indicated that community contribution is very minimal and this is driven by policy goal of setting the government as the main provider. In addition, the committees often lack technical understanding of the projects and would tend to be biased towards their wards, hence, their exclusion from decision making.

5.2.3 Roles and Responsibilities of the Water Authorities

Key officers in DWA, DLD and SDC were asked the roles and responsibilities of their institutions and whether they think they are clear and easy to implement. In response, the researcher was informed that the Department of Water Affairs is tasked with the overall responsibilities of national water resources planning, surface water resources investigation & development, protection of water resources from pollution and administration of the Water Act. Furthermore, the department is responsible for the design & construction as well as operation and maintenance of 17 major village supplies (MVWS) catering to 22.5% of the Country's population (299,000 people). It also designs and constructs rural village water schemes (RVWS) which are handed over to the respective district councils (DCs) for their operation and maintenance. The Director of DWA is also the Registrar of the Water Apportionment Board (WAB) vested with important responsibilities to record, grant and terminate water rights under the Water Act of 1968, and for the administration, in so far as it affects the water rights, of the Aquatic Weeds Control Act.

The department's role of service delivery in the 17 major village supplies is carried out by the Operation and Maintenance (O&M) Division which is charged with the following responsibilities:

- To manage the upgrading of water supply and maintenance programmes to secure the best value for money within available budget for water supply
- To carry out repairs and construction of private connections to the required standard and specifications at minimum cost
- To provide customers with potable and reliable water supply
- Operation and Control of pumping stations and reservoirs

- Construction of extensions to the reticulation systems for all water works due to new housing developments and change of household income or lifestyle
- Reticulation map production, storage and mapping of new construction on existing map for day to day and future utilization
- Water sales, with the use of computerised billing system
- Production of water output and consumption data for future analysis and performance measurements of the schemes
- Carry out boreholes water level monitoring and sustaining water quality
- Providing and maintaining consumers' service such as private connections, borehole maintenance etcetera.
- Supervising coordination and follow-up of work of external technical consultants

The DWA station office in Kanye is under the O&M division; however, information from the Kanye station manager revealed that other divisions within the DWA headquarters often make demands on them without passing through the O&M head. This confuses their mandates and disrupts their day to day activities of ensuring efficient service delivery. Whereas water supply systems in the small and medium villages are planned and constructed by DWA, these are normally handed over to District Councils under the Ministry of Local Government for their operation and maintenance. '*None the less, councils often run short of human and financial capacity to efficiently operate and maintain the schemes*' says the head of Operations and Maintenance Division in DWA headquarters.

According to the Local Government Act (1967), the main function of a local authority is service delivery, including provision of water and operation of a sewerage system. The Act also empowers local authorities to compile their own regulations and rules to govern the quality of service delivery and standard of supply. The Act does not provide any guidance nor is it prescriptive in terms of norms and standards. The director of the Department of Local Government and Development under-which the district councils' water units are, mentioned that, the water sector in the rural areas is driven by the following goals:

(i) Promote quality of life through a sustainable supply of safe water
(ii) Improve service delivery by recruiting officers for the delivery of services
(iii) Reduce time and unit costs of delivering the services to stakeholders implementing effective policies, systems, procedures and structures through:
    a. Encouraging private water connections by speeding up the process
    b. Enhancing public awareness by using the media

The councils' water units are tasked with the responsibility of realising the above goals by operating and maintaining water supply schemes in their areas of administration and bowsing water to areas with poor quality water sources. Furthermore the director mentioned that the district councils are financially empowered to carry out their activities. However, the Principal Water Engineer in Southern District Council informed the researcher that the water unit has financial constraints to carry out maintenance of the rural village water schemes. In addition, though their roles in the water sector are clear, they are often made to carry out other council duties outside the water sector such as workshop facilitation and participation in the tender documentation of non-water projects.

From the discussions above, it was revealed that DWA plays a compound role of operator, regulator and resource manager. The head of O&M in DWA highlighted that DWA has the challenge of prioritizing between its core function of strategic planning and management of water resources and its on-going service delivery ("operator") responsibilities in deploying its management and technical resources. The latter function normally wins in such a contest because service delivery is a responsibility that requires emergency response capacity, where the inability to respond to a need is felt immediately. This then calls for an institutional separation of roles service delivery from that of regulator and resource manager.

5.2.4 Customer Service standards

DWA has the following customer service standards:

- To repair minor pipeline (≤63mm diameter) breakdowns within 2 hours of receiving the report
- To repair major pipeline (≥63mm diameter) breakdowns within 4 hours of receiving the report
- To alert consumers of water interruptions within 3 days prior to the scheduled interruption and restore water supply within minimum time possible
- To connect water private connections within 14 days from the time of receiving the payment from the customer. To give the customer updated feedback within 1 day of realizing that the department will not meet the above stipulated standard.
- To carry out meter test regularly at quarterly periods and replace the first meter free, and all other consecutive meters at the customer's expense unless otherwise proven that it was DWA fault
- To produce water consumption bills monthly within the billing cycle of 22 days per month

- To communicate to the customer about scheduled disconnection of water for non-payment of bill, 7 working days prior to the schedule, and restore connection within 1 working day after the bill problem has been resolved with the customer
- A customer shall have a maximum of 15 minutes waiting time at the DWA revenue offices to pay their water consumption bills
- All customer complaints shall be responded to within 30 minutes of receiving the report as per DWA customer complaint procedure

These standards also serve as guidelines for the district councils water units. However, as mentioned earlier district councils still battle with capacity therefore, the standards will take some time to be realised.

