

INSTITUTIONAL CAPACITY FOR WATER CONSERVATION: A CASE STUDY OF SEDIBENG DISTRICT MUNICIPALITY

A research report submitted to the Faculty of the Built Environment and Engineering, University of the Witwatersrand, in partial fulfillment of the requirement for the degree of Master of Science in the field of Development Planning (MSc DP)

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ABSTRACT

Since the democratic transition in 1994, the role of local government has changed dramatically. Local governments are now expected to play a far more active role in their constituencies. As such, municipalities are expected to implement broader national policies and legislatures. The literature reviewed as part of the research indicated that most municipalities are faced with inadequate performance skills to manage and sustain their projects.

This particular study seeks to understand the institutional and human resources strengths and weaknesses that help or hinder Sedibeng municipality to actively pursue water conservation through implementing Integrated Water Resources Management (IWRM) principles. In pursuit of this purpose, a qualitative research approach was adopted with interviews conducted with Sedibeng Municipality's seven senior officials and community members.

The main findings of this study revealed that the key technical department of the water sector in Sedibeng has capacity challenges at individual and organizational level. Of special concern is the failure of the municipality to give ongoing training to staff, so as to pass on modern advanced knowledge and new technological innovation skills. This is further compounded by the mismatch between the qualifications and job descriptions of some staff members. The study also finds that public-private partnership between the municipalities and private companies is needed in the water sector to promote water conservation and thus provide a better level of service delivery.

The research concludes that institutional capacity is a prerequisite for the implementation of IWRM principles. In regard to this study, it has been established that to some extent Sedibeng District Municipality has the required institutional capacity in terms of organizational arrangement to harness the principles of IWRM. The accomplishment of IWRM depends profoundly on financial and human capacity of each municipality. Therefore, the key recommendation is that the municipalities should employ individuals based on merit and work experience to ensure efficient management of funds and effective execution of water related projects.

Key words: Water Conservation, IWRM, Institutional capacity, Sedibeng, Emfuleni.

DECLARATION

I declare that this research report is my own except where the authors have been acknowledged. It is submitted in partial fulfillment of the requirements for the degree of the Master of Science in Development Planning (MSc DP) in the university of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.

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DEDICATION

This research report is dedicated to my husband, Thabo Mmotong and my two lovely daughters, Neo and Bokamoso who have had to endure the pain and stress of the absent wife and mom but never failed to love and support me in my endeavours. I am deeply grateful to my mother, Ms. Manana Mokoena and my mother in law, Ms. Matlakala Mmotong for been very supportive and looking after my children in my absence. I pray that you live long enough to see the fruits of my hard work.

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Chapter 1

INTRODUCTION

1.1 Introduction

Local government is increasingly playing an important role as a vehicle for policy development. As such, national and provincial government is looking to local government for practical implementation of laws and policies. Therefore, it is important for local government to position itself in such a way that will enable it to respond to these legislative and policy requirements. With this in mind, there has been an increased interest in monitoring and evaluating the performance and progress of local municipalities in as far as capacity development is concerned. This report discusses some of the capacity challenges and positioning of local municipalities in response to management laws and policies.

One of the key parts of such positioning is institutional capacity, which will assist local government to manage water resources in a way that is sustainable. This interest of institutional capacity and Water Resource Conservation (WRC) is most crucial to the study. For the purpose of this study, institutional capacity is be used to refer to enhanced human resource capacity and stakeholder participation. In this sense, the institutional capacity is critical to the implementation of Integrated Water Resource Management (IWRM) policies and programmes. IWRM is a process which mainly focuses on three aspects: enabling environment; institutional roles; and management instruments to avoid a fragmented approach of water resources management (Global Water Partnership, 2005). Flawed distribution of responsibilities between role players, inadequate co-ordination procedures, mismatch between responsibilities and capacities for executing tasks are the main contributory factors that hinder IWRM implementation (Muller, 2010).

Furthermore, the approach of working in silos when it comes to water resource management has often led to conflicting interests amongst stakeholders. Policy objectives have been set out without taking into consideration the implications for other water users (GWP, 2005). Thus, available financial resources for water management have not been used efficiently to maximize total social welfare (Ibid). As a result, this suggests that there is a need to find suitable ways to orchestrate policy making, planning and implementation in an integrated manner across all water

sector related institutions and take into account more complex co-ordination problems arising in water management (Ibid).

1.2 Research background

Water remains one of the main challenges faced by countries in their struggle for economic and social development. Water shortages and water quality deterioration are among the problems which require an urgent attention (GWP, 2005). Based on the South African legislative review process for Water Resource Management (WRM) in 1995, the White Paper on National Water Policy was adopted, and culminated in the National Water Act (Act 36 of 1998). The chief objective of the White Paper is to outline guidelines for water management, the drafting of effective legislation, and the creation of programmes for implementation.

The National Water Act 36 of 1998 provides that water resources management is based on the realization of water as a finite and vulnerable resource that is part of an integrated hydrological process. Equally, given that water serves many different purposes, functions and services, it water requires an integrated approach in its management, recognizing its interaction with other natural resources and ecosystems. As a result, Integrated Water Resource Management (IWRM) is an approach which can assist in the effort(s) to deal with water related issues in a cost effective and sustainable way (Ashton, 2010).

Integrated Water Resource Management strives to strike a balance between the uses of water as a basis for the life support of the world's increasing population and conservation of water to sustain its functions and characteristics for generations to come (Ashton, 2010 & GWP, 2005). This is done through various principles, approaches and guidelines; each with a particular area of appropriate application, especially the Dublin Principles (Muller, 2010 & Global Water Partnership (GWP, 2005). Solanes and Villarreal (1999) explain that the Dublin principles were an attempt to concisely state the key issues and thrust of water management. These principles are defines by Solanes and Villarreal (1999) as follows:

- Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment;

- Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels;
- Women play a central part in the provision, management, and safeguarding of water;
- Water has an economic value in all its competing uses, and should be recognized as an economic good.

“Systematically pursuing IWRM constitutes a path that leads to long-term environmental and developmental needs to manage water resources in a holistic manner” (Funke *et al.*, 2007: 1238). This shows that IWRM upholds the principle of sustainable development. IWRM as an integrated method to the natural resources management advocate a specific task of water conservation at the local level (Haigh *et al.*, 2009). Nonetheless, lack of capacity to successfully implement water projects is still cited as a reason for the mismanagement of water in South Africa (Muller, 2010).

South Africa is faced with enormous water service delivery backlogs, especially in the rural and semi-rural areas, owing mainly to the lack of technical and administrative capacity as well as various problems such as corruption in municipalities (Nnadozie, 2011). This lack of expertise and inadequate staff has resulted in the deterioration of service delivery in many municipalities, giving rise to service delivery protests (Mananga, 2012).

This state of municipalities poses a serious challenge in the delivery of quality water services and efficient management of water resources. This also suggests that for Water Resource Conservation (WRC) to be successfully implemented there must be an institutional capacity to support it. The WRC is one of the key features of IWRM’s strategic profile. This strategy recognizes that it is only by effectively managing and protecting water at the local level that more sustainable use of a nation’s water resource will ever be achieved (Funke, Oelofse, Hattingh, Ashton, and Turton , 2007).

1.3 Problem statement and Research objective

Water may be argued to be the scarcest and most vulnerable natural resource in South Africa (Muller, 2010 & Ashton 2010). Just like air, water is one of the most critical human needs: the survival of humankind depends on it. Moreover, it is said that South Africa's fresh water resources will reach a critical state within the next twenty to thirty years if the demand is not reduced significantly (Funke et al., 2007). Expecting South Africa to be a "water secure" country is unrealistic if the people's attitudes and views about water do not change (Muller, 2010).

According to the Constitution of the Republic of South Africa Act 108 of 1996 and the Water Services Act 108 of 1997, water service delivery is a core responsibility of local government. However, this legislation does not explicitly describe the role of local government in the conservation of water resources.

South Africa has some of the most advanced water legislation in the world, a fact that has been acknowledged at various international fora (Lawless, 2009). Government is constantly adopting and revising water policies to align with the "sustainability" concept, but what should be on planners, consultants, officials and academics' minds is a question of whether our municipalities are in a position to deliver on the plans. Based on the range of literature sources such as the South African Institute of Civil Engineers (SAICE) and the Council of Science and Industrial Research (CSIR) water resources articles, a simple answer to this question would seem to be "no". However, more research needs to be conducted in order to thoroughly examine how municipalities might be failing to fulfill their mandate.

Lawless (2009) argues that most municipalities are not operating effectively due to poor management of people where issues of corruption and discipline are not being adequately addressed. Furthermore, she notes that municipalities are not employing the right people in terms of education and work experience. This is alarming because as McDonnell (2008) argues, in the context of IWRM, the administrative skills needed to practice IWRM include, among others, expertise, an understanding of the natural environment and familiarity with the legal framework for water resource management.

Therefore, lack of these administrative skills results in officials who do not understand their roles and responsibilities, thus distorting compliance and hindering a constructive

implementation process of IWRM (McDonnell, 2008). For example, some public offices are increasingly held by people who do not have the required skills for particular tasks. This results in a lack of institutional capacity, and can potentially hinder the implementation of water conservation in South Africa. However, there are also other challenges which contribute directly (and indirectly) to the escalating inefficient management of water such as inadequate infrastructure, inadequate funding and lack of community participation.

Against this backdrop, South Africa is at a point whereby implementation of policies is of utmost importance, following a complete revision of policies on water resources that accompanied the democratic transition. These new policies not only focus on sufficient supply of potable water for human needs, but also focus on promoting sustainable use of water resources. (Pollard and Du Toit, 2005).

Given the above discussion, the key problem is that municipalities are expected to implement broader national water resource policies and programmes while faced with inadequate performance skills to manage and sustain their projects. Against this background, the study will provide a focused inquiry related to the role that institutional capacity plays in dealing with water conservation issues at the local level. This is to be done by examining a case of Sedibeng district municipality. The study explores, examines and critiques whether the municipality is appropriately capacitated to actively implement IWRM aspects and pursue water conservation.

1.4 Overview of the case study area

This research focused on the Emfuleni local municipality in Sedibeng district municipality which is in Gauteng, south of Johannesburg. It has an estimated population of 916 484 people (Statistics South Africa, 2011). The municipality has a population of 721 663 people which is 80% of the overall Sedibeng district population (Census, 2011). Sedibeng district consists of three Category B municipalities, namely: Emfuleni, Lesedi and Midvaal. Midvaal accounts for more than half of the geographical area (1728 km²), followed by Lesedi (1489 km²), and the smallest is Emfuleni (968 km²). It was important for the researcher to focus on one of the three municipalities in order to properly manage the study. Emfuleni was chosen as the main focus area because three quarters of the population of Sedibeng district resides there.

1.6 Research questions

- *Primary research question:* To what extent is Sedibeng municipality capacitated in engaging in the practice of IWRM in the context of water conservation?

Secondary research questions:

- What are the water conservation measures implemented by the municipality?
- How much knowledge do municipal officials have of water legislation and regulations?
- What are the limiting factors in implementing IWRM in the municipality?

To what extent are water services integrated across departments in the municipality?

1.7 Chapter Composition

Chapter 1: Introduction

This chapter outlines the background and the context within which the study has been developed. It states the problem that this study seeks to address, including the formulated research question.

Chapter 2: Literature review

This chapter provides different conceptual frameworks that are put forward for use in assessing institutional capacity. It also considers theoretical perspectives and approaches in understanding institutionalism, water conservation and local government and critique thereof.

Chapter 3: Research Methodology

This chapter presents the research approach, describes the nature of the research, data collection methods, data analysis as well as validity and reliability of the results.

Chapter 4: ELM case study area

This chapter gives the description of Emfuleni Local Municipality and its water conservation related matters; and other issues that have been mentioned will also be discussed.

Chapter 5: Data Presentation

This chapter presents the data collected

Chapter 6: Data Analysis

In this chapter an analysis assesses whether the requisite institutional capacity exists for water conservation and for the implementation of IWRM.

Chapter 7: Conclusion and Recommendations

This is the final chapter in which observations and conclusions are made from the analysis and recommendations are proposed.

1.8 Conclusion

This chapter has briefly outlined the context within which local government water management is being institutionalized. It has dealt with the organizational and policy context of municipalities. It also presents the case study area and its water management strategies. Thus, based on the discussion in this chapter, an argument can be made that in order to assess whether Sedibeng Municipality has the capacity to implement IWRM programmes, there must be an assessment of its institutional capacity. Then based on the assessment, appropriate options to develop the required institutional capacity can be proposed.

This chapter concludes that the water resources authority should be structured and resourced accordingly in order to respond to all the water conservation management challenges within the local government. As a result, the next chapter will deal with the literature review in order to identify frameworks that can be used to assess and develop institutional capacity for water conservation of the Sedibeng Municipality.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

An assumption has been made by the researcher based on the literature that for water conservation to be implemented successfully there must be an institutional capacity to support it. In other words, the intention in this research report is to assess whether or not a district municipality such as Sedibeng Local Municipality has the institutional capacity to conserve water and how such capacity can be developed or enhanced for improved performance. Given the importance of the concepts in the study, this chapter stands on three main pillars being Institutional Capacity, Integrated Water Resource Management (IWRM) and Water Conservation.

The institutional capacity pillar looks at the structure and norms of institutions with regard to aspects of water governance and human capacity. This includes the legislative and institutional aspects of water resource governance. The second pillar scrutinizes the implications of integration (resources and humans) and ways in which IWRM principles are implemented and presented. The third pillar looks at procedures and techniques employed for improved efficiency and effectiveness of water use.

2.2. Institutional Capacity for Water Conservation

Generally, the success of any policy depends on the strength of its support mechanisms. Arguably, the backbone of this support mechanism is institutional capacity. Turton, (2010) suggests that institutions play an important role in determining policy outcomes. Furthermore, these institutions provide support to efficiently manage water resources and ensure delivery of strategic services that maintain social and economic development (Connor, Klintenberg, Turton, and Winpenny, 2012). “Global water problems can be traced to a deficit of governance resulting from a lack of appropriate institutions at all levels, and the chronic dysfunctionality of existing institutional arrangements” (Connor et al., 2012:141).

In this context, a working understanding of institutions refers to structures and mechanisms of social order which are socially constructed patterns of conduct commonly recognized by people within a particular society (Rowe and Wehremeyer, 2001, and Connor et al., 2012). Furthermore, they consist of informal rules (for example, established customs, practices, habits, norms, etc.) and formal rules (for example, written regulations, standards and laws (Rowe and Wehremeyer, 2001, and Connor et al., 2012). An institution is not one organization, but an inter-relationship of organizations. The framework suggests that institutions can be assessed in terms of a structure of governance, organizational resources and effectiveness in the use and management of such resources, organizational arrangements and organizational processes (Ashton, 2010).

Having narrowly defined institutions, attention is paid to the concept of “institutional capacity”. In the context of this study, institutional capacity means a system of rules, values, norms and their organization structures which enables local government institutions to perform efficiently and enhance their ability to fulfill their responsibility and implement water management and conservation policies (Haigh, Fox, and Coleman, 2010). The ability of institutions to organize and function as institutions is of importance and interest to the study, taking into account their arrangements to effectively manage water. The institutional capacity is measured in terms of the management in the integration process of resources (Haigh et. al, 2010).

