The management of potable water supply in Mogwase Township, Moses Kotane Local Municipality

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Mini-dissertation submitted in fulfilment of the requirements for the degree *Masters* in *Development and Management* at the Potchefstroom Campus of the North-West University

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November 2014

DECLARATION

I, Daniel Kagiso Mosime hereby declare that the mini-dissertation titled: “The management of potable water supply in Mogwase Township, Moses Kotane Local Municipality” submitted for the degree of Magister Artium in Development and Management at the Potchefstroom Campus of the North–West University, is my own original work and has not been previously submitted to any other University. I further declare that all the sources quoted have been acknowledged by means of complete references.

.....	.....
Daniel Kagiso Mosime	Date

ACKNOWLEDGEMENTS

I would like to thank Almighty God for giving me the strength and the wisdom to complete this research. I will forever Praise You, Father.

I also express my sincere gratitude and appreciation to Prof Eric Nealer from the University of South Africa for his unconditional guidance and support throughout the studies. God bless you with the good life and guidance for many more years ahead.

My special gratitude and appreciation goes to the following people:

- My late mother, Tryphina Matlakala Mosime, who taught me that “with God everything is possible”. This Master’s Degree is dedicated to you. Rest in peace Mom.
- The entire Mosime family, Pontsho Mosime, Ofentse, Olebogeng, Lerato Mosime, Nkoko Sariki Moyo, Ausi Ntshidi and the family. I extend my sincere apologies to Ofentse Mosime for being away because of my studies.
- Thuto Matladi for being there throughout the difficult moments.
- Ausi Connie Modise and family (Dr Thato, Javan, Omphile and Letlhogonolo Modise), my sister Sarah Maoka and her family.
- My brothers, Fortune Makore, Joe Maveneka, and Phala Mooa, for their unrelenting encouragement especially when I was about to give up. Your support is highly appreciated.
- Lovely brothers, Arthur Raditladi, Dr Siko, Rametsi Seabelo, Donald Montoedi, Aubrey Matshego, and Magic Salomane, thank you for believing in me.
- Super friends: Lebogang Mosenkeng, Thapelo Mokhobo, Boipuso Ngwenya, Sipho Xinwa, Kabelo Oliphant, Oarabile Gaoraelwe and Tumisang Mashele, thank you for your time, resources, support and guidance throughout the studies.
- A big thank you Mr Aaron Sibanda, Mr Mokgesi Pitse and the entire Uniting Reformed Church in Mogwase for their support during my studies.
- Lastly, I extend my appreciation to the Moses Kotane Local Municipality and the people of Mogwase Township for allowing me to conduct this study.

ABSTRACT

The continuous population growth and the notable development of the mining industry have resulted in challenges for potable water supply in South Africa. The ever-increasing number of people migrating to urban areas has resulted in the demand of potable water supply in South Africa. Water is regarded as a human basic right which is promulgated by the recent amendment of the potable water service provisioning Water Services Act 108 of 1997 and the National Water Act 36 of 1998. The afore-mentioned Acts started a process to address the imbalance that existed during the apartheid regime. (The apartheid regime essentially had one objective initially, namely the control of (black, coloured and Indian) people in order to protect white privilege). It was meant to separate people of different races).The Acts were formulated to address the equal distribution of national resource for all South Africans.

Mogwase Township in Moses Kotane Local Municipality is undergoing continuous growth with several mining areas being developed. Consequently, the supply of potable water has been a challenge in the area. It is, therefore, in the interest of the researcher to investigate the management of potable water supply in Mogwase Township with the aim of suggesting improved service delivery by the Moses Kotane Local Municipality.

Water is now recognised as a scarce resource that belongs to all South Africans. The provision of potable water by the water services authorities (WSAs) is an important basic service that faces a number of challenges, such as the use of outdated infrastructure, namely: pipelines from the Vaalkop Dam, the lack of skilled and knowledgeable people, improper planning, and the booming population that place overt pressure on the demand for effective and efficient service delivery.

This research was undertaken to investigate how Moses Kotane Local Municipality which obtains its potable water supply from Vaalkop Dam can improve the supply of water in a more effective, efficient, equitable, economic and sustainable manner through improved co-operative governance and integrated water resource management (IWRM).

The qualitative and quantitative research designs were used to conduct the research, which included a literature review, semi-structured interviews, data sampling and scientific analysis of the responses.

The researcher arrived at logical conclusions and S.M.A.R.T. (Simple, Measureable, and Achievable Realistic Timebound) recommendations with regard to all aspects related to the future management of potable water supply in Mogwase Township.