5.2.5 Selection of Areas of Jurisdiction

DWA head of Operations and Maintenance division was asked about the criteria the department uses to define areas of jurisdiction and the problems associated with such zoning. In his response he stated that DWA is responsible for the supply of reticulated water in the 17 Major Villages of Botswana. These were declared to be waterworks areas through the Waterworks Act, 1962. For a village to be declared a major village, it should be an administrative centre (district headquarters) with a population of more than 5000. This criteria has resulted in overburdening of the district councils capacity, hence, inefficiencies in operation and maintenance, response to customers, response to faults, dilapidation of reticulation networks and inadequate billing systems. However, one might argue that by the end of NDP 8 in 2003, DWA still performed 70% of the rehabilitation and upgrading work on minor village water supply systems on behalf of district councils whilst councils were only required to carry out routine maintenance. The contention is there is need for a major policy shift to build management capacities of the various district councils. The DWA station officer in Kanye village informed the researcher that within the entire southern district, DWA serves two villages with a total population of 57 550 persons as indicated in Table 5.1.

Table 5.1: DWA Waterworks Area in the southern district

Village	Population	Water Source	Tank capacity m^3	No. of public stand pipes (12/07/02)	No. of private connections (12/07/02)	No. of people per private connection
Kanye	40 628	Borehole	6 375	165	7 628	5-6
Moshupa	16 922	Interconnection		63	3 199	5-6

Source: SDC DDP 6, 2003-2009

'*The district councils water units are not employing for themselves, therefore their staffing requests are often turned down by staff ceilings of the Ministry of Local Government*' asserted the Principal Water Engineer, SDC when asked the same question as above. The District Councils are empowered under the Local Government (District Councils) Act to provide public water supplies outside any area for which a Water Authority has been appointed by law i.e. any area with population of less than 5000 but not below 150. The Southern District Council provides water to 94 villages and settlements (see Table 5.2) with water and operates and maintains their water supply reticulation system.

Table 5.2: SDC Waterworks Areas in the southern district

Village	Population 2001	No. of Villages with				Boreholes	Water Tanks	PSP	Private Connections
		VWSS	Inter-connection	Water Reliability (%)	Good Water Quality				
94 in total	169 586	94	12	79	77	130	86	784	7 755

Source: SDC DDP 6, 2003-2009

5.2.6 Decentralisation to and Within Water Authorities

The study established that authority has been decentralised from the central government to the district councils. This has been achieved by transferring the operation and maintenance of the minor villages' water schemes to the district councils after completion by DWA. According to the National Development Plan 8 (1997/98 – 2002/03) the government of Botswana called for rationalisation of responsibilities between all the water sectors for resource management and planning. DWA proposed phased transfer of the 17 major villages in their authority to district councils with some of the DWA personnel amidst the financial and human resource challenges of the councils. The District Councils apparently lacked capacity to take over the major villages from DWA and therefore the sustainability of the councils' obligations was uncertain. According to the SDC, the water unit has no enough authority to make water decisions on its own even if it is an emergency situation. Discussions are normally carried out with the Council Chairman who in turn is supposed to endorse the activity. This is a reflection of centralised management within the water sectors themselves.

At village level, findings show that decentralisation in water development is lacking. Both villages do not have water committees except for the VDC which is only involved in public stand pipe siting. The villagers of Molapowabojang felt that if they had their water committees, they could be contributing towards a private contractor to improve their service delivery in the village. However, this should be thoroughly assessed basing on the socio-economic situation of the village.

5.2.7 Coordination Across and within departments in the Water Authorities

Integrated management implies a very strong degree of co-ordination between all the sectors involved in or dependent on the use of water. It was observed during the study that there is a single guiding plan, the National Water Master Plan for all water development projects in the country. However, the master plan is not consistently followed as all the ministries and departments involved in the water sector development have their own action plans and budgets which do not adhere to the master plan. One example alluded to is where the Department of Waste Management and Pollution Control developed a centralised sewer network scheme without consulting Department of Water Affairs in the same village. In this scenario, DWA had different plans of water supply augmentation which did not cater for water driven sanitation network. It is apparent that their activities do not seem to complement each other and there is lack of coordinated planning. Subsequently, this has a negative effect on the users as the facilities would not be functioning well due to low water pressure resulting from competition in the distribution networks. In addition, there will be water shortages in some areas due to increased demand as it was gathered from the study in Kanye. In addition, both departments developed similar water development plans for their respective departments. This is an indication of duplication of roles instead of sharing the roles.

The Botswana National Development Plan 7 Report (1991-1997), highlights lack of inter-sectoral coordination in the village water supply as the major challenge to service delivery efficiency. According to the plan, decisions to allocate land to public institutions such as schools and hospitals, was made with little or no reference to the cost of providing water, as these institutions were often given plots well outside the existing waterworks area. The situation resulted in haphazard, inadequate and, in some instances inequitable development of reticulation systems in the villages. The same problem is highlighted in the National Development Plan 8. The report notes that due to lack of effective coordination between ministries some government institutions were built without prior and timely consultation with the water and sanitation service providers, hence, constraints in the water service delivery. Among others, village water supplies are normally designed to cater for 10 years projected demand, but the building of such institutions makes it difficult for the water service provider to meet their consumption. The study established that water shortages (as explained in section 5.4) in Kanye were also a result of

additional water consuming government institutional buildings with large per capita consumptions per day. A similar case was noted in Molapowabojang during the study. The land board allocated some plots outside the village waterworks area in 1993 without consulting the water service providers and the physical planning office. This caused delays in residential plots developments and the villagers had to walk a distance of 6km to the nearest public stand pipe. Others informed the researcher that they bought water from those residents with donkey carts at an equivalent of $1 US per 20 litre container.