2.2.1. Institutional Structure and Human Capacity

According to the United Nations Educational, Scientific and Cultural Organization (1997), developing human and institutional capacity is the base of building sustainable water resources, service delivery and management. This involves concerted and shared efforts between institutions, individuals and the general public at all applicable levels, to interact and build a stronger water preservation culture by creating and promoting greater awareness among all stakeholders (*ibid*). Given the increasing problems and complexities in the water sector, capacity building needs to respond to the whole range of concerns and also opportunities of IWRM (Ashton, 2008). That is, both holistic and sector-oriented approaches need to complement each other. IWRM helps to strengthen and enhance water governance through training and sharing experiences about the operations. The problems of water resources we face today (and in future) are directly linked to poor water governance (Rogers and Hall, 2003; Turton, Hattingh, Classen, Roux, and Ashton, 2007).

As stated by Haigh et al. (2010), individuals, institutions and society reflect a holistic approach towards the management of water resources. For instance, no institution can function efficiently without the support of a well-trained staff, or vice versa. Furthermore, neither staff nor institutions can realize their full potential without an enabling policy, legal environment and adequate financial resources (Ashton, 2008). This is why information exchange, networking, awareness raising and participatory approaches have become central modalities used to support the process of capacity building (Gray, 2008).

2.2.2 Human Resource Capacity in Local Government

Local government is the “level of government which is commonly defined as a decentralized representative institution with general specific powers devolved to it by a higher tier of government within geographical area” (Ismail, Bayat and Meyer, 1997 as cited in Tlakula, 2008:36). There are three different types of municipalities in South Africa, namely: metropolitan municipality (Category A); local municipality (Category B), and district municipality (Category C). Metropolitan municipalities only exist in South Africa’s six biggest cities; local municipalities comprise regions that fall outside of the metropolitan municipalities; district municipalities are made up of local municipalities that fall in one district. Overall, it is these municipalities that make up local government. It is known as a government that is closest to the public, and its strategic proximity enables it to decentralize services.

One of the major setbacks of local government is the inability to render effective and efficient service delivery, which to a large extent may be the result of lack of human resource capacity in terms of knowledge and skills (Turton, Hattingh, Classen, Roux, and Ashton, (2007). As highlighted in the first chapter, local government may have the authority and access to financial resources but unless they have the skillful human resource capacity to do the actual work, it is unlikely to produce the desired service delivery. Human resource capacity in this study is the effective utilization of human resource within the municipality in order to pave the way for effective implementation of water projects.

Inadequate human resource capacity may also be a crucial restrictive factor in the way of realizing a successful policy implementation. As a result, inadequate institutional capacity is

often used as a counterargument in proposals for policy implementation (Azfar, Kahkonen, Lanyi, Meagher and Rutherford, 1999). In this sense, they refer to capacity as the ability, competency, and efficiency of government spheres to plan, implement and evaluate policies and programmes designed to positively impact on a specific goal (Azfar, et al., 1999).

It is reported that there is insufficient capacity in SA municipalities due to the fact that there was a loss of experienced and skilled officials after the 1994 elections (van der Westhuizen, 2007). Van der Westhuizen (2007) further points out that most of these personnel left due to uncertainty of the new government and lack of common vision. Moreover, Turton (2010) asserts that after the transition to democracy, government allowed its technical capacity to decline precisely at the same time it was launching its ambition to extend potable water accessibility to the majority of South Africans. Thus, most local authorities largely lacked the capacity to do so (Turton, 2010). This gave rise to water supply problems and financial unsustainability of water service providers, leading to lack of attention to infrastructure maintenance. The quality of human resources is the key dimension of capacity. The quality of providing services relates to their skills and knowledge, and the way these skills and knowledge are utilized within the government (Azfar, et al., 1999).

Mananga (2012) alludes to the fact that most of the service delivery protests in South Africa are created by misuse of government resources as well as lack of capacity to implement and complete projects that assists the communities. This lack of capacity is hampered by the employment of under-skilled employees. The African National Congress (ANC)'s cadre deployment policy was claimed to have a negative impacts on service delivery in municipalities (Mananga, 2012). Mananga (2012) further points out that ANC comrades have been deployed in positions which they are not qualified to occupy and this exacerbates poor service delivery.

Skills and knowledge are generally measured by the level of education, training and job experience. While public servants may possess some of these skills, they may lack others. For example, they may have required information to assess local problems but lack the knowledge and skills to implement and manage large projects and budgets or coordinate policy implementation. It is therefore important to improve the capacity of officials in local government to maintain efficient, effective and sustainable water management, thereby enhancing water conservation and good governance. Nonetheless, even a highly skilled employee can be

unproductive if he or she does not have access to the necessary resources such as equipment and technology to execute his/her tasks.

2.2.3. Legislative Aspects of Water Governance

According to Rogers and Hall (2003), water governance demarcates a range of social, administrative, political, and economic systems which are put in place in order to build and manage water resources effectively and ensure delivery of water services at different levels. In this understanding, water governance is both a process and an outcome, involving a range of key stakeholders. In an effort to integrate the management of water resources (whilst addressing the issues of equity and sustainability), South Africa has initiated the process of decentralisation of management and regulation. This process requires the inclusion of stakeholders and public participation as expressed in the Constitution and both the National Water Act and Water Services Act. In this context, decentralisation is articulated through the development of several institutional measures. As a result, the decentralization of decision making to a local level must take place within the framework of institutional complexity which requires clear communication between the different governing structures (Pollard and Derick, 2005).

In this process, local governance structures, especially the local and district municipalities, must play a critical role in management and supply of water given their position as Water Service Authorities and Providers. In particular, water resources and their management are the responsibility of the National Water Act (NWA, 1998). Water Services Provision (WSP) falls largely under the Water Services Act (WSA, 1997) and functions to provide water services within municipal boundaries (NWA, 1998). As a result, this study raises the potential disjuncture that is developing between water services provision and water resources management.

Despite the National Water Act's new requirements (NWA, 1998) which demand a move towards the Integrated Water Resources Management, the longstanding exclusive focus on supply still dominates many water-related institutions. This means that there is a gap between water supply and water conservation, both institutionally and legislatively which delays, if not undermine, the plans and process of integration. This perpetuates the gap between sustainable water supply and water resource management.

The National Water Policy: NWP (DWAF, 1997) provides an outline for the management of water and provision of water services, and forms the foundation for two main laws: the National Water Act (DWAF, 1998 Act 36) and the Water Services Act (DWAF, 1997 Act 108). The water policy has adopted an approach that can be appropriated and summarized by the following motto: “*some for all, forever*”. This highlights the Constitutional commitment to provide access to “*sufficient food and water to meet basic human needs*” as a basic human right (NWP, 1997). Accordingly, the water policy makes provision to plan for sustainable water management in order to ensure that sufficient water is available for human needs of the current and future generations (DWAF, 1997).

The provision of water services takes place in the context of administrative boundaries of district and local municipalities. The Water Services Act (1997) frames the challenges of water sanitation and supply, and also outlines key institutions which are related to water provision such as water services providers and water boards (DWAF, 1997). As expressed in the National Water Policy, National Water Act (Act 36 of 1998) and Water Services Act (Act 108 of 1997), the decentralization of water regulation and management to local authorities must happen through the Water Services and Catchment Management Agencies. The argument here is that local authorities’ responsibility is narrow within Water Resources Management, especially since it focuses mainly on water supply (Pollard and Derick, 2005).

2.2.4 Institutional Aspects of Water Governance

According to the Global Water Partnership, “water governance refers to the range of political, social, economic and administrative systems that are put in place to develop and manage water resources and the delivery of water services at different levels of society” (Rogers & Hall, 2003:7), a practice now introduced in many countries. In order to realize more successful water governance, it is essential to strategically foster an enabling atmosphere which facilitates cooperation between private and public sector initiatives, especially to ensure the stakeholders’ participation in expressing their needs and deal with unaccountability.

According to Lawless (2009), empirical evidence suggests that there are no fixed solutions in dealing with poor governance. Even though there is no single model of effective water governance to emulate, in order to be efficient, research shows that governing systems must strive to fit the economic, social, and cultural particularities of that specific country (Rogers &

Hall, 2003). Therefore, it is useful to observe and draw lessons from some of the common characteristics that make water governance effective in practice. In this sense, we need to consider some of the basic principles which are essential for effective water governance. These key elements include, among others, open and transparent institutions, inclusive and participative decision-making, equitable access to the resource, coherent and integrated policies (GWP, 2005; Schreiner and Hassan, 2011).

Solanes and Villareal (1999: 27) define the principles for water governance. These are summarized below:

Approaches

Openness and transparency:

Institutions should work in an open manner. They should use language that is accessible and understandable for the general public to increase confidence in complex institutions. In addition to being open, good governance requires that all policy decisions are transparent so that both insiders and outsiders can easily follow the steps taken in the policy formulation.

Inclusive and participative decision-making:

The quality, relevance and effectiveness of government policies depend on ensuring wide participation throughout the policy chain from conception to implementation. Participation is likely to create more confidence in the end result and in the institutions that deliver policies. This is to say, governance institutions and systems need to communicate among the actors and stakeholders in very direct ways.

Equitable and Ethical Practice:

All men and women should have the opportunities to improve or maintain their well-being. Equity between and among the various interested groups, stakeholders and consumers needs to be carefully monitored throughout the process of policy development and implementation. Above all, water governance has to be strongly based on the ethical principles of the society in which it functions and the rule of law.

Coherent and integrative Practice:

Policies and action must be coherent. The need for harmony and coherence in governance is increasing as the range of tasks have escalated and become more diverse. Water governance should enhance effectiveness of Integrated Water Resource Management. The institutions will have to consider all uses and users within the traditional water sector and also their interconnections with and impacts upon all other potential users and sectors.

Performance and operation**Accountable:**

Roles in the legislative and executive process need to be clear. Each institution must explain and take responsibility for what it does, but there is also a need for greater clarity and responsibility from all those involved in developing and implementing policy at any level. Decision makers in government, private sectors and civil society are accountable to the public as well as to institutional stakeholders. This accountability differs depending on the organization and whether the decision is internal or external to an organization.

Efficient:

Is concerned with the quantity of inputs used to produce the desired outputs. The idea is to reduce inputs while maintaining or increasing outputs.

Responsive and sustainable:

Policies must deliver what is needed on the basis of the demand, clear objectives, and an evaluation of future impact and where available, of past experience. Responsiveness also requires policies to be implemented in a proportionate manner and decisions to be taken at the most appropriate level. The institutions should be built with an eye towards long-term sustainability. Water governance must serve present as well as future users of water services.

2.3 Integrated Water Resource Management (IWRM)

Water resources and their use(s) have become multifaceted, and this is reflected in the shift away from conventional sector approaches to what is known as Integrated Water Resources Management (IWRM) (Butterworth and Soussan, 2001), which explains the inter-relationships between the use(s) of water within the policy, institutional and legal context (under which they occur). According to Ashton (2008) and Cap-Net (2005), this makes IWRM “a systematic process for sustainable development, allocation and monitoring of water resource use in the context of social, environmental and economic objectives” (as cited in Jonch-Clausen, 2004:14).

“This intervention approach has been internationally accepted as an approach to water management that enables the three goals of efficiency, equity and sustainable development” (Jonch-Clausen, 2004: 14). There are different definitions of IWRM, but all stress its importance to achieving equity in access of water, social, economic, and sustainable development. IWRM mainly seeks to operationalize the Dublin principles.

With all these different objectives, it becomes necessary for water resource management to be integrated. “IWRM thus implies a move away from traditional sub-sector foci that address domestic water supply, wastewater, irrigation, industry and the environment separately (often within different agencies or government departments) to a more holistic approach (Butterworth et al, 2010: 69).”

Addressing trade-offs of different sub-sectors can prove to be challenging and there still remains the need for best strategies for intersectoral coordination. However, finding intesectoral solutions is not the only problem. Limited capacities in water sector institutions remain a threat to the pursuit of IWRM. Significant capacity building is required to support planning and implementation of IWRM at the local level, seeing that local government has become a vehicle for the national’s policies to have practical expression.

2.3.1. Implications for Integration in Water Resource Management

Generally, water is both a subject and resource in which we are all a stakeholder. Thus, we need to engage issues concerning water management, especially due to competition for the resource and the complex institutional constraints (Rank, 2007). This means that the decision-making process in the context of integrated water management can be time consuming as it involves many participants. In this process, water control facilities and environmental factors are both used in order to realize an effective water management plans (Rank, 2007).

As a systematic process, IWRM offers instruments that can be employed to ensure effective water governance that prioritizes and optimizes its availability and use (GWP, 2005). IWRM has proven its effectiveness in revealing difficult water use patterns and water resources management due to lack of awareness and knowledge of water as an unevenly distributed resource, lack of sufficient public involvement in decisions, lack of detailed and consistent legal implementation of general water regulation and lack of satisfactory trans-boundary and national decision rules (GPW, 2005; Gray, 2008).

To disrupt this, strategies to prioritize and satisfy the demands of different water users/sectors like human consumption, tourism, agriculture, and ecological needs should guide the process of IWRM to acquire water efficiency, infrastructure optimization, and public wise use of this scarce resource at the local level of government (Haigh et al., 2010). For instance, in South Africa, the municipal responsibility to manage water is often outsourced and given generally to parastatals such as Rand Water to deal with water quality services, wastewater and water supply, etc.

In the process, accommodating the standpoints of all stakeholders is often a challenge in the integration process due to differing perspectives. However, the views of stakeholders must be taken into consideration and trade-offs should be balanced (Jonch-Clausen, 2004). Jonch-Clausen further states that the complexity of IWRM requires wisdom and knowledge from various areas of disciplines which can bring valuable understanding about the possibilities and consequences of decisions and actions (2004). IWRM considers the viewpoints of water management agencies with specific purposes, governmental and stakeholder groups, geographic regions, and disciplines of knowledge (Mitchell, 1990) as described in the following figure 1.