Keywords: Potable water, integrated water resources management (IWRM), geo-hydrology, underlying dolomite, vulnerability, active participation, insufficient potable water supply, underground mining. Moses Kotane Local Municipality, Integrated Development Plan, Basic Water Services.

OPSOMMING

Die voortdurende populasie groei en die snelle ontwikkeling van die mynboubedryf het tot gevolg dat daar groot druk geplaas word op die drinkbare water in Suid-Afrika. Die toename in die persentasie bevolking wat nou in stedelike eerder as landelike gebiede woon plaas verdere druk op beskikbare drinkwater. Water word beskou as ’n basiese noodsaaklikheid en mensereg, en soos uitgevaardig deur die onlangse hersiening van die Water Voorsienings Wet 108 van 1997 en die Nasionale Water Wet 36 van 1998 in Suid-Afrika is die proses begin wat die wanbalans aanspreek van hoe die nasionale hulpbron in die verlede benut is.

Mogwase dorpsgebied van die Moses Kotane plaaslike munisipaliteit is gedurig besig om uit te brei en die ontwikkeling van mynbou plaas groot druk op die beskikbaarheid van drinkbare water vir die gemeenskap. Dit is dus tot voordeel vir die navorser om die bestuur van drinkbare water in die Mogwase dorpgebied te ondersoek met die doel om aanbevelings te maak ten opsigte van die verbetering van diensverskaffing in die area van die Moses Kotane Plaaslike Munisipaliteit.

Water word beskou as ’n skaars hulpbron wat aan al die mense van die land behoort. Die voorsiening van drinkbare water deur water diensverskaffer owerhede (WSA’s) is ’n belangrike basiese diens wat baie uitdagings die hoof moet bied, soos die gebruik van verouderde infrastruktuur soos die pypleiding van Vaalkopdam, die tekort aan vaardige mense met kennis, onvoldoende beplanning en die vinnig groeiende bevolking wat groot druk plaas op dienslewering.

Hierdie ondersoek vind dus plaas om ondersoek in te stel hoe die plaaslike munisipaliteit van Moses Kotane, wat hul water van Vaalkopdam kry, dit gaan behartig om water op ’n meer effektiewe, doelgerigte, billike ekonomiese vlak en volhoubare manier te bestuur deur middel van ’n verbeterde verhouding en samewerking met regeringsinstansies.

Beide kwalitatiewe en kwantitatiewe ondersoekmetodes is gebruik vir die navorsing, wat ’n geskrewe terugvoering, semi- gestruktureerde onderhoude, data uittreksels en ’n wetenskaplike analise van terugvoering insluit.

Die navorser het tot logiese gevolgtrekkings en aanbevelings met betrekking tot alle aspekte wat verband hou met toekomstigebestuur van die drinkbare watervoorraad in die Mogwase woongebied gekom.

Kernwoorde: drinkwater, geïntegreerde drinkwaterbestuur, geo-hidrologie, onderliggende dolomiet, kwesbaarheid, aktiewe deelname, ontoereikende drinkwatervoorraad, ondergrondse mynbou, Moses Kotane Plaaslike Munisipaliteit, geintegreerde ontwikkelingsplan, basiese water voorsieningsdiens.

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CHAPTER 1

INTRODUCTION AND ORIENTATION OF THE STUDY AREA

1.1 INTRODUCTION

Drinking water in South Africa is mostly unsustainable, there are millions of inhabitants without access to an adequate supply of safe drinking water (Swartz, 2009:1). Since the beginning of mankind, water has been a basic human need. Since water is one of the basic requirements for life, meddling with water supplies was one of humankind's earliest technical triumphs (Davies & Day, 1998:16). The National Water Act 36 of 1998 recognises potable water as a scarce and unevenly distributed national resource that belongs to all the people of the country (Fuggle & Rabie, 2005:293).

Municipalities in South Africa are constitutionally obliged to ensure that its citizens living within the respective geographical municipal areas of jurisdiction enjoy equal access to efficient, affordable, economical and sustainable potable water supply services. An example is the Moses Kotane Council (North West Province).

The purpose of this research is to outline the nature and extent of potable water services in Mogwase Township, the management of the Municipal potable water supply and to suggest ways in which the services can be managed in an improved manner.