Findings also revealed that coordination is also lacking within the water authorities in the study areas. During consultation with the DWA station manager in Kanye, it was gathered that water development projects and other public projects are conceived at the DWA headquarters level without involving the implementing offices (i.e. satellite offices) since they are a lower level of line management. Therefore, satellite offices find it difficult to understand the projects as well as to implement them because they are never part of the negotiations. As a result, users lose trust in their service delivery efficiency. In the SDC, it was observed that coordination is also lacking within the council. The Principal Water Engineer informed the researcher that sometimes they hear about projects when at the time of implementation. In some cases, the water unit lacks transport to carry out its duties because the transport unit within the council would not give out some vehicles.

5.3 Adherence to IWRM Principles

The National Water Master Plan Review, 2006 remarks that a sound institutional framework is a precondition to ensuring efficient water service delivery within the IWRM tenets. Findings revealed that the "institutional reform recommendations in the first National Water Master Plan foreshadowed the institutional changes that were adopted by, among others, the UK, Australia and South Africa in the 1990s for the protection and stewardship of a nation's water resources (MMEWR, 2006). Significantly, it also anticipated the IWRM principle of decentralization, devolving service delivery responsibilities to district councils whilst DWA plays the role of national facilitator, the formation of an independent regulator namely the Botswana Water Resources Council as well the creation of a platform that enables sect oral coordination in water developments. However, the recommendations were never implemented. This failure could be attributed to lack of incentives to tackle resource management issues when resource development opportunities were yet to be exhausted and challenges of constructing water infrastructure to meet large imminent demands in urban areas. In addition, insufficient appreciation of the subject of resource management and lack of trained personnel to undertake resource management functions at the time. In spite of these failures, findings also show that progress was made in giving the District Council water units the responsibility to do all the operation and maintenance work, as well as at least 50% of the rehabilitation and upgrading of village water supply systems. Because of capacity constraints, the DWA still performed about 70% of the rehabilitation and

upgrading work on village water supply systems on behalf of District Councils. The Councils performed 100% of the routine operation and maintenance themselves.

5.4 Adequacy and Efficiency of Service Delivery

According to ISO/DIS 24512:29 guidelines for improvement and assessment of the service to the user in view of improving governance and quality of water services, *"An objective of a drinking water utility should be to ensure a sufficient supply of safe and agreeable drinking water to meet the public health and sanitation needs of the user"* This objective has been compromised during times of water shortages. Both Kanye and Molapowabojang focus group participants complained of blockages of their waterborne toilet facilities because of low water pressure. In a case of Molapowabojang, the headmistress of Pitsonayane Primary School informed the researcher that in the 3 months preceding the study in January 2007, primary school pupils in Molapowabojang were sent home because they could not use their waterborne toilet facilities in school. Currently, bowsers of $30m^3$ capacity start to ferry water to Molapowabojang at 5am to 10pm and make 20 trips in total per day. However, Plate 5.1 scenario of water spillage and puddle seemed to be the case because taps would be left open at a time when there was no water.

Plate 5.1: Typical Water Point Scenario when water comes

In assessing the efficiency of water service delivery, three indicators were used: coverage levels, reliability of water supply and consumer satisfaction. Coverage is related to the proportion of households located within a certain distance from a public stand pipe, in this case 400m as held by the Botswana Rural Water Supply Manual. Distance to and time spent queuing at water source are discussed as spatial and temporal elements of coverage. A reliable water source facility regularly and reliably provides enough water of acceptable quality for domestic and other

purposes. Consumer satisfaction implies the extent to which households are satisfied with their water source facility.

5.4.1 Coverage Levels

One of the major indicators of an efficient water service delivery is the percentage of the population with access to water services. The study findings revealed that the majority of the households in Kanye and Molapowabojang relied on piped water sources - communal standpipes and private connections. The relatively short distance travelled to the water point enhanced access and coverage in rural areas. Information from DWA station manager in Kanye shows that the average walking distance for all households without an on-plot water supply source was 200m with 88.6% of these households living within 400m of their water source. This shows that in terms of water supply provision, DWA is efficient and water users can carry out activities like construction with ease because of frequent water flows. However, in Molapowabojang, the nearest public stand pipe is within the walking distance of 500m in wards which have stand pipes.

Water Reticulation in Molapowabojang

Reports from the SDC water unit indicate that Molapowabojang is interconnected to a scheme supplying the villages of Lotlhakane East, Kgomokasitwa and Molapowabojang itself. Sources of water for this scheme are four boreholes at coordinates 4297, 4301, 4634 and 8576 in Ramonnedi well field southeast of Lotlhakane. The scheme is such that water from the boreholes is collected in a 300m^3 tank at Ramonnedi which gravitates water to a 250m^3 tank which act as a distribution tank for the three villages (SDC, 2006). The four boreholes had a combined production of 235m^3 per day against three villages's total water demand of 418.20m^3 per day before they dried out. Whenever there is a problem of water supply in this village cluster, Molapowabojang with the largest demand of the three villages experiences severe water shortages. The problem often manifests in some parts of the village experiencing low water pressures or having no water at all. Efforts to alleviate acute water shortage in the cluster included suspension of private water connections, connection of other boreholes and ferrying water in water bowsers.

Water supply in Molapowabojang is distributed by a network of pipes serving public stand pipes and private connections. The village water supply scheme was last upgraded in 1992 by DWA and handed over to SDC for operation and maintenance. However, due to population increase and escalating demand, the water supply system reached its design capacity earlier than planned but the council could not upgrade it further due to lack of funds. Currently the village water supply is augmented by Department of Water Affairs and Southern District Council bowsers. The bowsers get water from Lobatse as a result of the depleted boreholes that the village relied

upon (SDC, 2003). All the wards within the village have at least two stand pipes at the wards' focal points. The wards are dissected into two blocks and the stand pipes are located at the center of each block. These locations are chosen by the VDCs. New plots on the south of the village have no reticulated water. These plots were allocated by the village land board in 1998 outside consultation with the Water authority hence exclusion from water reticulation scheme. A water tank which was installed in 2006 is serving as a remedial measure and all households have to queue for water the south of the village. Everybody is getting water from the tank with wheelbarrows. The majority of the focus group participants indicated that they spend more time queuing and going back and forth to fill their storage tanks.