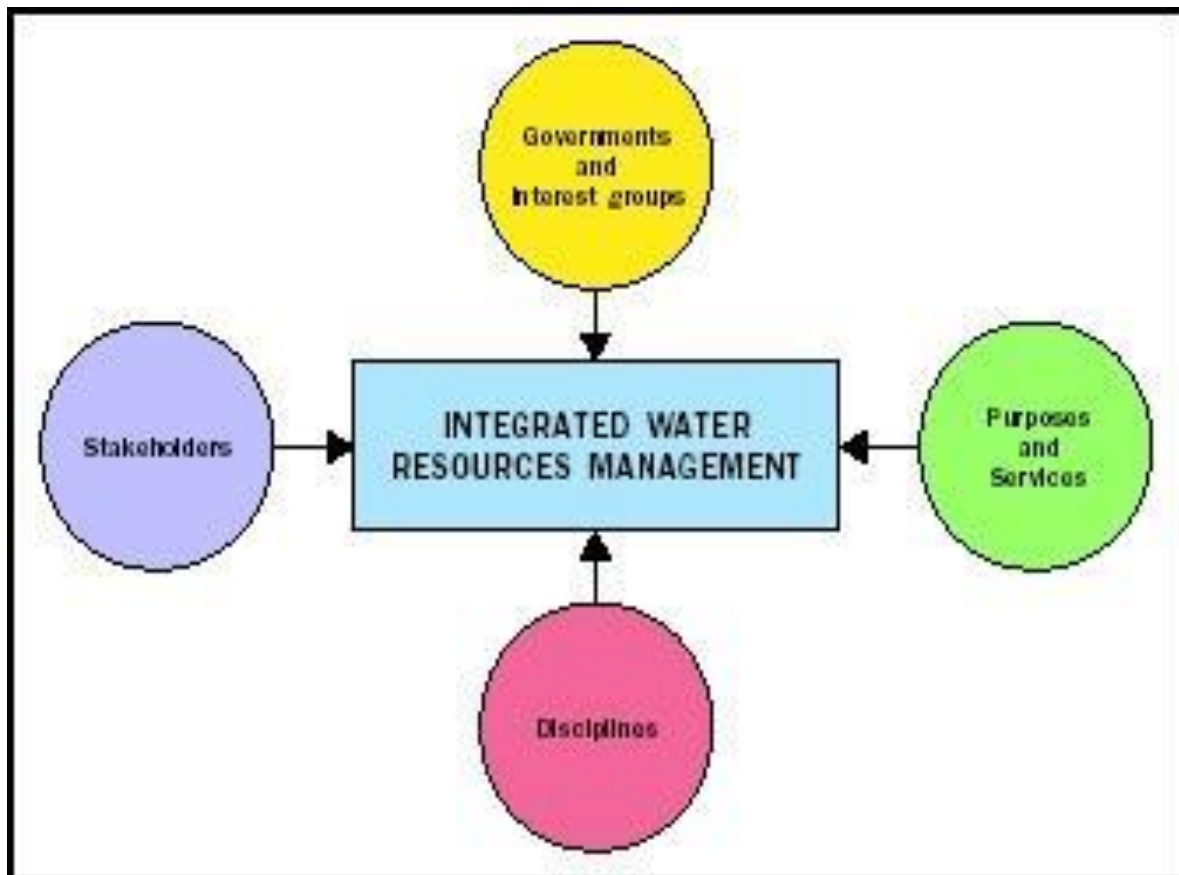


Figure 1: Components of IWRM. Source: www.iucn.org/themes/law, 11/02/2012.

The above figure highlights how water and water resources are linked to human beings from different perspectives. This means that all the different uses of water resources are to be considered together. When responsibility for drinking water, irrigation, industry and environment rest with different agencies, the lack of cross-sectoral integration leads to uncoordinated water resource development and management resulting in waste and unsustainable systems (Schreiner and Hassan, 2011). The need to put the IWRM approach into operation is becoming a more pressing issue recognized by the entire world.

The international conference on water and the environment held in Dublin (1992) stressed that water resources need to be managed at the lowest appropriate level, which can be highlighted as the responsibility of the local municipalities in the South African government structure. “IWRM promotes integration across sectors which recognize the finite and vulnerable nature of water resources; a need for more participatory approaches to develop and manage the economic value of water” (Butterworth et al, 2010:71). This Dublin conference placed IWRM on the international agenda. Hence, four guiding principles emerged and formed the foundation for the

implementation of IWRM in many countries (Rahamam and Varis, 2005:3). These principles are as follows (UN, 1992:2):

- Firstly, the effective management of water resources necessitates a holistic approach due to the essential role that water plays in sustaining life, juxtaposed with its limited supply.
- Secondly, the development and management of water resources should be undertaken through a participatory approach where decision-making with public consultation and involvement, occurs at the lowest possible level.
- Thirdly, the crucial role of women as both providers and users of water should be adequately reflected in water-related policies. Women should participate in the decision-making process and in the implementation of water resource programmes.
- Lastly, water is an economic good and has a corresponding economic value. Managing water resources by recognizing its economic value to society enables the achievement of both efficient and equitable water use.

These basic principles have boosted the perception that River Basin Organizations (RBOs) can achieve IWRM at the basin level (Report of the 1st general meeting, Batu, Indonesia: 2004). This is to state that “all the different uses of water resources are to be considered together, taking into account the wide range of people’s water needs. Water allocations and management decisions should consider the effects [and implications] of each use on the others and take account of overall social, economic and environmental goals” (Schreiner and Hassan, 2011). This means that people must make a conscious decision to manage water development in a way that ensures long term sustainable use for future generations (DWAF, 2004b).

According to Schreiner and Hassan (2011), with the rising economic development and population growth, demand for water is also increasing creating additional pressure on the finite water resource. As such, they argue that if adequate measures to improve water use efficiency and to conserve this scarce resource are not taken, attaining water security would be difficult (Schreiner and Hassan, 2011). IWRM is better suited to respond to these challenges because it offers a comprehensive management tool that makes use of participatory planning so that it can effectively manage water resources, especially since it involves the management of both demand and supply mechanisms in order to provide water services in an optimal way that allows for the attainment of the four broad goals mentioned above. Hence, “water demand management is the

part of IWRM that aims to influence the demand and usage of water for both institutions and individual consumers” (DWAF, 2001:4).

This also emphasizes the fact that water conservation plans should address conservation in terms of both the supply and demand aspects of water. IWRM considers the full range of sectoral interests as well as water resources allocation decisions taking into account the relevant constraints and objectives of society, which implies, integration across sectors; integration of use demand and the environment (Turton, et al., 2007).

Evidently, IWRM approaches are attractive because they provide a framework to manage competition for limited resources and the potential conflicts and inefficiencies that may arise, providing mechanisms to resolve the trade-offs between different users (Muller, 2010). Stakeholder participation to encourage wider ownership and to empower them is a key step in water conservation and management process with regard to IWRM principles. Also, active involvement of all affected and interested groups in promoting general sustainability to bring more resource efficient and socially responsible water management that benefits all sections of society will involve institutional arrangements facilitated through resource integration and human integration (Turton, 2008).

2.3.2 Legislative Aspects of IWRM

For the country to change its water management towards a more holistic and integrated management system, it will require a review of its water policy (Pollard and du Toit, 2008). This is currently on-going in many countries in Southern Africa. Water policy often starts with the definition of a small number of basic principles and objectives such as the need for sustainable and desirable socio-economic development. There are three key policy principles; Equity, Ecological Integrity and Efficiency, which are also known as three Es as defined by Postel (1992).

- a) **Equity:** Water is a basic need. No human being can live without a basic volume of fresh water of sufficient quality. Therefore, humans have the basic human right of access to water (Gleick, 1998; Republic of South Africa, 1996). This policy principle is related to the fact that water is often considered as a public good. This is to say, water is such a

basic requirement for human life and survival that society has to defend the uses of the water resources in the public interest.

- b) Ecological integrity: water resources can only persist in a natural environment capable of regenerating potable water of sufficient quantity. Only sustainable water use should be allowed such that future generations will be able to use it in similar ways as the present generation and therefore healthy ecological environment can be preserved.
- c) Efficiency: water is a scarce resource. Therefore, institutional arrangements should be such that cost recovery of the water services should be achieved. This will ensure efficiency of water use and sustainability of infrastructure and institutions.

Most water resources management agreements are about finding appropriate middle ground between these policy principles that sometimes conflict with each other and the different aspects of IWRM (Savenije & Van der Zaag, 2002). The Dublin Principles established the concept of water as a scarce resource crucial for sustainable development, as an economic good, but it is also seen as a basic human need and even a right. This view creates a conflict of interest whereby, there is an over-exploitation of water resources under conditions of open access for human survival, consequently resulting in the abuse of the resource and lack of sustainability.

2.3.3 Institutional Aspects of IWRM

The complexity of water management creates a need for the management of water to be at the lowest appropriate level, resulting in the national government delegating functions to the devolved organizational and operational level (World Bank, 1993). Thus, in managing the resource, a practical differentiation is made between constitutional issues, organizational issues and operational issues (World Bank, 1993), which are the three aspects of institutional arrangements.

The three different aspects of institutional arrangements (Solanes and Villareal, 1999:29):

Constitutional level: This refers to the activities being governed by agreements of international organisations, the national constitution, and national legislation.

Organizational level: Activities at this level are defined by state regulation, governmental regulation, and provincial regulation.

Operational level: This includes activities being governed by cities, districts sub-catchments, by-laws of public or private water users' organizations etc.

The most imperative issue in dealing with water resources is to ensure coordination of activities by different fields of institutional structures that all have a bearing on water. For example, ELM as a water services authority have an effective collaboration with Rand Water which is a bulk water supplier and DWA which is a water resources custodian, as well as private companies such as GIZ and Sasol.

2.4 Water conservation

Water conservation refers to the “minimization of loss or waste, care and protection of water resources and the efficient and effective use of water in order to meet economic efficiency, social development, social equity, and environmental protection, sustainability of water supply and services, and political acceptability” (Kerr, 1989:94). In other words, water conservation refers to the process of reducing the usage of water and the recycling of waste water for different purposes such as cleaning, manufacturing and agricultural irrigation. Thus, water conservation is understood as any possible water use and waste reduction, as well as the preservation in water quality which involves the improved water management practices (Ashton, 2008).

This needs the adaptation and implementation of policies and initiatives by water institutions to influence the water demand and usage. Some researchers have suggested that water conservation efforts should be primarily directed at farmers, in light of the fact that crop irrigation accounts for 70% of the world's fresh water use (Vickers (2002); Pimentel et al., (2004); and Helmle (2005). This section will focus on sustainability of water resources and water use efficiencies.

2.4.1 Water use efficiencies

Water efficiency is nonetheless the accomplishment of a function, task, process, or result with the minimal amount of water feasible [which is] an indicator of the relationship between the amount of water required for a particular purpose and the amount of water used or delivered

(Vickers, 2002). Due to declining water tables and diminishing spring flows, it has become necessary to improve the utilization and management of water through conservation (Akkad, 1989). Water conservation includes, among others; technologies, techniques and procedures that enhance effectiveness and efficiency of water use (Charalambous, 2001). In this case, efficiency is a measure of the extent to which the resources of water in an organization are utilized to provide the service, while effectiveness is a measure of the extent to which the [target] objectives are met (Keller and Keller, 1995).

The key focus of water efficiency is reducing waste, not restricting use. This entails, for example, fixing leaking taps, taking showers rather than baths, installing displacement devices inside toilet cisterns, and using dishwashers and washing machines with full loads to obtain the desired result or level of service with the least necessary water (Keller and Keller, 1995). Water efficiency is essentially required because of the growing human demand, especially given the looming effects of climate change, meaning that the future of water supply is not stable. This aggravates the competition for water amid industrial, agricultural and human consumption.

This is the reason why it is preferable to refer to the concept of effective and efficient water resource management “which takes into account both the quantity and quality of water [taken] from and returned to a basin’s water supply when estimating the total freshwater input for each use-cycle in water conservation process (Keller and Keller, 1995). Salmon (2007) argues that water conservation should not be equated with the restrictions for consumer use. He further explains that while water conservation programmes focus on the on-going improvements in the water use efficiency, water restrictions have been used as a quick fix measure for drought management or water shortage situation(s). Furthermore, “it is widely recognized that naturally occurring water usually can only be effectively and efficiently managed within a river basin or catchment area, because of the ability to manage all aspects of the hydrological cycle” (Ashton, 2010:1). He explains that this “catchment-based approach helps to achieve a balance between the interdependent roles of resource protection and resource utilization” (ibid).

In addition, water conservation serves two main purposes; 1) reduction of water loss over a prolonged period of time, and 2) suppressing peak demand requirements. This has a considerable impact on the size and capacity of facilities required to provide reliable supply to consumers (Akkad, 1989). In order to successfully implement water conservation measures, social and behavioural factors of water use need to be considered, including the impact of behavioural

influences on water consumption within the numerous socio-economic structures of Sedibeng municipality. This means that the municipality must strive for behavioural change that will maintain both the current and future water saving requirements, while simultaneously focusing on residential socio-economic sections within its jurisdiction in order to enhance water related behaviors that exist. Also, the municipality must be able to assess the effectiveness of selected behavioural change models to positively influence water conservation. This can only be feasible when applying integrated water resources management principles.

2.5 Summary of frameworks for water management and conservation in SA

2.5.1 Water Services Act (WSA, 1997)

In keeping with the provisions of the Water Services Act (1997), municipalities are given power to improve water services development plans for their areas of jurisdiction. However, a water authority does not have to be the same as a water provider, and the Act provides for alternative arrangements such as joint ventures and parastatals, thereby opening the way for the private sector's involvement in the process. The Act was in fact a regulatory instrument for water services leaving the department of water affairs and forestry ultimately responsible for monitoring water service providers, including private sector providers (DWAF, 1997). This Act followed by the Municipal Systems Act of 2000.

2.5.2 Local Governments: Municipal Systems Act (MSA, 2000)

The MSA (2000) allows for local government to provide services which will be meaningful to the people and contribute towards their social and economic empowerment. Moreover, it defines the legal nature of municipalities and also deals with management issues like planning, performance management, and organization change. The Act has solely considered the development of local government and the people on the ground. The Act highlights the issue of water supply to the people by the local government and clarifies issues on service delivery which includes the outsourcing of service provision to the contractors, instead of the public sector doing the work. It further requires the municipalities to ensure that proper process of community consultation are adhered to and information reaches the community.

2.5.3 The free water policy

In 2000, the minister of Water Affairs and Forestry made a public announcement about the provision of free basic supply of water amount from 6 to 15 kilo litres per month depending on the level of poverty and the size of household. The policy is used to determine the bill for any water consumed over and above the free basic water. Even though the policy was received with dissatisfaction by elites, poor communities were appreciative. A task team was established to oversee the free basic provision. The team consisted of members from different departments such as the South African Local Government (SALGA), National Treasury, Energy and Minerals, and the Development Bank of Southern Africa (DBSA). The team was mandated to deal with the challenges of delivering on the policy.

2.5.4 Blue Drop Status

In 2008 the Department of Water Affairs introduced a so called “Blue Drop Status” incentive-based water quality regulation. Under this regulation, Drinking Water Quality Management was placed under the spotlight with the introduction of the Blue Drop Certification Programme; ensuring that municipalities and water service providers alike are held accountable to provide tap water of safe quality to its constituencies (Blue Drop Status, 2012). The programme was an incentive-based regulatory initiative that required water service institutions to provide information as per requirement of section 62 of the Water Services Act 108 of 1997.

The Blue Drop certification required the Water Services Authority to ensure that water was safe to drink and complied with the national standards by scoring 95% Blue Drop Requirements. Water Service Authorities are certified with a Blue Drop if they meet certain requirements. These include not only monitoring compliance with water quality standards, but also the existence of water safety plan, process controlling and credibility of sample among others.

2.5.5 Theories of water provision

Water is a scarce resource internationally, and both the private and public sectors are making efforts to preserve it. The sustainability of water provision services is also an important focus of sustainable development. As such, a range of theories about water provision and sustainability exist, four of which are discussed below:

2.5.5.1 *Water demand management theory*

This theory highlights efficiency and equity in water provision. Brooks (2007) argues that for efficiency and equity to be attained in the provision of water the following actions are required:

Institution and laws: Demand and supply always take place within a particular set of legal guidelines; water rights, civil and social institutions, and land rights, and these can be informal or formal, tradition or modern, local or international. They all play a role in conflict resolution. A good legal framework and its enforcement can make governance in water management easy.