1.2 ORIENTATION AND PROBLEM STATEMENT

In South Africa, access to sufficient water is a human right in accordance to the Constitution of the Republic of South Africa 1996. The owner of a public water system is responsible for meeting all of the legal requirements that apply to the water supply (Swartz, 2009:14).

It is, therefore, important that the owner and the controller of a public water system work together to ensure that the quality of drinking water is provided to meet the needs of the people. In a municipality, the ultimate responsibility of potable service delivery rests with the Municipal Manager.

Moses Kotane Local Municipality forms one of the five local municipalities (Category B Local Municipalities) that together form the Bojanala Platinum District Municipality in the

North West Province of the Republic of South Africa. Moses Kotane Local Municipality (MKLM) was established in terms of the Municipal Demarcation Act 27 of 1998.

Moses Kotane Local Municipality consists of 109 villages and two formal towns namely: Mogwase and Madikwe. Mogwase is developing at a rapid pace and is situated near the Pilanesberg National Park and the Sun City Resort in the North West Province (See Figure 1).

Mogwase Township is 15.76km² with a total population of 19,342 (Statistics South Africa, 2011). The racial makeup of the Mogwase Township consists of:

- Black African 94.4%
- Coloured 1.6%
- Indian/Asian 2.9%
- White 1.1%

The significant growth of Mogwase Township is largely attributed to the impact of the mines in the immediate vicinity of the town, Rasimone mine and Bakubung Platinum mines. Moses Kotane Local Municipality has been characterised by notable population growth since 1996. The estimated total population for Moses Kotane Local Municipality is 236 845, representing a growth of about 3.2% since 1996 when the population was estimated at 229 410 (Statistics South Africa, 2011).

It is projected that the population was around 253 799 in 2006 and 281 931 in 2011 (Statistics South Africa, 2011). This growth can be attributed to phenomena such as the natural growth of the population and inter-regional migration, both of which trigger water stress. The Impala Platinum Mine in the area has created the need for Mogwase Township to apply for town status because of its location along the main road that connects North West and Limpopo provinces.

The Moses Kotane Local Municipality covers an area of approximately 5220km^2 and is located in the north-west part of Bojanala District Municipality in the North West Province. Moses Kotane Local Municipality (MKLM) was formed by incorporating Magisterial Districts of Madikwe and Mankwe of the former Rustenburg District Council. (Refer to figure 1).