Water Reticulation in Kanye

Kanye is provided with water under the Major Village Water Supply Scheme operated and maintained by the Department of Water Affairs. The village is served by a network of pipes for water reticulation. According to the monthly report by the DWA station office in Kanye for February 2007, all the wards within the village have at least ten stand pipes distribute evenly within the wards. The system relies on boreholes located in the Kgwakgwe well-field lying to the south west of the village and on the Rammonedi well-field. The village has been experiencing a water supply deficit since 2001 due to abnormal decline in the source well field coupled with pollution of the Moshopa boreholes whose demand has shifted to Kanye. Given this predicament, Kanye has been gazetted to get connected to the North-south Carrier Water Project (NSCWP). The total average production from the boreholes currently stands at 7560m^3/day. The demand as from January 2005 until September 2005 was approximately 958,935 cubic meters for Kanye (3515 m^3/day) and 1375m^3/day according to the Kanye station office annual report of 2006. This means an accounted for water of 33.6% lost or unmetered. According to the DWA Kanye water loss monitoring report of June 2006, leakages are often resulting from 25mm plp pipe breakage (Table 5.3) and old meters.

5.4.2 Reliability of water supply

Reliability refers to the ability of a water point source to consistently provide water without any interruptions. According to Saunders and Warford (1976) it is difficult to find a village where the systems are working precisely as planned. The majority of focus group participants in the study areas indicated that they experience breakdowns of their water draw off points. All but one of the households using tap in yard in Molapowabojang stated that they had not experienced any breakdowns of their water source facility since it has been in operation. The relatively high frequency of pipe breakdowns also explains why the Molapowabojang community dismiss SDC as incompetent. Major breakdown statistics in Kanye are attributed to the poor workmanship at the time of pipe laying.

Table 5.3: Pipe breakage reports in 2006

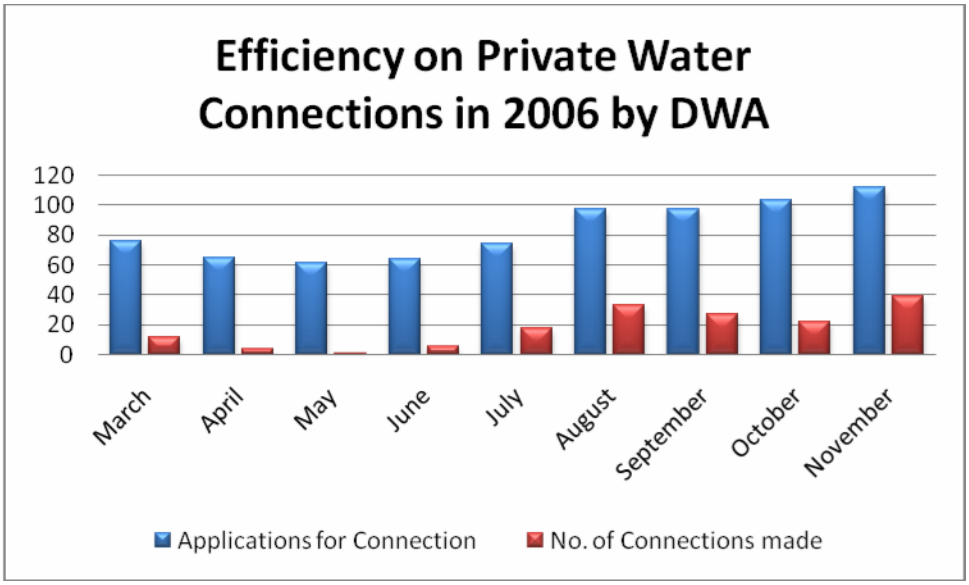
Pipe size & type	January	February	March	April	May	Average (Monthly)
25mm plp	196	196	146	121	216	175
63mm pvc	27	22	19	42	38	30
90mm pvc	7	2	4	7	9	6
110mm pvc	1	0	4	2	5	3
160mm pvc	0	0	1	0	1	Twice in 5 months
200mm pvc	0	0	0	0	1	Once in 5 months
250mm pvc	0	0	0	0	0	-
315mm pvc	0	0	0	0	0	-
315mm pvc	0	0	0	0	1	-
Total	231	202	218	172	199	204

Though the breakages are high, the DWA station manager mentioned that they only have one pipe fitter, one assistant pipe fitter and three labourers who are responsible for all the faults and new connections. The DWA 2006 annual report further indicates that the lack of adequate capacity has also impacted on the private water connections efficiency as indicated in Figure 5.1 below. The Kanye station cannot compete with the number of application for private connections. On average, only 20% of the total applications are connected per month.

5.4.3 Consumer Satisfaction

Consumers were asked if they are satisfied with the level of water services in their respective villages during the focus group discussions. Kanye participants mentioned that they were generally satisfied with the service offered by DWA except that response to faults sometimes took more than a week without any explanation. In addition the participants expressed their dissatisfaction in time taken to connect private taps saying it is too long i.e. 3months. However, others differed by saying they never waited that long a period to receive the service. The Molapowabojang participants however, dismissed the SDC as inefficient because the authority failed in private connection which were said to be dating as back as 1999, low pressure in the water distribution network, maintenance of pipelines and bowsing water in times of shortage.