Market-based measures: Pricing is seen as a relevant but not convincing incentive for realizing efficiency, sustainability and equity. This is usually the case where poor people cannot afford to pay high tariffs. As such, pricing can be seen to encourage conservation but not cost recovery. Moreover, imposing certain tariffs on people does not always work. For example, in rural areas it can be a serious challenge as most people are unemployed or earn low salaries. Subsequently, equity and efficiency will be compromised; therefore, sustainable development might not be achieved. However, credit control should be adopted to control water consumption.

Non-market measures: This applies if strict regulations are put in place such as disallowing the use of hosepipes to irrigate the gardens. In this case, the regulations should be both suitable and effective for managing the demand of water.

Direct intervention: This refers to direct intervention by government and water suppliers by providing services which include installation of conservation equipment, fixing leaks, adjusting pressure and providing sewage.

2.5.5.2 *Community Participation*

Community participation entails the inclusion and active involvement of community members in various stages of a project. This participation presents a high possibility of fostering ownership and sustainability of the project(s). It ensures that development belongs to the community and should be owned by them. Community participation in water projects can encourage communities to take responsibility for water services. Swanepoel (2002:5) argues that “the huge problem of sustaining development and maintaining facilities instituted by development is

resolved if the affected people participate, knowing that they have a stake in the effort and the result”.

Swanepoel (2002) notes that development cannot and should not be externally managed. Human development is for the people by the people. It should not be imposed on people but people should manage it themselves. This is why public participation is so fundamental in development planning. Communities have to be involved in policy-related discussion(s), amongst other things. Turton, et al. (2007) asserts that “water resource management processes need to become more people oriented, rather than being dominated by purely technical considerations”. This calls for a fundamental goal of human resource capacity development, whereby people’s ability to evaluate and address water resources management issues is enhanced.

2.6 Conclusion

The concepts discussed in this chapter support the underlying assertion assumption of the research topic that there is a need to build institutional capacity for water conservation at local government level. In other words, institutions do matter in influencing outcomes. If local government water conservation and management is to be successful, there is a need to institutionalize it at the municipal level. With this in mind, an argument can be made that in order to assess whether Sedibeng District Municipality has the capacity to implement IWRM for water conservation, there must be an assessment of its institutional capacity. Then, based on the assessment, appropriate options to develop the required institutional capacity can be proposed.

The IWRM is clearly not about integrating institutions responsible for water into some sort of vast controlling bureaucracy. Rather, it is about the harmonization of the approaches and understanding of the multitude of different resource managers. This is a matter of persuasion and information so that different actors can see that it is to their long-term benefit, as well as the wider social good, to modify their management of water resources. On their own, however, policies are not enough. They need to be translated into effective action and it is this step that is often the missing link. (Muller, 2010).

Furthermore, the literature reveals that the consensus is growing that water scarcity and misuse of water poses threats to sustainable development. Therefore, water as a natural resource should

be conserved in order to be sustainable. The sustainability of water involves the government working with the community and the different stakeholders within the community, improving people's lives but allowing them develop economically without putting the environment into jeopardy. Efforts by government to increase access to water services have yielded some positive results over the past few years. Despite the apparent success in water provision, access to clean potable water will be a great challenge in the near future, especially if we don't give appropriate value to the resource. The following chapter details the manner in which the research was conducted as well as the process of obtaining and analyzing data.

Chapter 3

RESEARCH METHODS

3.1 Introduction

This section presents the research approach, describes the nature of the research, data collection methods, data analysis as well as validity and reliability of the results. It is important to select a research design that spells out the approach that will be studied. When the study was conceptualized, the main focus was on the institutional capacity to pursue and implement the IWRM approach. Therefore, it became imperative for the researcher to conduct qualitative, descriptive and explorative research in order to evaluate and provide a clear understanding of the situation of water conservation in Sedibeng Municipality.

3.2 Research Approach

The subject matter of this research focuses on the challenges of water conservation, in relation to the institutional capacity and IWRM. This informs the types of data collection methods utilized. This study employs a qualitative method approach for collecting and analyzing data. The choice of qualitative inquiry fits the proposed research given that not much is known concerning the challenges to be investigated (Creswell, 2003). “The goal of qualitative research is defined as a describing and understanding, rather than the explanation and prediction of human behaviour” (Babbie and Mouton, 2006:357). A qualitative approach is a suitable method to study human action, the perspective of social actors themselves and allows the researcher to use a broad methodological approach (Creswell, 2003).

Leedy and Ormrod (2005) hold that qualitative research provides a means through which the effectiveness of particular policies and practices can be judged by a researcher. Further, Neuman, (2006) explains that qualitative methods can be used to develop explanations or generalizations that are close to real data and context. Moreover, a qualitative approach is flexible because it allows the researcher to modify the research plan at any time and adapt the methods timeframes and other aspects of the study to suit the objectives of the study (Neuman, 2006). Situations sometimes change in the middle of the research and this requires adjustment to

the plan as well. However, there are limitations that are associated with qualitative research which revolve around time, finance and availability.

Fontana and Frey (2005) state that interviews are used as a tool when a researcher wants to find an in-depth knowledge from participants about their attitudes, perceptions, and feelings of reality. As such, a questionnaire was used as a research technique and questions followed a particular order, providing guidance to the interviewees and allowing room for extended expression when responding to questions. Follow-up questions with the aim to construct as complete a picture as possible from the respondents were made. Through this process, the researcher aims to explore and gain an understanding from the perspective of the Sedibeng Municipality water sector officials and community-based organization practitioners on how IWRM is being implemented, the role of institutional capacity in that implementation process as well as the challenges that come with conserving water resources. This objective is realized by means of interviews and review of relevant municipal documentation. Therefore, data is collected using primary and secondary sources.

Secondary Data – Document analysis

The objective of the study will be met by reviewing published and unpublished material on the subject. Some documents which were critical to the study were collected during and after the interviews, and were used by the researcher to conduct document analysis to extract secondary data. The Municipal Integrated Development Plan 2012-2013, its WSDP as well as water loss reduction project plan were analyzed to extract data related to water conservation and management.

Given the complex nature of water as a natural resource, most legislation has at least some impact on water resource conservation. The study necessitates a review of Sedibeng municipality's mandate(s) relating to environmental, economic, land-use and water management, especially where related to water conservation in reference to the following policies and legislation: National Water Act of 1997, Water Services Act of 1997, Municipal Systems Act of 2000, National Environmental Management Act of 1998 and Free Basic Water policy.

Primary Data – In-depth Interviews

The data collected through interviews is referred as primary data. Primary data refers to information that is “close to the truth” and is derived from direct observation of a particular phenomenon or direct interaction with the stakeholders (Leedy and Ormond, 2005). The interview is one of the most frequently used methods of data gathering within the qualitative approach. It is a data collection technique that involves oral questioning of participants either individually or a group (Leedy and Ormond, 2005). Opting for a qualitative method, primary data was sourced through semi-structured individual interviews; i.e., officials from water sector were interviewed in order to gather primary data.

The interviews allow for the direct interaction and to some extent contribute in establishing trust between the two parties (Leedy and Ormond, 2005). Open-ended questions are an important component of in-depth interviews and allow the researcher to probe for more answers and attend to any confusion that may occur (*ibid*). An in-depth interview method is preferable for this study because it can create an environment that encourages participants to discuss their lives, opinions and experience in free flowing discussions to help the researcher gather ‘authentic’ understanding. As such, the objective of the study is also be met using in-depth interviews with leading water sector practitioners and stakeholders in the local government water planning departments.

The involvement of the all stakeholders in the planning and management of water resource is a crucial element in obtaining an effective and equitable utilization of water. As explained above, data was collected from seven people who have been purposively selected on the basis of their involvement with the water sector. Research data was therefore be collected by means of semi-structured interviews, and also from document reviews, i.e. IDP, WSDP, water projects plans etc. Sedibeng Municipality was selected for ease of access from where the researcher resides.

3.3 Case study method

According to Yin (1994:23), “a case study is an empirical enquiry that investigates a contemporary phenomenon within a real-life context, particularly when the boundaries between the phenomenon and context are not clearly evident and in which multiple sources are used”. Case studies are presented as analytical depictions of various kinds of information collected from various sources (Strauss, 1996).

Case studies are often used as a research strategy when “how” and “why” questions are being asked (Yin, 1994). They are effective in situations that do not require control over behavioural events as in experiments, and are also useful in cases where contemporary knowledge is more important than historical knowledge (*ibid*). They can be descriptive, explanatory or exploratory (Yin, 1994). However, when presented they should reflect a conceptual analysis of the information gathered using theoretical frameworks and comparisons (Strauss, 1996). They can be conducted as either a single case study where a single phenomenon is being investigated or as multiple case studies where a number of entities are being studied with the intention of making comparisons (*ibid*).

On one hand, a major advantage of using case studies as a research strategy is that they have the strength and the ability to deal with a broad selection of material e.g. documents, interviews and observations (Yin, 1994). Case studies take an inductive approach, thus providing for an in-depth investigation of the phenomena. On the other hand, case studies have been criticized for a lack of rigour, for providing little basis for scientific generalization, for taking too long and resulting in massive “unreadable” documents (Yin, 1994). This impact on the validity of the results is often doubted in case studies.

3.4 Rationale for choosing the case study method

Firstly, the research questions that this study deals with are both exploratory and descriptive in nature. For this reason, the case study method is regarded as the best type of method within which to investigate and answer the research question(s). Secondly, given the context of local government transformation in South Africa today, both contemporary and historical data are relevant in this study, although the main focus will be on contemporary data. New ways of doing things in local government municipalities are continually being developed. Since no best

practice can be claimed to exist in the country yet, this is an opportunity to document these developments for the purpose of using the data as learning material for other municipalities. Thirdly, while the results of a single case study may not be generalized to all local municipalities in South Africa, it can provide valuable lessons for improved development of institutional capacity for water management in the local government arena. The case study method is thus an appropriate method for this study.

3.5 Data collection

The data analysis and presentation in this research thus involved transcription of recorded interviews. The data identified in this the study went through the stages of coding, summary, themes and interpretation. The data identified here were summarized, organized into themes and finally interpreted. The themes that emerged from interviews conducted include: stakeholder participation, water education and awareness campaigns, cross departmental integration.

3.6 Data capture

Neuman (2011: 463) refers to open coding as the ‘first pass’ through recently collected data. Data that was collected by means of interviews and document analysis was categorized in relevant topics. The researcher formulated themes under which the data collected were categorized. These themes were to some extent aligned with different research questions. “Themes were at a low level of abstraction and came from the researcher’s initial research questions, concepts in the literature, terms used by members in the social setting or new thoughts stimulated by the researcher’s concentration on the data” (Neuman, 2011: 463). Badenhorst (2007:25) argues that the research questions could provide an organizing framework for a research report.

The argument made by Saldana, (2013:5) is that coding is both natural and deliberate. He explained that coding is deliberate because one of the primary goals of the coder is to establish patterns of action that are repeating and consistencies in human affairs as documented in the data. In this research, there were more repetitive patterns of evidence that came out naturally from the interview sessions as will be reflected by the findings. Such patterns promoted the development of themes and thematic codes that allowed the researcher to proceed with thematic analysis.

To code qualitative data into themes, the researcher had to be able to recognize patterns in the data in terms of concepts and frameworks. The researcher used knowledge derived from the literature reviewed in chapter two to extract meaning from the data collected. From the meaning, the researcher examined patterns and connections, and started to build the theory thereby analyzing the data.

3.7 Validity

Since validity refers to truthfulness, Neuman (2011) argues that qualitative studies are more interested in the authenticity of understanding truth and not about narrowing the viewpoints. In ensuring validity, this research ensured that profound understanding of challenges associated with the institutional capacity development was created and also provided detailed information to inform the conclusions. Therefore, this research used both primary and secondary data to ensure a more profound understanding of capacity challenges associated specifically institutional arrangements in Sedibeng Municipality. The findings were not generalized to all municipalities in SA but used to explain the extent to which institutional capacity to implement IWRM exist in Sedibeng Municipality.

3.8 Reliability

Reliability is always a chief concern in all research. The researcher understands that it is impossible to have 100% reliability but has ensured that the concepts developed and analyzed in this research used a precise measurement. The information retrieved from ELM was followed up after the planned interview process was over; this was done to ensure that data collected were reliable (Neuman, 2011).

Neuman (2011:214) defines reliability as “dependability or consistency”. In ensuring consistency, the researcher asked similar set of questions to the different respondents that took part in the interview process. The findings of this research were however very much reflective of the responses that were discovered during the interview process.

3.9 Limitations of the research

The nature of the study would not allow for universal generalization to other municipalities even though they have similar mandates. This was due to the specific nature of the sample size, the methods used and the specific nature of the recommendations provided. However, the study could be used to understand the context of Sedibeng Municipality and also to assist in dealing with similar mandates in other municipalities.

The inability to find appropriate stakeholders for interviews. The researcher initially planned to have seven interviews but two were on leave at the time the researcher conducted the interviews so only five were personally interviewed. The other two emailed their responses to the questionnaire.

The study was limited by lack of information from the municipality as municipal officials were not be willing to divulge internal weaknesses or confidential information thereby falsifies information. To overcome some limitations, a brief participation and information sheet concerning the research and its purpose was given prior to interviews. In addition, ethical measures were advanced and communicated with the respondents beforehand.

3.10 Ethical Considerations

There have been provisions of guidance by researchers on ethical conduct in the research. Concerns, conflicts, and dilemmas are some of the ethical issues that arise from conducting a research. Thus a researcher has a moral obligation to be ethical (Neuman, 2011). The ethical considerations ensured in this research were therefore that:

Anonymity in this research was taken into consideration. To that effect, the researcher did not include any name of the respondents. Permission was sought from the respondents as to whether they would allow the researcher to state positions they hold in the office and they had no problem with that. The opinions which the respondents expressed in this research were in no way associated with them personally. The issue of confidentiality was discussed with the participants that the information they provide was only to be used in this study which will be kept at the Wits library and electronic data base and only to be accessed by authorized personnel.

The researcher found it very important to get permission from the different respondents that took part in the interview process. The researcher thus visited the offices of the different respondents

first and gave the respondents participation and information sheet regarding the research study conducted, and then only after that were appointments for interview dates were set. All the respondents gave their permission and different dates for the interviews. The researcher negotiated that appointments be made within two days' time frame.

The sensitivity of the research has the potential elicit negative reaction from the Sedibeng municipal officials and ruling party. Therefore, the researcher applied for ethics clearance certificate from the university as a symbol of approval to conduct the study. Sedibeng municipality is a very small municipality and people could easily detect who provided particular information. Therefore, data required diplomacy to guarantee respondents' protection.

3.11 Conclusion

This chapter explained clearly the methods used in this study. The specific paradigm used in this study was the interpretive paradigm. The sampling approach and how data was collected and captured, and presented and analyzed was also discussed. It also provided an explanation of the validity, reliability, and limitations of the study. Furthermore, the ethical considerations which looked at the issues of conducts, concerns, dilemmas and possible conflicts were provided.