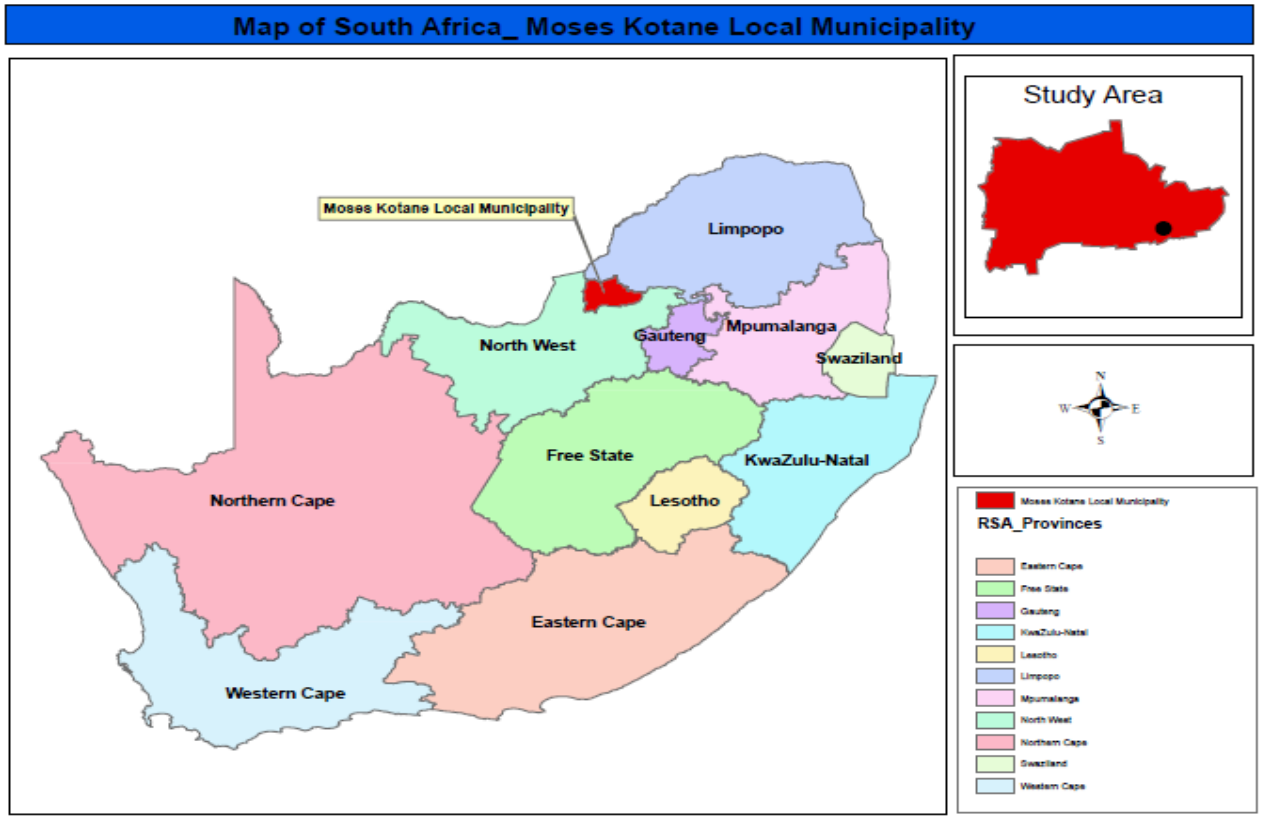


Figure 1. Map of South Africa- Moses Kotane Local Municipality
(Source: Demarcation Board, 2011:online)

Mogwase Township's potable water is primarily supplied from the Vaalkop Dam. The raw water flows southwards via concrete canals. At Vaalkop Water Treatment plant, the water is purified and then pumped into various water reservoirs located over the Mogwase Township from where the potable water is fed into the water supply pipeline network to the consumers (Liebenberg, 2008:18).

The history of the Vaalkop Dam started in the early 1950s when dam sites were explored for the construction of a dam that would supplement the supply to Rustenburg area as well as mining activities in the Northam area. The Vaalkop Dam is located at the confluence of the Hex and Elands rivers and construction of the dam commenced in April 1966 and was completed in October 1972. The Vaalkop Water Treatment Works (WTW) was commissioned on 15 September 1972 soon after the dam was completed. It supplies water to the George Stegmann Hospital, Pilanesberg and the Union Mine of Northam (Refer to figure 2).