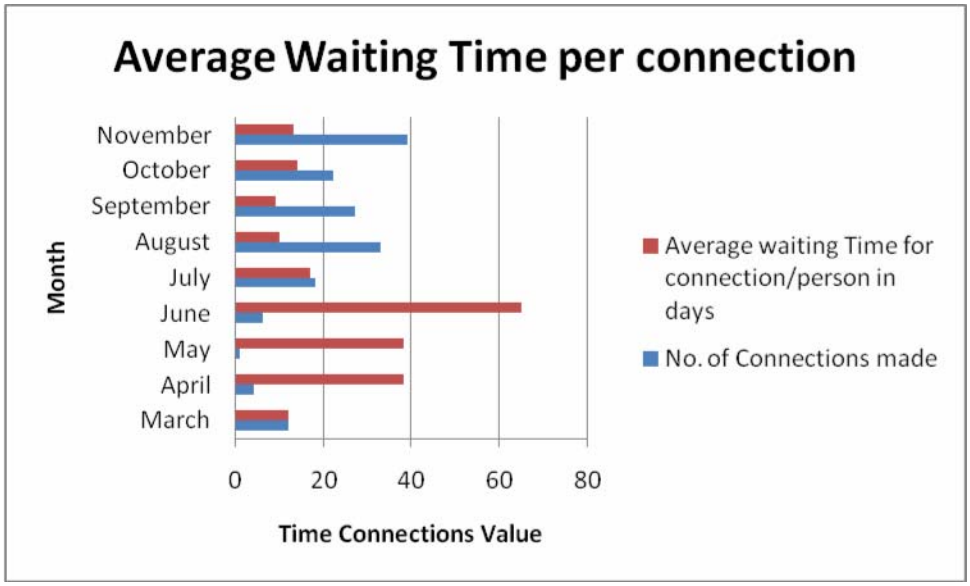
Figure 5.1: Water Authorities Performance on Private Water Connections



In addition, majority of focus group discussion participants expressed their dissatisfaction with the average waiting time per connection. The general concern was that the waiting period was too long. This was verified by the DWA 2005 local report which showed that some households waited more than 30 days before being connected (see figure 5.2). This is contrary to the DWA customer service delivery standard of '*To connect water private connections within 14 days from the time of receiving the payment from the customer*'. However, the Molapowabojang residents felt that the average waiting time under DWA is better than SDC. The interview participants who did not have private connections mentioned that they have been waiting for 5 years to be connected at the time of the focus group discussions. Those who had private connections told the researcher that they waited for an average of two years before being connected. The findings suggest that there is a weakness in the service delivery management procedure. In DWA, standards are set without mechanisms to realise them. In responding to the Molapowabojang community concerns, the Principal Water Engineer in SDC, explained that private connections are made according to the 5 year District Development Plan covering 94 villages. The officer mentioned that some people would not be around at the time of connection for the village hence miss their chance to be connected. Furthermore, there was no water in the village aquifers therefore private connection and any expansions of the scheme were suspended from 1998. Other reasons raised for the slow uptake of private connections were attributed to non-availability of pipes and fittings to meet the request from the consumers for these connections. In addition, there is no standard procedure for the provision of private connections. Normally the applicant is asked to pay a connection fee after which the applicant's request would be considered. The connection fee is paid to the council cashier and the money does not go to the water unit for the unit to buy the materials for connection. From this explanation, it could be gathered that if the

district council water units finance was not centralized, the units would be able to improve their service delivery by making water connection materials readily available.

Figure 5.2: Average Waiting Time for Private Connections in Kanye



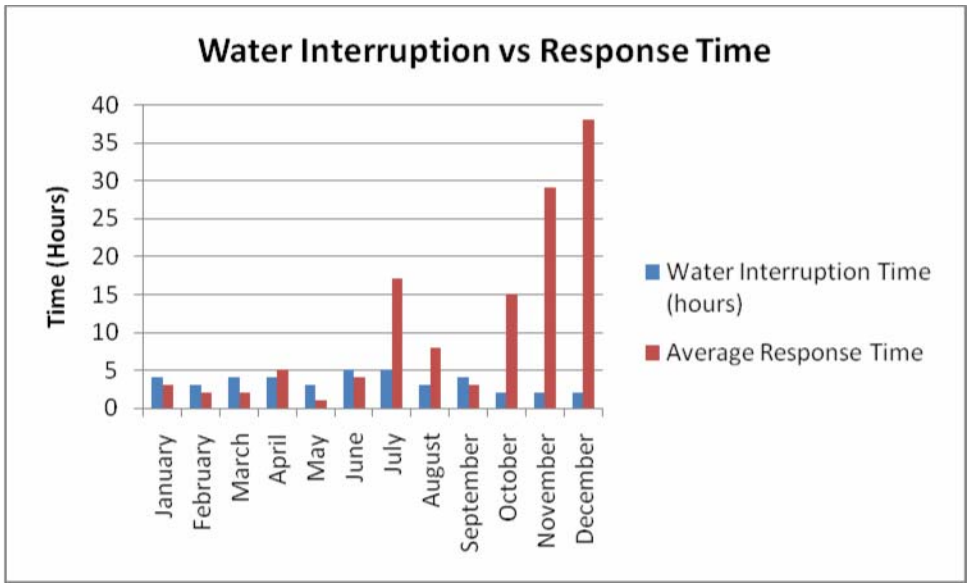
The results in figure 5.2 suggest that there is more waiting time for connection between April and June. This could be explained by the beginning of the government financial year in April and distribution of funds across sectors, hence the delay in connection time.