Chapter 4

Emfuleni Local Municipality - CASE STUDY AREA

4.1 Introduction

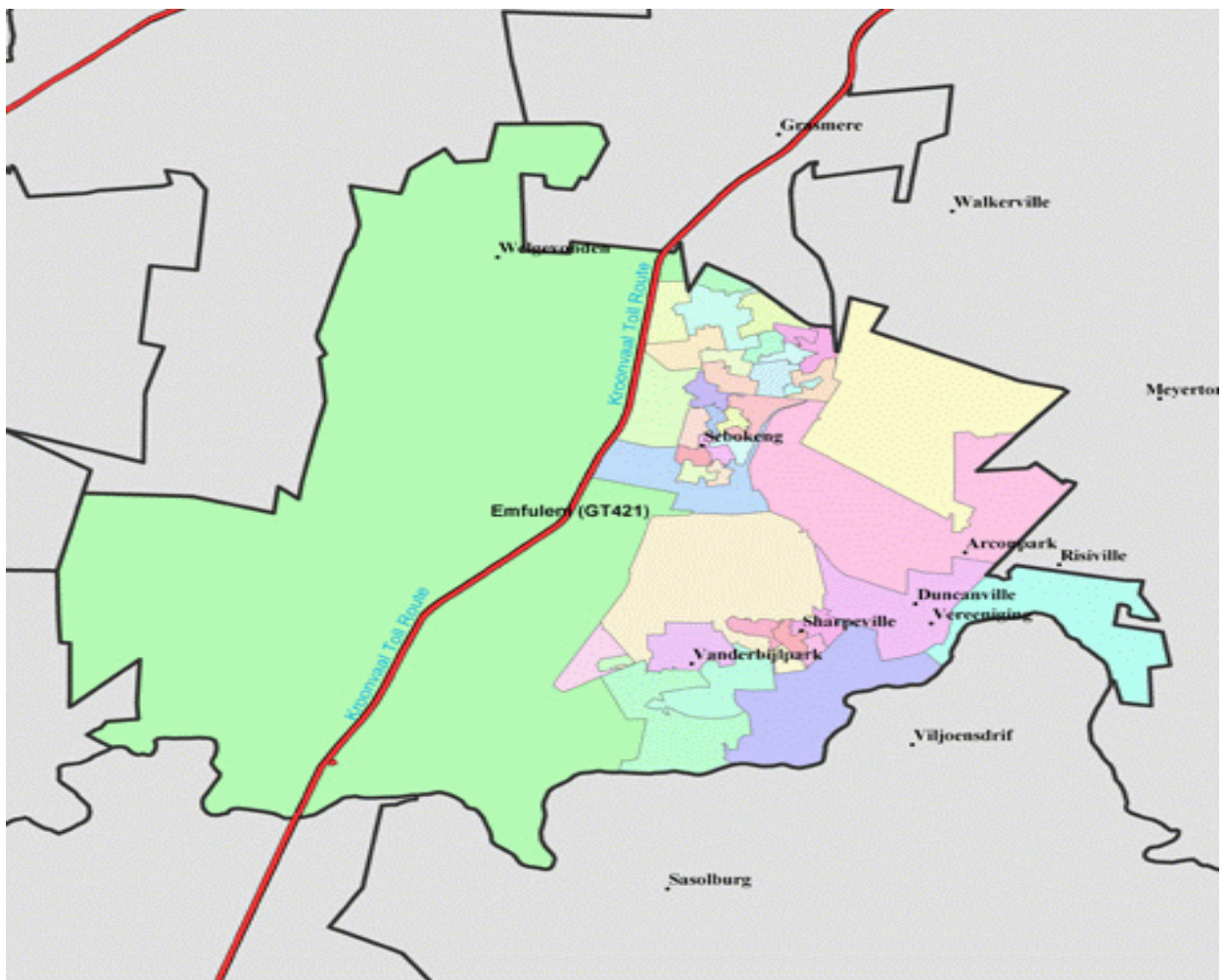
This chapter briefly presents and describes the case of the study area. The main area of focus was Emfuleni Local Municipality which is located in Sedibeng District Municipality. Sedibeng is located in the Vaal Triangle (Gauteng province), and the most widely spoken language is Sesotho (Stats SA, 2011). The district is made up of three local municipalities, namely Emfuleni, Lesedi and Midvaal. While Midvaal occupies almost half the geographical area of Sedibeng District, 80% of the population lives in Emfuleni (Census, 2011). This is the main reason why Emfuleni was used as the focus area for the research report.



Map 1: Sedibeng district. Source: The South African LED Network (<http://led.co.za/municipality/sedibeng-district-municipality>, 11/02/2012).

Emfuleni is in the west most of the three municipalities comprising Sedibeng district, which is in the southern area of the Gauteng province. Emfuleni covers approximately an area of 987.45 km². Emfuleni shares boundaries with Midvaal to the east, Metsimaholo to the south, City of Johannesburg to the north and Westonaria and Potchefstroom to the west (ELM IPD, 2012-2013).

The municipality is strategically located with access to a well-maintained road networks such as N1 which links Johannesburg to Bloemfontein. The strategic location of Emfuleni gives it the advantage to exploit tourism opportunities and other forms of economic development. Emfuleni has two main centres, namely: Vanderbilpark and Vereeniging within the area, with Sasolburg which is 10 kilometres to the south (ELM IDP, 2012-2013). ELM is also has six large semi-urban townships, namely: Boipatong, Bophelong, Evaton, Sebokeng, Sharpeville, and Tshepiso. Emfuleni forms the part of what was formerly known as the Vaal Triangle, well known for its contribution to the steel and iron industry in South Africa (ELM IDP, 2012-2013).



Map 2: Geographical Overview of Emfuleni Local Municipality. Source: ELM IDP, 2012-2013.

4.2 Background to water provision and management in Emfuleni Local Municipality.

Emfuleni Local Municipality as a Water Services Authority has delegated Metsi-a-Lekoa as an internal Water Service Provider to assess and ensure immediate to medium term implementation of its rights and obligation to realize the sustainability and turnaround of water services delivery and demand management.

The Water Services Activity Chain in ELM

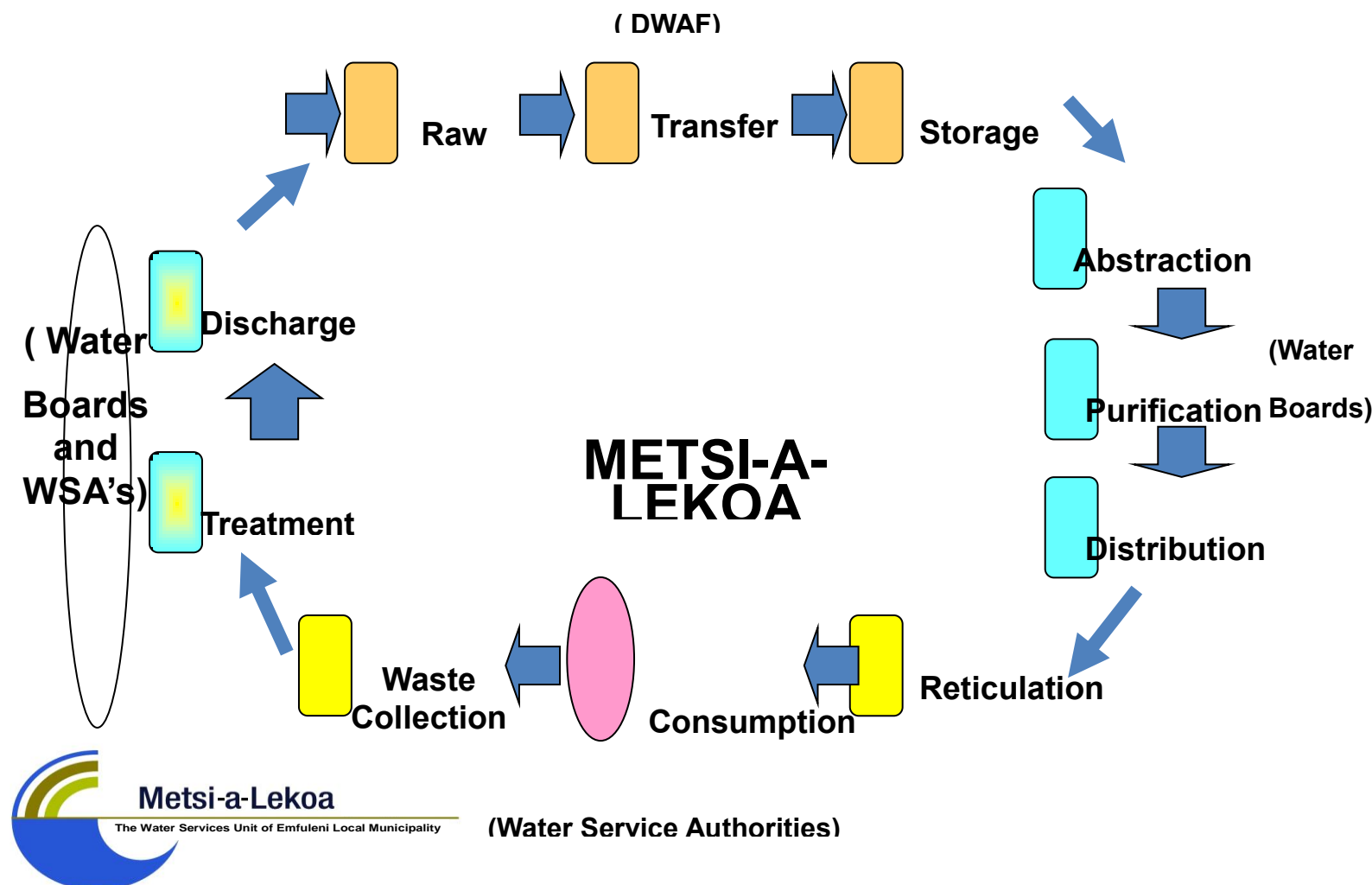


Figure 2. Metsi-a-Lekoa Activity Chain. Source: (ELM IDP, 2012-2013).

Metsi-a-Lekoa is a ring-fenced water services business unit of the ELM which was established in 2005. Historically and traditionally, the operations and management of the Water and Sanitation management were under the control of the Emfuleni municipality through the Lekoa Water Company (DWA, 2009). Emfuleni municipality council decided to ring-fence this service as part of water management strategy. The outcome arose due to the deteriorating financial and operational water services delivery situation within Emfuleni and the resulting inability to effectively carry out service delivery requirements and to meet the expectations of the wider community.

This restructuring decision was premised on the fact that the new entity should drive water services delivery and demand management in a way that is effective and efficient. As a result, Metsi-a-Lekoa has a mandate to maintain water services system and is also responsible for all costs associated with portable water supply.

Currently, Emfuleni Local Municipality supplies water to approximately 721 000 people or 220 000 households (Stats SA, 2011) from Rand Water at a cost of over R 420 million per annum. The total annual consumption is approximately 83 million m³ with an average unit consumption of about 31 m³/household/month which is considerably higher than the national average of 26 m³/household/month (ELM IDP, 2012-2013).

The Sebokeng and Evaton areas, situated in the northern part of Emfuleni municipality, are predominantly residential areas with approximately 74 000 connections, supplying approximately 397 000 people in 115 000 households, each of which is supplied with an individual water supply as well as water -borne sewage. The annual consumption for this area is approximately 38 million m³. The average household consumption is about 28 m³ and currently, there is no incentive for residents to repair leaks on private properties. The municipality doesn't take responsibility to fix infrastructure in private properties, which results in excessive leakage and wastage and unsustainable use of water resource (ELM IDP, 2012-2013).

To address this problem, the municipality entered into a public-private partnership with Sasol and Gesellschaft fur Internationale Zusammenarbeit (GIZ) in 2012 to provide seed funding for a water loss reduction project. In return, the municipality agreed to ring fence the savings created by the reduction in water use to augment the seed funding and to continue with water

conservation interventions. It was anticipated that the seed funding from Sasol and GIZ will serve as a catalyst to improve the deteriorating water supply situation in the area.

An estimated 15% reduction in water demand was set to be achieved by the end of 2014, which will save the municipality approximately R17 million in water purchase costs annually. If this target saving could be achieved, the savings will be re-invested into the water loss reduction activities so as to provide funding necessary for the water conservation projects. Based on the results reported on Boloka Metsi project (2014), ELM had achieved a reduction of 8.2% by the end of June 2014. It is anticipated that with the reduction of 15% the municipality will be able to provide a better service, create jobs, reduce leakage and wastage, and reduce consumption in the overall Vaal river system (ELM IDP, 2012-2013).

4.3 Conclusion

This chapter discussed the geographical overview and demographical context of Emfuleni local municipality. It also gave a background to water provision and management in the municipality.

Chapter 5

DATA PRESENTATION

5.1 Introduction

This chapter presents the data collected during field visits, in which interviews were conducted with various stakeholders. Furthermore, this will include municipal documentation such as the Integrated Development Plan and Spatial Development Framework, as well as Water Loss Reduction Project Plan. During the data collection process, the researcher discovered repetitive patterns that led to the development of the following themes, which will be presented in this chapter: water resources management; improved communication and stakeholder involvement; capacity challenges of the municipality; and water as a valuable commodity. The findings were largely based on the personal interviews that were conducted on the seven interviewees as per the sampled target group in Table 1 below.

5.2 Social Demographic information

With regard to the interviewees, their ages range between 29 and 48 years. They were categorized as Municipal member 1 & 4 (Customer care division) Municipal member 2 (Project management division), Municipal member 3 (Environmental management division); community member 1; and Engineer 1 & 2 (Water management division). This was done to protect the identity of the respondents seeing that some issues maybe be sensitive. All respondents have tertiary qualifications some diplomas and some bachelors' degrees. However, based on their type and level of education, it is deduced that there is a potential mismatch in regard to job description and tertiary qualification. 29% of respondents' qualifications are irrelevant to their respective jobs, possibly creating capacity limitations.

5.3 Water Management

Emfuleni Local Municipality was classified as a Water Services Authority under Sedibeng District Municipality. This meant that ELM had a duty to gradually ensure affordable, efficient and sustainable access to water supply services for communities under its jurisdiction (Water Services Act 108 of 1997).