The villagers of Molapowabojang reported that sometimes they go for three weeks without running water and when this happens they fetch water from a distance of 40 km using donkey carts. This report was cemented by the SDC's Principal Water Engineer, who informed the researcher that interrupted supplies were due to water shortages in the boreholes and lack of enough bowsers to meet the village demand at the time of interruption. Furthermore, the Water Engineer agreed that sometimes the public standpipes as well as private connections pumped out air instead of water. However, private connections will be charged since the air moves the meter.

According to the reports collected from DWA and SDC, there have been delays in responding to emergency situations of water interruption. This supplemented reports from the community members of slowness of water authorities to respond to faults. Figure5.3 below shows that sometimes the water authorities took 28-30 hours to respond to faults. 'The amount of time taken to respond to water interruption depends on the nature of the fault'. This is a statement given by the SDC Principal Water Engineer and DWA Station Manager in Kanye. The representatives of the two authorities argued that though their annual reports indicate slow response to repairs and

faults attendance, this is sometimes due to lack of spare parts such as new pipe fittings, meters and truck tyres which would have to be ordered from the capital city through the approval of headquarters. SDC sites this as a common problem which is often exacerbated by the fact that the water engineer's estimates for any year are always cut down by the finance department of MLG during budget approval, and purchase of spare parts is adversely influenced by it. Informal interviews with SDC bowser drivers showed that the council has only three bowsers and only one is operational because of lack of spare parts. The drivers mentioned that sometimes all the council bowsers are parked for three months waiting for new tyres. They acknowledged the frequent complaints lodged by consumers, but at times they have no option but to take some time before responding.

Figure 5.3: Average Response Time to Faults



Findings show that unsatisfactory performance of the water institutions on billing, response to faults, water interruption, pressure and private connections efficiency have an impact on the community perception towards them. Those who have domestic standpipes in their yards complained that they only got water for a short period of time after the village storage tanks were filled by water trucks. Most of them were concerned about the high water bills they got from the council although their stand pipes hardly produced any water. At the time of the study, it was established that the majority of the community members consider SDC as a non-performer when compared to DWA. Communities explained that SDC could not bowse enough water for the whole community for a period of 5 years. However, they noticed a considerable improvement after DWA trucks arrived. However, other participants explained that DWA is effective because its mandate is just water as compared to SDC which has many local administration roles such as environmental health, roads, primary education, clinics etc.

Reports from SDC concur with the community allegations. SDC water unit water engineer told the researcher that the council could not ferry enough water because they were using only one truck as compared to DWA which uses two. In addition, DWA has readily available equipment to provide water whilst the council does not. The researcher also observed that public stand pipes in both Molapowabojang and Kanye were vandalised. Some did not have heads; others had leaking meters while others were broken. This could be an expression of dissatisfaction in the service delivery and lack of sense of ownership of the facilities because of minimal involvement in the water development projects. Participants with private connections in Molapowabojang mentioned that sometimes they are discouraged to go and pay their water bills because there is never proper billing system. Those in Kanye felt that they wait longer than 45minutes in the payment queue.

5.4.4 Communities Coping Mechanisms

The study established that the Molapowabojang community stores water in big tanks in their households whenever available to help in times of need. However, the water is sometimes contaminated and the whole tank has to be emptied. The Molapowabojang community suggested that SDC should install prepaid meters for public stand pipes to avoid spillages and water wastages.

5.4.5 Community Understanding of the Water Institutions

The study also sought to establish whether the two communities of Kanye and Molapowabojang directed their queries to the right offices. They were asked if they knew water institutions responsible for their water service delivery. All the participants in Kanye knew their water authority as DWA and they directed their complaints to the station office in Kanye. The majority of the focus group discussion participants indicated that they were satisfied with the assistance they got from the office. In Molapowabojang, the majority of the participants thought that DWA was their water authority instead of SDC. They explained that they saw DWA constructing the water reticulation network and the booster station.

5.5 Summary of Results

The findings discussions established that lack of inter sectoral coordination characterises the water sector in Botswana. This in turn has affected the performance of the water authorities service delivery. The village of Kanye has experienced little effect on the service delivery because the village is equipped with 70 public standpipes in different wards. Therefore,

whenever there is shortage in one area, the villagers go to a different ward to get water. However, some institutions such as schools are forced to close the water borne sanitation facilities whenever, the water is not running. Those with tap in yard mentioned that they were billed even though they had not got any water from their private connections.

DWA plays a compound role of service provider, regulator and resource manager, hence, difficulty in prioritising the water development activities. In addition, poor performance and frequent breakages in the water supply systems are attributed to poor workmanship during pipe laying. Attendance to faults is delayed by lack of machinery and human resource capacity. Furthermore, DWA satellite offices and SDC water units have no budgetary autonomy. Water developments are prescribed by headquarters at ministerial level. Similarly, different councils accord different levels of priority for water supply in their areas. These shifting priorities appear to indicate that roads get a higher profile and greater resources than the Water Unit in SDC leading to loss of morale. Findings have also shown that SDC is experiencing a severe lack of trained staff. This situation is exacerbated by transfer of staff while in the middle of water development projects. 'Transfers do not take into account an individual's specific expertise and experience as they relate to the capabilities needed in the location to which he is transferred' reported the SDC Principal Water Engineer.

6 CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This study focused on the impact of institutional setup on water service delivery at domestic level. The case study revolved around Kanye and Molapowabojang villages in the Southern District of Botswana. The findings reveal that although the water institutions mandates are clearly documented and understood by key informants, there are short comings in the operation and maintenance of water supply schemes as well as the ability to meet user preferences. The previous chapters have shown that these discrepancies are associated with the institutional arrangement governing water service delivery in the case study areas.