The municipality receives potable water directly from Rand Water and it is delivered to communities through pump pipe system. ELM doesn't have measures in place at the moment for water recycling. The only way in which water is "recycled" is from the sewerage purification plant back to the river. The main use of water in the municipality is for domestic purposes, as depicted on the graph below:

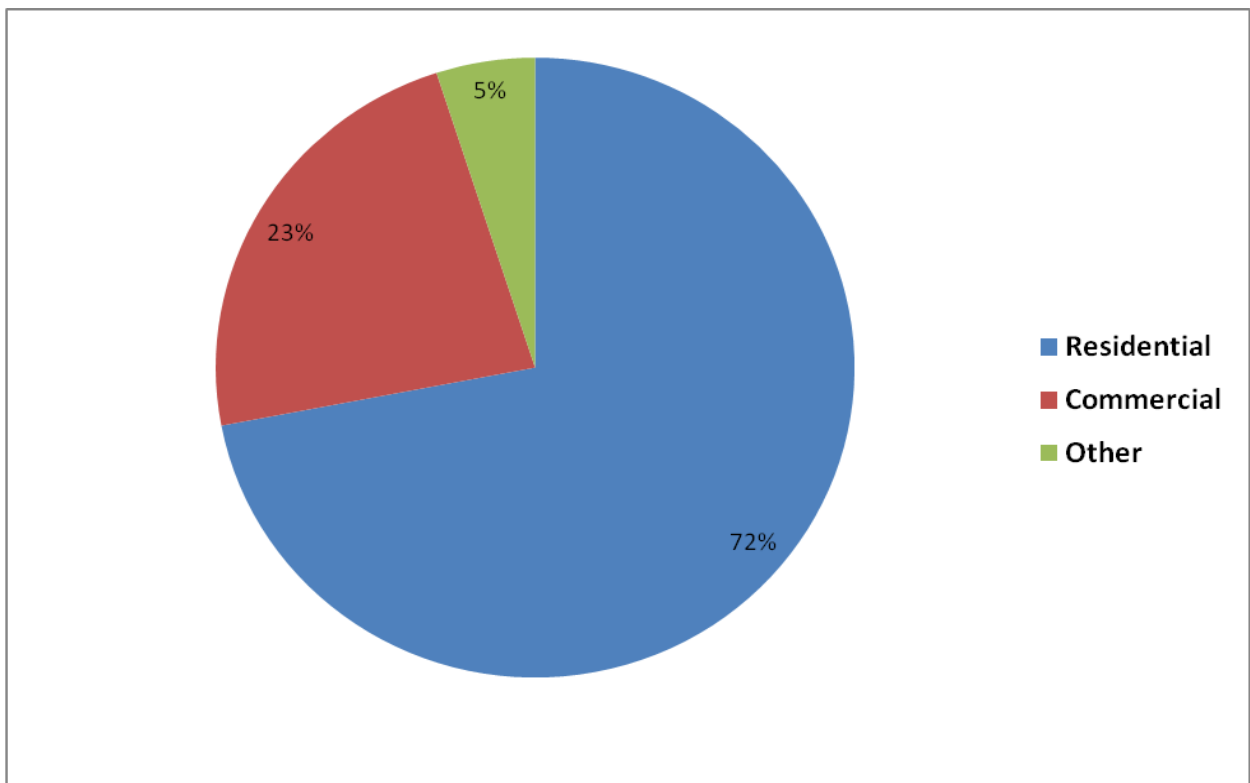


Figure.3Distribution of water consumption per sector in ELM. Source: BolokaMetsi Project, 2014.

5.3.1 Strategies for water resource management

As part of the ongoing water resource management strategy, Emfuleni has initiated effective and sustainable Water Conservation (WC) and Water Demand Management (WDM) interventions. These entail the implementation of a mixture of appropriate activities within two WC/WDM Strategic Pillars, comprising the following areas of intervention:

- Social Interventions
- Technical Interventions

4.3.1.1 Social interventions

Given that the community plays an integral part of any water conservation and water demand management programme, it should be involved in the process to ensure sustainability. A full-scale community awareness programme was undertaken with the help of civil societies to encourage consumers to conserve the available water resources, decrease leakage and wastage and to participate in improving service delivery in the area. The community awareness programme ran simultaneously with the technical interventions. The following approaches were considered:

Appointment of Water Conservation Warriors (WCWs)

As part of the programme, a team of 52 WCWs was appointed following an open and transparent recruitment process. This team consisted of 18 males and 34 females. The strength of the team was said to emanate from the inclusion of both males and females perspectives, which resulted in a unit that was well accepted by the community and capable of addressing a variety of socio-cultural conditions in the community. Following the appointments, a three day training programme was developed for the WCWs, and it was designed to introduce them to the concept of Water Conservation and Demand Management, as well as communication principles and skills which they would utilize during everyday community engagements. The Warriors worked Monday to Friday, using a time table and schedule adopted by the municipal community developer.

Day of the Week	Activity
Monday	Door to Door Education and Domestic Leak Auditing
Tuesday	Door to Door Education and Domestic Leak Auditing
Wednesday	External Leak Detection
Thursday	School Workshops
Friday	Clinic Workshops

Table 2: an example of the weekly schedule. Source: Boloka Metsi Project, 2014.

Development of awareness and education campaigns

The community developer and education officer (CDEO) explained that comprehensive awareness materials were developed for the (awareness) campaigns. This material included posters and pamphlets, which were distributed to consumers in Sebokeng and Evaton. She explained that educational materials also in the form of posters, pamphlets and stickers were prepared for the programme addressing wasteful household use of water and tips on how it can be conserved; water wise gardening as well as the repair and reporting of leaks. The material was available in four local languages; English, Afrikaans, SeSotho and IsiZulu to cater for the diverse population in the area.

She also implied that, in addition to this material, standard letters were provided by the municipality to be issued to consumers who waste water. According to the community developer, wastage of water in South Africa is considered unlawful, irrespective of whether consumers pay for it or not. ELM has water by-law which focuses on ensuring the availability of portable water by regulating water use to ensure conservation. Therefore, failure to adhere to the law may necessitate options to lay charges in terms of Section 156 of the National Water Act of 1998. This piece of legislature lends power to the authorized official to take a reasonable action against persons who contravene Sections of the by-law. The letters were based on the municipal bylaws and were a means of issuing directives to consumers to stop wasting water or curb the loss of water through internal plumbing fittings, which were left in a state of disrepair for long periods, and urged communities to use water sparingly.

Community awareness

The most significant element of the social component was creating awareness in the community. One of the primary objectives of the initiative was to capacitate people with the skills to implement solutions for their problems themselves. The Warriors utilized the provided schedule to run the awareness campaign(s) which allowed variation in activities, including door-to-door, external leak detection and out-reach activities. However, the door to door awareness activities remained a critical form of community engagement, especially in terms of targeting the main water users who are at home and using water during the day. To function as the eyes and ears of the municipality, the Warriors provided support to the customer care manager of Metsi-a-Lekoa to create a visible presence of the municipality in the community. By the end of 2013, 96 250 households were visited by the WCWs (Boloka-Metsi Project, 2014).

Water wise gardening programme

The water wise gardening programme was incorporated into the community awareness programme as opposed to being treated as a separate programme. A portion of the educational material was dedicated specifically to water wise gardening to encourage consumers to curb the use of hosepipes during peak demand hours. It recommended that they use a bucket or watering can instead of a hosepipe to water the garden and other general household chores. This is because hosepipes are particularly problematic in that they substantially decrease the pressure in the system during peak demand hours such that there is not enough pressure to supply the entire area. This message was emphasized strongly in the community workshops where buckets were distributed to the workshop attendees in order to curb the use of hosepipes during peak demand hours.

In addition, consumers who repeatedly used hosepipes during peak demand periods even after engagement with the warriors were issued with a municipal letter, which presented a directive to cease this behaviour as it impacted on the availability of water in the neighbouring areas. Emfuleni Local Municipality collaborated closely with the Department of Agriculture, particularly on their food gardening and poverty alleviation programmes, to ensure that these programmes were executed in manner that does not compromise the availability and supply of potable water in the area, especially since no grey water is used at this point. Gardening material was issued by the Department of Agriculture to promote water efficient gardening practices.

Councilors' training and induction

One of the important steps taken in engaging the community was the consultation of the Ward Councilors'. The Ward Councilors' represent the political stakeholders and are the gatekeepers of communities. Therefore, their support and participation in such initiatives cannot be over emphasized. The Councilors' of the wards participating in Water Conservation programme were provided with a half-day induction workshop in order to understand the objectives of the programme and to obtain their support and guidance in navigating the issues faced by the affected communities. Subsequent to the initial induction, the Councilors' participated in a one-week ESETA accredited training course on water conservation as it relates to local government, which comprised of both theoretical and technical component.

The Councilors who completed the training were then given certificates to validate their successful completion of the course. The accredited certificates were awarded by Deputy Minister of Water and Environmental Affairs, Ms Rejoice Mabhudafhasi as the conclusion of their practical course component coincided with Emfuleni Water Summit. Both the induction and training sessions were said to be invaluable in facilitating a positive relationship between the Metsi-a-Lekoa and the political leaders, as well as obtaining their support and buy in which was reflected in the relatively smooth implementation of the Water Conservation programmes.

5.3.1.2 Technical intervention

The technical interventions implemented to address poor water management, included different aspects such as: water pressure management, installation of consumer metering, installation of leak detection equipments and so on. Social intervention ran concurrently to these interventions, providing support that aimed at addressing mismanagement of water by the consumers and identifying critical challenges that hinders inefficient use of water.

As part of the activities of the door-to-door consultation, the WCWs were responsible for conducting internal leak audits to determine the main water loss contributors in each area. These profiles were utilized to guide engagements with the Councilors and also informed the issues tabled for discussions with the community during workshops and public meetings convened by the Councilors.

Figure 4 below shows the distribution of water and sewage problems in the area. In both cases, it is suggested that more than 60% of the water losses could be attributed to internal leakage, which provides a clear case for the implementation of proper billing and proper metering in these areas. Approximately 55% of consumers are billed based on meters, the rest are billed per flat rate (fixed rate for indigents). It has also been reported that there are numerous cases of inaccurate billing due to damaged and illegal meters in the areas.

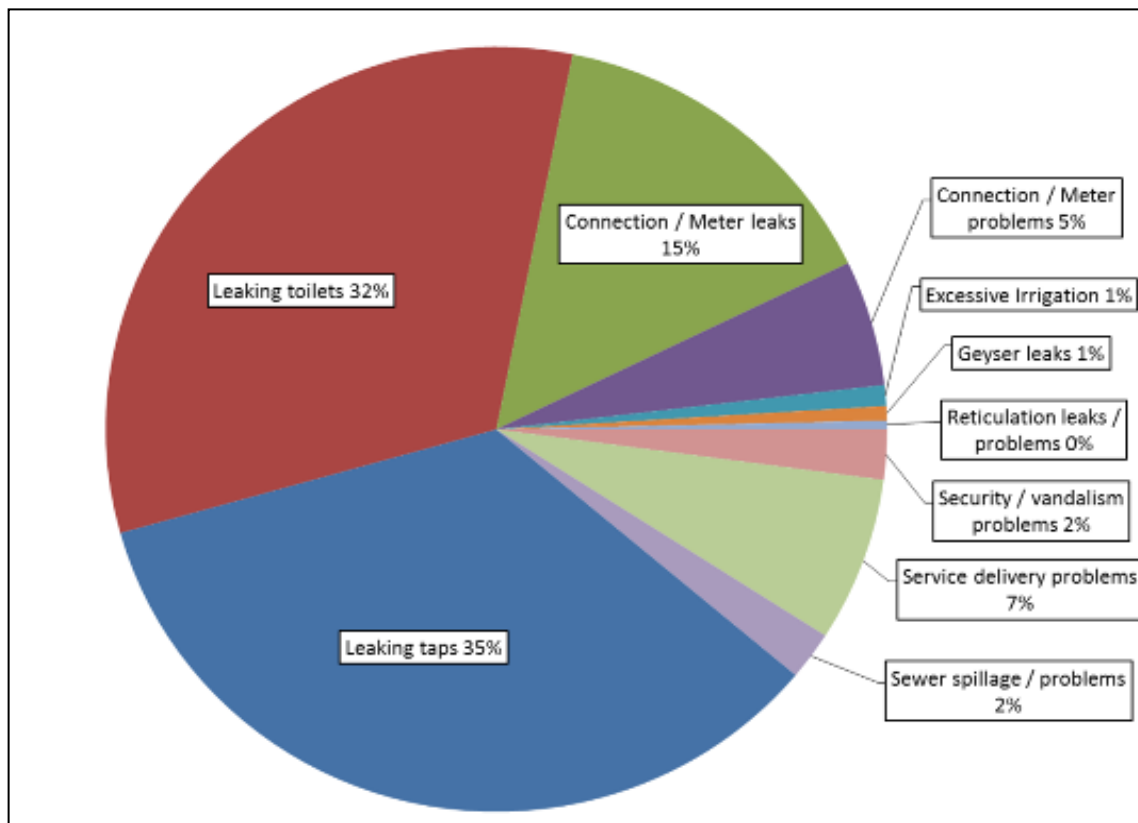


Figure 4: Distribution of water and sanitation related problems. Source: BolokaMetsi Project, 2014).

Due to high levels of unemployment in most areas such as Evaton and Sebokeng, the billing and metering must be supported by ongoing education and awareness as a form of water loss control, especially because in these areas revenue cannot effectively be recovered. The engineers emphasized that currently these internal water losses impact on the municipality as non-revenue water, which must be addressed if the municipality is to become economically sustainable.

5.4 Improved communication and stakeholder involvement

ELM dedicated Customer Care Department to deal with the community. Municipal member 1 explained that the department is very active in the supply areas, attending to customers complaints and providing community educational campaigns and workshops. He further explained that the department also assists with queries related to municipal accounts and executing indigents' policy. All the respondents believed that the consumers needed to be more responsible with water and try by all means to pay their accounts.

Municipal member 2 explained that the municipal relationship with the surrounding local communities is satisfactory, but could be improved. He said that the relationship could improve if communities could play their role in managing the scarce resource through responsible water use and payment of the service received. He explained that the problem communities do not understand is that water is a scarce resource and costly to provide. Therefore, even consumers who are capable of paying for the service simply don't pay. However, he acknowledged that poverty also plays a role in the ability of consumers to pay for services.

But both municipal member 3 and 4 have a perception that community involvement will help curb water conservation challenges. According to respondent municipal member 4, that is because community involvement is the "open end of the water network". That is, municipalities do not have direct control over the use of water resources at this point. As a result, engineer 1 and 2 shared the view that there is a need to upgrade households' water infrastructure in order to curb water loss, specifically because a large portion of water losses within the municipality takes place from internal leaks on house plumbing systems. In this way, communities can play a vital role to help deal with water conservation challenges.

Respondent community member 1 is a member of the civil society concerned with water and environmental protection. This gentleman, in his late twenties, expressed mixed feelings about the relations between municipal water services and the community. On one hand, he expressed discontent with the indigent's policy which was introduced by the previous Councilor, because it's letting people down, especially the pensioners. He said that, this is because many pensioners have always been paying for services until they were advised to register as indigents and then stopped paying. Now more than a year later, the pensioners' accounts are in arrears and have to also pay collection fees, he added.

On the other hand, he said that he and most of the community members in the surrounding area are happy with the overall service that Metsi-a-Lekoa is rendering. He believes that the community is somehow satisfied with the timeliness of Metsi-a-Lekoa's response to calls, especially the sewer repair team. He added that the teams on the ground are very knowledgeable and have a very good attitude and tone when talking to people and addressing issues. More than anything, this community member likes the fact that every year Metsi-a-Lekoa conducts a residents' Customer Satisfaction Survey in order to rate their service and to get to the bottom of issues, as well as to have a thorough understanding of their consumer base.

SECTION A	Area: _____	Date: _____
	Household address: _____	
	Name of interviewee: _____	
	ID of interviewee: _____	Male <input type="checkbox"/> Female <input type="checkbox"/>
	Position in the household: Head of house <input type="checkbox"/> Spouse <input type="checkbox"/> Knowledgeable adult <input type="checkbox"/>	
Signature of interviewee: _____		Time: _____
Name of interviewer: _____		Pay number: _____
SECTION B	1. Do you have a water and sewer connection to the municipal network? a) Water and sewer <input type="checkbox"/> b) Sewer only <input type="checkbox"/> c) Water only <input type="checkbox"/> d) No connection <input type="checkbox"/>	
	2. Do you have a water meter? a) Yes <input type="checkbox"/> b) No <input type="checkbox"/>	
	3. Do you pay your municipal account? a) Yes <input type="checkbox"/> b) No <input type="checkbox"/> If no, please explain why: _____	
	4. Is your municipal account up to date? a) Yes <input type="checkbox"/> b) No <input type="checkbox"/> If no please explain why: _____	
SECTION C	5. Have you ever interacted with Metsi-a-Lekoa customer service? a) Yes <input type="checkbox"/> b) No <input type="checkbox"/> c) Don't recall <input type="checkbox"/>	
	6. How did you interact with our office? a) Phone <input type="checkbox"/> b) In person <input type="checkbox"/> c) Other <input type="checkbox"/>	
	7. Please rate how satisfied were you with our service: 1 = Dissatisfied 2 = Somewhat dissatisfied 3 = Neutral 4 = Mostly satisfied 5 = Very satisfied	
	i. How satisfied were you with our overall service? 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	
	ii. How satisfied were you with the timeliness of our service? 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	
	iii. How satisfied were you with the expertise and knowledge level of our staff? 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	
	iv. How satisfied were you with the tone and attitude of our staff? 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	
	8. Did the customer service representative answer all of your questions? a) Yes <input type="checkbox"/> b) No <input type="checkbox"/>	
	9. Additional comment: _____ _____	

Figure 5: Customer Satisfaction Survey. Source: Metsi-a-Lekoa Customer Care Department.

5.5 Institutional capacity

Human resource capacity

All the respondents were of the view that the municipality had capacity problems in dealing with the demands of IWRM. The shortage of skilled personnel in critical positions was identified as the main problem. According to respondent municipal member 2, the skills were required at the water plants as per Regulation 17 of Department of Water Affairs (DWA). Regulation 17 is mainly concerned with ensuring that process controllers of water plants are suitably qualified and correctly registered. The regulation also advocates for continuous professional education of process controllers. However, there was a problem in ELM with regards to the training of staff members that are under qualified on the required skills.

Municipal member 2 explained that the staff responsible for maintenance of the water infrastructure was short of the required skills; hence the majority of the water infrastructure was ageing and as a result underperforming. He explained that, Emfuleni hired consultants to implement water infrastructure projects but most of the time; the quality was not up to standard. According to respondent engineer 1, even though most of the staff had years of experience, they lacked the technological skills needed for new water infrastructure. Moreover, there was also limited funding to address skills shortage through training and development programmes, he added. Despite this, the researcher discovered that ELM always succeeds in implementing water projects due to a collective effort of personnel from different departments within the municipality.

Respondent municipal member 1 explained that water sector department is seriously understaffed, especially in the skilled areas. He further explained that there was a huge backlog of reported problems on the municipal water supply system, and the municipality was, to some extent, unprepared to deal with the increased reporting of leakage. In particular, he explained that the technical department encountered difficulties in terms of the availability and capacity of the field staff, materials and vehicles to repair all the leaks detected. In this respect, the researcher discovered that three local contractors were appointed, following an open and transparent tender, including technician student trainees, to fix visible leaks on private properties. Municipal member 2 concluded by saying that there are several senior vacant posts

that must be filled if ELM water sector is to have any credible capacity not only for water demand management but to also implement policy approaches such as IWRM.

According to the respondent municipal member 3, more interventions for conservation of water resources are necessary. She explained that efficient and effective management of water at the municipal level will help to sustain the water supply in the Orange-Senqu River basin. She further explained that, it will help the municipality to provide a sustainable water supply to its consumers who currently face the possibility of curtailments in the near future if the situation is not addressed. She also emphasized that the municipality is required to achieve a 15% reduction in their total demand in terms of the Integrated Vaal River System (IVRS) to prevent possible water restrictions. “This is a challenge as the municipality needs an estimate of R100 million to address the key existing problems and to improve the current situation which is rapidly deteriorating”, she said.

Blue Drop Report 2012

The blue drop certification required the Water Services Authority to ensure that water was safe to drink and complied with the national standards by scoring 95% Blue Drop Requirements. This was a regulation designed and implemented to safeguard tap water quality management. The programme was an incentive-based regulatory initiative that required water service institutions to provide information as per requirement of section 62 of the Water Services Act 108 of 1997 (Blue Drop Report, 2012). Emfuleni’s water utility, Metsi-a-lekoa, was awarded a positive Blue Drop status three times in a row.

2010 Blue Drop score	95,75%
2011 Blue Drop score	96.42%
2012 Blue Drop score	96.8%

Table 2: ELM Blue Drop scores.

There are a couple of agencies involved in ELM water resources management, which are: Department of Water Affairs, National Provincial and Emfuleni Local Municipality, Rand Water and Metsi-a-Lekoa. These agencies play different roles in the effective management of water resource.

- The Department of Water Affairs is the custodian of all raw water resources in South Africa and potable water supply compliance through Blue Drop (as the custodian).
- Rand Water is a water company responsible for water purification and bulk supply of potable water in the Gauteng area. They are also responsible for the management, in conjunction with the Municipality, for development next to the river.
- Emfuleni Local Municipality is responsible for the distribution of safe drinking water to the community.
- Metsi-a-Lekoa is Emfuleni's water utility, delegated for supplying the community with portable water, water demand management, and water conservation.

Although diverging in responsibilities, to some extent, there is coordination mechanism between the mentioned agencies. For instance, every two months ELM and Rand Water holds a meeting to discuss water quality, water conservation, and the Blue and Green Drop certification. This coordination has been very effective in ensuring a highly satisfactory ELM Blue Drop status.

5.6 Water as a Valuable Commodity

Post-1994 South Africa has some of the most progressive water laws and policies in the world, but at the same time these laws and policies carry a twofold meaning that distinguish water as a basic human right but also recognizing its economic value (Harvey, 2005). Transformation of water from being a public good into a tradable commodity potentially creates friction, especially at the local municipal level where people believe it's their constitutional right to have clean water. This belief somehow exacerbates the culture of non-payment of water services.

The culture of non-payment of water services by many communities can be attributed to different factors such as lack of inclusive strategy of revenue enhancement, poverty, and constitutional rights to water access. ELM has numerous problems concerning the issue of revenue collection for the service to supply communities within its jurisdiction with potable water because most houses have accounts in arrears averaging more than R15 000. According to the municipal member 1, the non-payment of municipal accounts is due to:

- Joblessness

- Communal taps
- Meters in neighbours' yards
- Household meters being vandalized
- No receipt of monthly statements from the council
- Accounts in the name of the previous owner
- Leaks
- Open manholes
- Indigent policy
- Non-payment culture

Assessment of water savings within a period of partnership between ELM and GIZ

ELM is actively implementing water conservation initiatives to ensure effective, efficient, and sustainable management of water resource. The assessment of water savings came as a result of different initiatives to reduce water loss, and calculations were made accordingly by the ELM.

The objective of these calculations was to measure the savings against the predetermined baseline. Savings were monitored on a monthly basis against the actual Rand Water billed metered consumption. The savings for the period of July 2012 until June 2014 are summarized in the following table 1. It shows the reduction in demand since the beginning of Metsi-a-Lekoa's partnership with Sasol and GIZ on Boloka Metsi Project.

Social intervention mitigation measure was a useful avenue for encouraging consumers of Emfuleni to conserve water which impacted on the overall water demand. Technical intervention was one of the important water saving measures. Through fixing of leaks of different types; metering properties; and water pressure management, this intervention contributed significantly to the reduction of water loss.

Date from	Date to		Saving m ³ water	Value (R)
Jul-12	Jun-13	=	2 076 793	R 10 513 490
Jul-13	Jun-14	=	4 763 580	R 26 461 570
Total			6 840 373	R 36 975 061

Table 3: Summary of annual savings. Source: Boloka Metsi Project, 2014.

5.7 Conclusion

The general findings indicated that social (improved communication and stakeholder involvement) and technical interventions running parallel could result in significantly satisfactory outcome when it comes to water conservation. The social interventions were, by all means, a useful avenue to engage and encourage all consumers of Emfuleni to conserve water which impacted on the overall demand. Lack of infrastructure led to people not paying for the service rendered and the non-payment culture of services negatively impact on conservation measures. Theft and vandalism also exacerbated misuse of water in communities. This suggests that, more control from municipality is required, perhaps through more involvement of civil society.

There was an overall satisfaction with the extent in which community participated in water projects. ELM employed many community members in the project as one way of extending public participation. People were capacitated to run some projects and were awarded accredited certificates of competence. So, all in all, stakeholders were involved and participated to address water service delivery and conservation measures in different platforms.

This chapter highlighted the fact that public participation is crucial for conservation and good management of water resources. It also revealed the fact that public-private partnerships are possible in the water sector to reduce water losses and provide a better level of service. The following chapter analyzes the findings presented in this chapter and attempt to answer the research questions.

Chapter 6

ANALYSIS OF FINDINGS

6.1 Introduction

This chapter presents a discussion as an analysis and interpretation for the data that was presented in chapter five. The researcher processed the findings under the same theme as formulated in chapter five. The following were themes under which data analysis and interpretation were presented: social demographic information; water resources management; improved communication and stakeholder involvement; institutional capacity; and water as a valuable commodity.

6.2 Social Demographic Information



Figure 6: Respondents' years of working experience in the water sector.

Of all the respondents, 100% have attained a tertiary qualification but only 71% of them were doing jobs relevant to their qualifications. For example, one municipal official has acquired a Diploma in Education but is employed as a senior staff in water sector department. The graph

above depicts the years of experience for the respondents. The United Nations Development Programme (UNDP, 2008) framework for capacity assessment recognizes that for each country to reach its developmental goals, it depends on its capacities at individual and organizational level, as well as its enabling environment. Each one of these dimensions work interdependently in influencing policy outcomes. In relation to this study, the individual level relates to skills, knowledge and competencies of the people involved in water conservation and management.

The demographic profile above shows that the majority of the respondents are well capacitated to deal with water conservation and management issues, with only 29% of them not meeting the requirements for the job position. However, the main challenge was the fact that most of them attained tertiary qualifications many years ago, some not even relevant to the field as explained above and now there are no ongoing training programmes for development of upgraded skills. This is why all respondents were unfamiliar with the concept of IWRM and its principles. 43% had insubstantial knowledge on policy and legislation related to water resources.

6.3 Management of Water Resources

From 2001, ELM started to prioritize the supply of piped water to all household and has, over the years, been engaged in various water projects to meet the demand. The municipality's Water Services Development Plan was informed by the municipal Water Services Act 108 of 1998 and the Municipal System Act of 2000. ELM was classified as a Water Services Authority responsible for ensuring provision and access to water services for its communities.

ELM has a population of 721 663, with 34, 7% unemployed (Census, 2011). ELM supplies approximately 721 000 people (Census, 2011) from Rand Water, which is more than 99% of its residents. This means that ELM adheres to the requirements of the Water Services Act 108 of 1997, and the notion of "developmental local government" as introduced by the Local Government White Paper of 1998. In line with the South African government's dedication programmes to extend water to all human beings in communities, ELM was progressively implementing water conservation projects to ensure a sustainable supply of clean water.

Based on the findings, the public-private partnership between ELM, Sasol and GIZ was a great success whereby Sasol and GIZ entered into a memorandum of understanding with ELM to provide a seed funding for water loss reduction project. In return, the municipality agreed to ring

fence the savings created by the reduction in water use to continue with water conservation interventions. According to Solanes and Villareal (1999), one of the elements for the water governance framework is a responsible and sustainable approach to water management. They argued that institutions should be built with an goal towards long-term sustainability. Evidently, the memorandum of understanding between ELM, Sasol and GIZ embedded the goal of serving present and future users of water services. Sasol and GIZ contributed R5 000 000 and R5 163 390 respectively towards Boloka Metsi Project. The following are some results of the project:

- 52 Water Conservation Warriors (WCWs) were appointed.
- 103 088 of households were visited and engaged with personally by WCWs.
- WCWs reported 24 698 water and sewer related problems.
- 98 712 tap washers and 144 216 toilet washers have been replaced in 114 000 households.
- 98 schools were visited regarding the management of water losses in the schools.

This really proves that public-private partnerships are possible in the water sector to reduce water losses and provide a better level of service. Both ELM and private entities gained from improved level of service and ensured water security. Chetty (2012) in his study based on Nkomati Local Municipality found that private investment has the potential to enhance service delivery by improving efficiency and the capacity to spend allocated budget. He argued that the public-private partnership(s) have a positive impact on equitable distribution of water to the community. The same results were discovered in ELM.

6.4 Improved Communication and Stakeholder Involvement

The second Dublin principle is: “the development and management of water resources should be undertaken through a participatory approach where decision-making with public consultation and involvement occurs at the lowest possible level” (Rahamam and Varis, 2005:3). Involvement of stakeholders, including government, private sector, and civil society, plays a critical role (Muller, 2010) and is confirmed by the establishment of private-public partnership of ELM, GIZ and Sasol.

Turton et al., (2007) assert that water resource management processes need to have a social consideration to them, instead of purely focusing on technical aspects. This assertion supports the researcher's findings in chapter 5 that stakeholder involvement is crucial for the effective management of water resource. All of the interview respondents also shared the view that the public involvement was the chief contributing factor to the excellent service delivery in the municipality. By allowing the public's involvement, ELM opened a platform whereby different stakeholders gathered together and sought resolutions to the problems of water mismanagement and distribution.

In the same way, Solanes and Virreal's (1999) framework for water governance advocates inclusive and participatory decision making. They argued that participation is likely to create more confidence in the institutions that deliver policies. Thereby, citizens won't be compelled to use other unpleasant channels to such as protests to make their voices heard. This is to say that public institutions need to communicate among to stakeholders in very direct, open and transparent ways, as seen at ELM.

Local government should also strengthen customer participation in service related processes as part of the concept of improvement (Naidoo, 2011). The findings in chapter 4 show that every year ELM gives the residents a survey to rate and put across their concerns and recommendation for better water service delivery. Moreover, through workshops and ward meetings, ELM representatives address issues that need clarity and follow up on residents' concerns. These sorts of conduct from the ELM enhance improved communication amongst stakeholders; therefore uplifting the ethos of water governance.

98 schools were visited and engaged by WCWs on water conservation matters. This showed that ELM is embracing DWA water education for schools, a water literacy programme aimed at educating learners on the value of water. The key objective was to promote behavioural change on the use of water and to raise awareness on water and climate change issues (DWA, 2020 vision).

6.5 Institutional Capacity

Literature reviewed as part of this study suggests that the success of any policy depends on the strength of its support mechanism. The backbone of the support mechanism is institutional capacity (Nthimo, 2012). Different theorists agree that institutions play an important role in determining policy outcomes. This will be the case with water conservation policies as well.