6.2 Conclusion

The study shows that from the supply side, the current institutional setup has relatively succeeded in serving the villages of Molapowabojang and Kanye (Figure 3.3 and 3.4). This has been reflected by the reticulation network infrastructure in the villages in spite of the recurrent water shortages. However, the institutional approach is inadequate in the management aspect of the water schemes and community service. The schemes are characterised by water interruption, dilapidation, pipe breakages and escalating water losses. These have been attributed to lack of coordination within and between DWA and SDC and the fact that the authorities are housed under different ministries with different mandates and financial provisions for water service delivery. In addition, it is not clear as to who is ensuring that the authorities perform their duties efficiently. DWA cannot police SDC because they are both government and the communities cannot because they are government dependent. Consequently, there are some inefficiencies in serving the communities such as slow response to faults, delays in private connections and frequent interrupted water flow, hence, the congregation of villagers at public stand pipes. Other problem faced by water users in the study villages:

- Poor billing mechanisms
- Frequent water shortages with high water losses in the distribution network
- No supervision of personnel in the villages, hence, at times operators would not start the pump station engine on time
- Residential plots development was delayed because of lack of water. As a result some plot owners were threatened with land expropriation because they had not developed their plots within the land board specified development period of 5 years.
- Some of the educational activities such as gardening could not be carried out due to lack of water
- The hygiene of the school was compromised since school toilets use water

Molapowabojang community expressed their dislike for fetching water in wheel barrows from the public stand pipes while they have paid for private connections. Others mentioned that if private connections were not delayed, they would be willing to raise the connection fee and continue to pay the bill. In Kanye, community members' main concern was about pipe bursts and slowness of DWA to respond to faults. Results have shown that both SDC and DWA normally design the water systems for a certain period but the systems normally get overloaded before the anticipated upgrading period. This is an indication that the authorities are characterised by technical solutions' approach when a crisis hits rather than exploration of possible IWRM measures like water demand management strategies and empowerment of local authorities to operate and maintain the water schemes. However, there is currently some noticeable cooperation between DWA and SDC which started in 2005 to redress the service delivery inadequacies in the areas of study. As indicated, DWA is assisting Molapowabojang village with bowsed water to augment the supply in the village. In the case of Kanye village, notable success has been made by DWA in reticulating water in the village.

It was also concluded from the study that the Molapowabojang community does not know their service provider. The community considers DWA as their service provider instead of SDC. This is so because the community had seen DWA constructing the water scheme. This is a reflection of lack of community involvement and information dissemination. If the communities were part of the water development projects, they would be aware that the management aspect of their water scheme is the responsibility of the SDC.

Furthermore, the study shows that the concept of IWRM has been partially enshrined in the water service delivery in the study areas. This was reflected by devolving some power to the district councils to carry out rural village water supply. However, the researcher argues that decentralization has merit if functions can be undertaken more effectively at local levels of government and there is value in the central government relieving itself of fiscal pressure and administrative responsibilities that are more efficiently done at local level where the consequences of decisions are felt locally, through a more direct feedback loop. It does not add value to decentralise and not empower as it was reflected in the findings. Results of the study showed that DWA designed and constructed Molapowabojang rural village water schemes and handed over to SDC to operate and maintain. Nonetheless, SDC had no capacity to fully main the scheme, hence, water losses, dilapidation of pipe networks, frequent water interruption and inefficient billing.

The community of Molapowabojang suggested that DWA should take over the running of Village Water Supply Schemes (VWSS) from the Southern District Council Water Unit to improve the quality of service delivery. This proposal was equally supported by the District

Council itself which proposed handing over of some of their water schemes to the DWA in order to improve service delivery and revenue collection. This however goes contrary to the policy direction articulated in the National Development Plan 8 (1997-2003) that DWA should gradually hand over the operation and maintenance of village water schemes to District Councils (Amusa, 2005).

It was also shown that the Department of Water Affairs is responsible for the planning, design and implementation of water national water schemes in conjunction with the upgrading of the major village water supplies. The respective District Councils in the Ministry of Local Government carry out the operation of the rural water schemes. The private sector is not really involved in major water supply operations, except at some mines and commercial irrigation schemes, but the private sector in the water industry could be mentioned. Private companies provide equipment, goods and services to the water industry. They also provide installation and maintenance services, as well as drilling and test pumping services. A number of professional engineering companies provide consulting services to the water industry. In this regard it can be stated that the private sector is playing a vital role in the water sector.

In a nutshell, water service delivery at operation and maintenance level is not entirely efficient and adequate as it was reflected by the findings. The major impacts of institutional setup on water service delivery could be summarised as follows:

1. Lack of capacity of village level organizations to carry out their functions such as initiating, planning and implementing projects
2. Community participation weakened by government's supply oriented approach
3. Water supply technologies in the villages' demand total dependence of communities on the district based skilled staff
4. Limited availability of private sector facilities within reasonable distance of the villages
5. Requests for private connections turned down due to manpower capacity problems, lack of adequate water supply from boreholes & District Development Plan Schemes

Given the water scarcity situation in Botswana as a whole, there is a need for coordinated management and sound institutional arrangements to efficiently utilise the little that is available. There is a need to understand the level of service provision which the country is at i.e. effective management rather than infrastructure provision.

6.3 Recommendations

The data seems to suggest that the problem is not institutional configuration but one of capacity hence, the major and overriding recommendation is to develop this capacity. However, The

following aspects should be taken into consideration in order to enhance the performance of the institutional setup in the water service delivery in Botswana.