The frameworks discussed in chapter 2 suggested that institutions can be assessed in terms of structure and governance, organizational resources, and the efficiency in the use of such resources, organizational arrangement and organizational process and mechanisms (Nthimo, 2012). An institution is not one organization, but is a network of organizations. These organizations may come in a form alliances and partnership to create a function capacity. It is therefore important to understand the functional capacity of ELM water sector to conserve water resources and implement IWRM principles.

The study took into account that the South African government system constitutes national, provincial, and local government which are interdependent spheres. The National and Provincial spheres make up the external structures of local government, whereas sub-municipal structures such as civil society, private partnerships, and municipal organizational arrangements make up the internal component of the local government. This study mainly focused on the internal make-up of ELM. It looked at the institutional set-up holistically, taking into account the inter-organizational linkages that make up the whole institution.

ELM was formalized in accordance with the municipal Structures Act 69 of 2000 as a Water Services Authority. This meant that ELM was actively participating in the Tap Water Quality Management Programme of the Department of Water Affairs, which was evidenced by attainment of a prestigious 96.8% of the required 95% nationally in 2012 (Blue Drop report, 2012).

Beyond the quality of water, a Blue Drop certification looks into risk management, operation and assets management issues. Certification was awarded also as an acknowledgement in those areas, in accordance with the legislative requirement of Section 62 of Water Services Act 108 of 1997 (Blue Drop report, 2012). Municipal member believes that, the success of the municipality in meeting the required national standard of more than 95% Blue Drop status can therefore be

attributed to effective collaboration between DWA, Rand Water and ELM. Irrespective of the fact that ELM lack skilled personnel as expressed by the interviewees, the effective coordination mechanism of agencies prove to have worked.

A shortage of skilled personnel in the provision of water services was identified as the main capacity problem. The impact of skills shortage was a contributing factor to ageing and underperforming infrastructure such that consultants were hired to do most work but the quality of the work still remains unsatisfactory. Skills development programme of ELM had to refocus on skills training to close the gap.

There was absolutely no linkage of ELM shortage of skills to its water quality and service delivery. The lack of skilled personnel affected mainly water management on the ground which undermined water conservation interventions. It was clear that the skills improvement programme and recruitment of special skills was necessary to ensure a positive implementation of water conservation policies.

ELM was perceived as successful at managing water projects. All the respondents felt that through the Boloka Metsi project, the municipality has provided reliable interventions which would ensure sustainable water provision to the community. Both social and technical interventions were highly praised as mitigating measures for water loss reduction in the municipality.

Noruzi and Haj (2011) argued that an applicable suggestion for developing capacities of implementing policy was to explore and discuss contemporary issues affecting it. All issues that were raised by the majority of residents through the annual customer satisfaction survey provided critical information for consideration by ELM. McDonnell (2008) argues that for informed decisions to be made in IWRM, there must be available a reliable and updated data for all the characteristic of the area. This is obviously important to any good governance in order to ensure that balanced, efficient and equitable objectives are met (McDonnell, 2008).

Accountability was found to be the main factor for the excellent provision of water service to the communities in ELM. Solanes and Villareal (1999) explained that, the roles and responsibilities in the legislative and executive process must be unambiguous and each institution must clarify and take responsibility for what it does. ELM was required by the Bill of rights to take

reasonable measures to achieve the progressive realization of access to safe drinking water as a human right. From what the researcher found, clearly ELM seriously took the responsibilities within its ranks to achieve this constitutional mandate. The researcher concluded that ELM proved to be accountable to its stakeholders yet again upholding the ethos of water government.

6.6 Water as a Valuable Commodity

The third Dublin principle, as described by (Rahamam and Varis, 2005:3) is that “Water is an economic good and has a corresponding economic value”. “Managing water resources by recognizing its economic value to society enables the achievement of both efficient and equitable water use” (UN, 1992:2). For instance, without an adequate pricing mechanism such as “pay as you use”, consumers have no motivation to use water more efficiently as they don’t receive any signal indicating its value (Bekker, 2009). He further recommended that consistency in applying the law will promote this important principle.

The respondents stated that non-payment of services was an issue. In fact, the customer care manager said that the revenue collection was very poor in ELM, especially in the township, due to unemployment and the culture of non-payment. During the interview, he expressed sad emotions that the majority of people still don’t understand why it is that water services cannot be free. He argues that this was one of the main reasons why the municipality had to embark on education campaigns to enlighten residents on water conservation and supply. Respondents accepted that where there was insufficient infrastructure, consumers were not expected to pay as they use. Close to half of the population in ELM was not billed appropriately due the lack of infrastructure and vandalism. The figure below shows the proportion of how customers are billed. The ones billed on meters are billed based on their consumption, and the ones billed on flat rate are billed based on a standard price decided by the municipality.

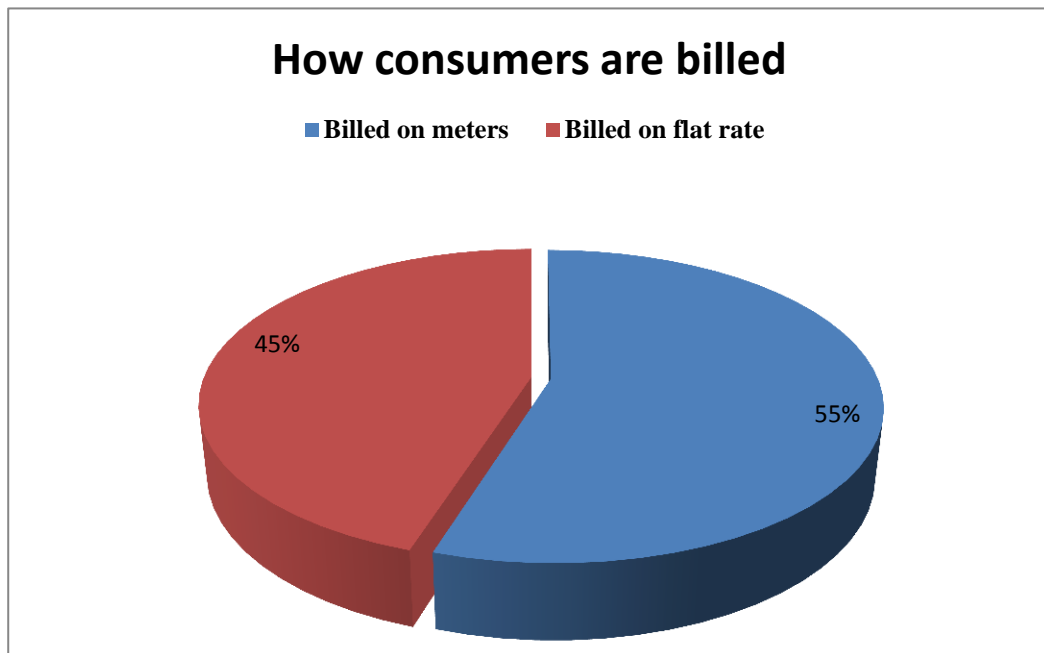


Figure 7: Percentage of how customers are billed

Most poor people, including pensioners, were cross subsidized as part of the indigents’ policy, but in other areas which are classified as suburbs there was a high cost recovery. As mentioned earlier, ELM is characterized by the culture of non-payment. Two respondents explained that this culture is to a greater extent attributed to politicians who lure people into voting for them in exchange for free services. Therefore, ELM had to change this mindset by arranging campaigns to educate people and to encourage payment for water services. ELM also channeled funds to offer workshops to political leaders within the area. Ward Councilors were trained about water demand and conservation issues. Following the completion of the training, they received accredited certificates and were tasked with a mandate of encouraging residents to pay for water services.

Solanes and Villareal’s (1999) framework for water governance also includes the notion of efficiency, which is concerned with the idea of reducing quantities of inputs while maintaining or increasing outputs. Between July 2012 and June 2014, ELM saved a total of 6 840 373m³ of water which would have cost R36 975 061 to supply (Boloka Metsi Project, 2014). ELM attained efficiency in the provision of water following its market-based measures, non-market based measures, and direct intervention (Brook, 2007).

6.7 Conclusion

From the analysis and interpretation, the researcher managed to get knowledge and understanding of ELM experiences in management and conservation of water resources. In closing the chapter, the researcher noted that the ELM had a few capacity problems such as the lack of relevant skills due to lack of development and training programmes, lack of skills in critical positions due to recruitment delays, and ageing of water infrastructure due to lack of dedicated funds and human capacity.

The other key point discovered in the analysis is that ELM created a participatory mechanism in which different water users participated in seeking solutions for water loss and misuse. There was an open and transparent environment which enabled the residents to directly communicate with the municipality regarding water service delivery and conservation measures. Lastly, the analysis showed that ELM explored potential trade-offs between economic and social goals through partnering with GIZ and Sasol.

Chapter 7

CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

The intention of this chapter is to examine if the objectives of this study are met. The purpose of this work was to explore, examine and critique whether Sedibeng municipality is appropriately capacitated to actively implement IWRM principles so as to pursue water conservation and sustainability by means of using ELM as a study area. In concluding the report, the researcher provides a summary of the analysis and interpretation of the findings and suggests recommendations that would address the positive and negative experiences in implementing IWRM. The implementation of suggestions would hopefully assist ELM in making improvements on capacity for water conservation.

In this chapter, the researcher also attempts to answer the research questions as part of the summary of the analysis and interpretation of findings. The following were the thematic headings under which the conclusion and recommendations were presented: Water resources management and stakeholder involvement; and institutional capacity.

7.2 Water resources management and stakeholder involvement

ELM embarked on a water conservation project which had two pillars running concurrently; namely: technical and social intervention. The social interventions focused on educating the communities on water wise behaviour and the technical interventions focused on fixing leaks by putting new washers 144000 in households and 98 schools altogether and reducing tap water pressures. The pressure management installation resulted in significant reduction in water flows and subsequent savings on the total ELM system input. As part of the community's education campaign, households, schools, small scale farmers and councilors were visited and offered workshops on water conservation and management. This strategy yielded positive results, as people were now aware of their direct negative impact on water mismanagement.

ELM recruited and trained 52 community members with the aim of broadening stakeholder participation, to empower citizens to be effectively involved in decision making and to be knowledgeable on water resources management. Even though 65% of these members were females, the extent to which women played apart in developing, managing, and safe guarding water was not recognized.

ELM had no revenue enhancement strategy to be incorporated into its plan to deal with the non-payment of the poor communities. 45% households were not billed according to how much water they use. Consumers were billed on a flat rate due to the lack of metering infrastructure and vandalism, and to a greater extent, this encouraged misuse of water and unaccounted-for water. Thus, it was not surprising that the municipality had low cost revenue for the water service delivery.

Recommendations

ELM should give training and workshops to stakeholders from different disciplines such as Town Planners; Development Planners; Environmental Planners; Researchers; and Independent Water Consultants. This will help ensure that all water sector stakeholders speak the same language by reconciling diverging interest(s) with regard to water management; the trainings and workshops should put emphasis on the water resources management functions at the basin scale and basics of IWRM, legislative and institutional water resources framework. The fact that all the respondents had no knowledge on the basics of IWRM should be a serious concern for the ELM.

The second concept of IWRM which focuses on a participatory approach has been implemented by ELM. Communities are involved in all water conservation and water demand management. This is indeed a good strategy for effective management of water because much day to day decision on water management issues remains in the hands of consumers and communities. It seems that, ELM have some knowledge and understanding of basic IWRM principle on stakeholder participation. However, more workshops for municipal officials and other involved stakeholders need to be conducted as a way to ensure that there is full participation of different players in IWRM planning and implementation process.

The third concept of IWRM is that women should play a central part in the provision, management and safeguarding of water (GWP, 2005). This principle which focuses on the role that women play in water management seemed to be less focused on when it comes to stakeholder involvement. ELM should focus on facilitating gender responsive programmes as part of water conservation projects. However, many of water warriors are women even though it's not clear whether it was a random employment selection or intended for the majority of warriors to be women so as to uphold the above mentioned principle of IWRM.

The fourth concept of IWRM emphasizes that water is an economic, social and environmental good (GWP, 2005). This is to say water is a valuable commodity like all other natural resources. To a lesser extent, ELM has tried to endorse this principle. ELM should establish good revenue costs while striving to uphold a social right of people to safe drinking water. All of the households should be billed according to how much they consume so as to increase revenue collection. Customers use less water when they have to pay more for it and use more when they know they can afford it. However, most people consider water to be a "free good" and are not willing to pay higher prices for it. This proves that the cost of water can influence its effective management, thereby enhance water conservation and reduce wastage. ELM should also introduce a revenue enhancement strategy with minimal payments that are targeted for the poor communities, at least in that way even the poor will be encouraged to pay something rather than nothing at all.

7.3 Institutional capacities

ELM had capacity problems in infrastructure management. It has become the culture of ELM to engage consultants in that regard, irrespective of the quality of work produced. This over-engagement of consultants suggested that ELM has a capacity problem within the technical department. Nonetheless, there is certainly no correlation between insufficient skills among the existing ELM staff and the water quality and service delivery. Even though there is a general consensus about corruption in municipalities based on Auditor General's annual reports, it wasn't found to be the case in ELM. ELM received a prestigious Blue Drop certificated for three consecutive years (2010-2012) and more than 99% of ELM residents has access to safe drinking water. This proves that there is an effective management of water resource.

Recommendations

ELM should strive to address all its technical capacity problems with immediate effect, to ensure that water conservation interventions are not undermined. Also, the municipal skills development programmes should be active and aligned to the guidelines of IWRM policy approach. That would enhance institutional capacity for water conservation.

7.4 Conclusion

In concluding the research report, the researcher provided a summary of the analysis and interpretation of findings. The researcher then drew recommendations from the analysis and interpretation of the findings such that they were specific to the experiences of ELM institutional capacity for water conservation. The implementation of suggestion would therefore ensure that ELM would have to make adjustments in its institutional capacity to implement IWRM policy approach. The literature review showed that good governance is a prerequisite to improved service delivery. The review also indicated that water governance is vital in the achievement of IWRM and water conservation.

Drinking water is certainly essential for human survival. Misuse of fresh water pose serious threats not human survival but to sustainable development also. Despite the shortages of fresh water, misuse if still widespread. Majority of are citizens are uninformed about water resources and this leads to its mismanagement. It is therefore crucial for consumers to be adequately educated about water conservation and management. Not only will educating consumers ensure that water resources are available for current and future use, but will also encourage public participation.

The research has confirmed that institutional capacity is a prerequisite for the implementation of IWRM principles. Institutional capacity embodies the aspect of “enabling environment” whereby water resources development and management; suitable policy, and stakeholder cooperation is intertwined. Policy enabling environment is fundamental for organizations to function to the best of their ability. In regard to this study, it has been established that to some extent ELM which represents Sedibeng municipality has the required institutional capacity to harness principles of IWRM. While the officials are not aware of the term IWRM and its official

definition and principle, they are however managing to implement some of these principles. The achievement and positive outcomes of IWRM also depend profoundly on financial and human capacity of each municipality as in the case of public-private partnership between ELM, GIZ & Sasol. It is therefore important for municipalities to employ individuals on merit and work experience, and also curb financial mismanagement.

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