- Capacity building to meet the dynamic water service demands in the districts
- More involvement of DWA satellite offices in the decision making processes
- Equipping satellite offices with human and financial resources
- Review of the water legislation to allow water authorities to respond to emergency situations without waiting for the minister's directive
- The introduction of a demand responsive approach to ensure effective maintenance of the supply system
- Development of a water service delivery standing committee to ensure that effective involvement of all decision makers including politicians in the water development projects
- The separation of service delivery functions institutionally from that of regulatory and resource management functions, as mentioned above, is a central feature in 'best practice' models for water sector institutions
- The distinct roles of institutions involved in water resources management and the management of water services should be defined and clearly established.
- Water management institutions should be designed to facilitate the participation of all stakeholders relating to water, especially rural communities, and to facilitate feedback to high levels of government through involvement of stakeholders at every planning stage.
- Water management institutions should be structured so as to devolve decision-making to the lowest appropriate administrative level, accompanied by the necessary human and financial resources for effective implementation. This could be attained by building human capacity before devolution and setting up financing mechanisms to ensure successful transformation.
- Management structures and institutions should be underpinned and informed by effective collection, management and analysis of information.
- Existing institutions should only be used where it has been established that they enjoy the support of rural residents.

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8 APPENDICES

Appendix 1: Focus Group Discussion Guide

FOCUS GROUP DISCUSSION GUIDE

1. Knowledge of institutions responsible of water service delivery in your village
2. Problems with water services in your village
3. Community measures to redress the problems
4. Suggestions for improvement
5. Willingness to pay for service delivery improvements
6. Community Participation in water developments
7. Why is the community not participating
8. How would the community want to participate (if not participating)

Appendix 2: Key Informant Interview Guide

University of Zimbabwe

Faculty of Engineering

Department of Civil Engineering

Key Informant Interview Guide

Interviewer's Name: _____

Name of Village: _____

Name of Respondent: _____

Position: _____

Date: _____

Start Time ---------- Finish Time ---------- Total time ----------

Good morning/afternoon/evening. My name is _____. I am/We are here today to administer a questionnaire for an MSc IWRM student at the university of Zimbabwe who is conducting a research on **"The Impact of Institutional Setup on Water Service Delivery in Botswana".**

The aim of this interview is to gain insights into the efficiency of current rural water supply and the problems faced by these schemes. It also intends to assess the extent to which the existing institutional arrangement is affecting the quality of water service delivery at domestic level.

Role in Water Service Delivery

a. What roles does your institution play in water service delivery?
b. What are the challenges faced by your institution with regards to the above roles?

Sectoral coordination

a. Which authorities do you work with to supply water?
b. What problems have you faced in working together e.g. delays in infrastructure development,
c. What problems does the current institutional set up bring in relation to:
    i. service delivery efficiency
    ii. Technical issues (operation and maintenance, system upgrading, infrastructure development, staffing etc?
    iii. Customer livelihoods
    iv. Other

d. In your opinion is there a mismatch on central government (DWA and DLGD) policies with what is happening on the ground?
e. How much control does the central government have on your organisation's daily work?

Sectoral Ability to sustain projects

a. What are the main problems faced by your institution with regard to water service delivery?

b. What scale of projects does your organization carry out?

c. Does your organization have the financial capacity to maintain the system?

d. Some villages in your jurisdiction have been experiencing water shortages, what was the problem?

e. What limitations hindered you from addressing the shortage promptly?

f. What mechanisms are in place to allow sustenance of the water supply schemes?

g. Does your organization have enough capacity for efficient operation and maintenance?

Clarity of responsibility

a. What is the criteria for defining your area of jurisdiction?

b. Are your mandates for your jurisdiction understandable?

Adherence to IWRM principles

a. How does your organisation promote water user participation in the water development projects?

b. What mechanisms are in place to encourage users participation in the governance of service?

Appendix 3: Data Analysis Checklist

Objectives	Areas of Concern	Variables	Data Sources
To review the institutional arrangement of water supply authorities in delivery of water services in Botswana	Relevance of the institutional structure to existing water challenges	• Clarity of roles and areas of jurisdiction • Monitoring and reporting structures • Ease of project implementation •System operations & management	•Review of reports and assessments by District Council Water Departments and Department of water Affairs •Review of national development plans, district development plans and existing water policies at national and district level •Key informant interviews with officials in the Water Unit Department in each council, Department of Water Affairs, Non-Governmental Organisation (GWP office) and Drought Management Committee
To assess the extent to which the current institutional setup adheres to the second principle of IWRM which states that '*Water development and management should be based on a participatory approach, involving users, planners and Policy makers at all level*'	Inter-sectoral coordination	•Information sharing between sectors •Transparency	•Focus group discussions •Key informant interviews •Review of national development plans, district development plans and existing water policies at national and district level
	Decentralization	• Opportunities for partnerships in water resources development •User participation mechanisms in place •Local authority empowerment	•Focus group discussions •Key informant interviews •Review of national development plans, district development plans and existing water policies at national and district level

To assess water authorities perceptions about service delivery and consumer satisfaction *vis-à-vis* stakeholder opinion on the quality of water service delivery in the study area	Service delivery efficiency	•Water supply coverage • Unaccounted for Water •Spatial variability • Connection established within target time (%) • Interruptions per connection annually & their causes • Availability of service information •Accuracy of billing •Cost of service provision •Disconnections	•Field observation •Focus Group Discussion •Review of technical reports and assessments by District Council Water Departments and the Department of Water Affairs •Key informant interviews with officials in the Water Unit Department in each council • Field observation
	Effect on user	•building projects •Community based profit making projects •Household chores •Community coping mechanisms	
	Responsiveness to Customers	• Complaints & requests •Notification on restrictions & interruptions •Availability of service information •Waiting period for connection & attendance to faults/breakdowns	

Appendix 4: Water Institutional Arrangement in Botswana