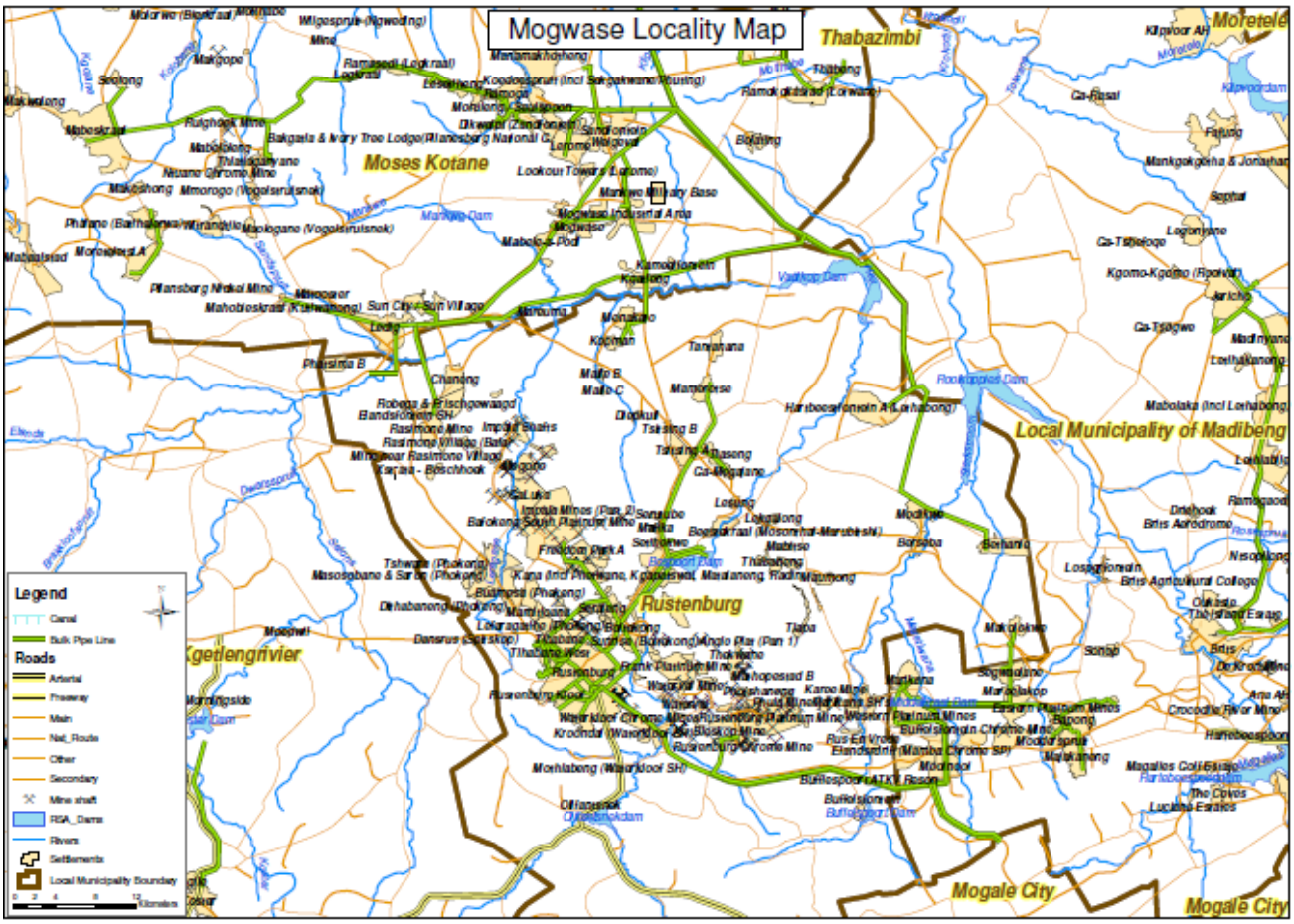


Figure 2: Route of water from Vaalkop Dam
(Source: Demarcation Board, 2011)

The water treatment plant comprises of a raw water pump station, coagulant dosing, rapid mixing, flocculation, sedimentation, rapid sand filtration and chlorination (refer to Figure 3). The plant has a capacity of 18 Mega Litres per day (M/D) and was later expanded to 30 M/d. The treated water is pumped approximately 20 kilometers to a regional storage reservoir from where it gravitates to the consumers at Mogwase Township. During the purification process water was abstracted from the Vaalkop Dam was almost pristine and originated from the catchments of the Hex and the Elands rivers. Apart from developments in the Rustenburg area, very little pollution takes place in the catchment of the Vaalkop Dam (USEPA, 2003).

Figure 3: Vaalkop Dam raw water treatment plant
Source: Magalies Water database (2012:Online)

The Vaalkop Dam receives a mixture of raw surface water from the upper Crocodile River system via the Hartbeespoort and Roodekopjes Dams as well as the Bospoort Dam and the Elands River (Clement & Haarhoff, 2004:12). The most prominent challenge faced by the treatment plant is high turbidity after rain events. This is dealt with swiftly by dosing an adequate amount of lime, ferric chloride and polymer. Water quality analyses were first undertaken by the Rustenburg Local Municipality. Magalies Water later established an in-house laboratory at Vaalkop Dam in 1989. Water from the Roodekopjes Dam originates primarily from the Hartbeespoort Dam. The quality of the Hartbeespoort Dam water is now well-documented as being very poor. The water sourced from Roodekopjes Dam exhibits high Total Dissolved Solids (SDT), high concentrations of viable and non-viable algae and high concentrations of taste and odour compounds (Clements & Haarhoff, 2004:24).

Water from the Elands River is primarily polluted by the Seshabele River which carries water from the Mogwase Sewage Treatment Works (STW) and the industrial effluent from the Bodirelo Industrial area. High concentrations of ammonia, phosphates, sodium

and chlorides are discharged from this perennial tributary of the Elands River. Water in the Hex River originates primarily from Rustenburg town in the form of treated effluent.

The effluent is first “oxidised” in the Bospoort Dam before it is released to Vaalkop Dam. This water is, in many respects, worse than the Hartbeespoort water and contains high Dissolved Oxygen Contamination (DOC) and algae concentrations as well as taste and odour compounds (USEPA, 2003).

Therefore, all three surface water sources exhibit water quality issues that are difficult to address with conventional treatment processes. These issues may not occur simultaneously but collectively contribute to the degradation of the Vaalkop Dam raw water quality.

Water quality problems related to taste and odour became prevalent and almost persistent in the 1990s. It was for this reason that the extension of the water purification in 2000 included a Powdered Activated Carbon (PAC) treatment step and the addition of flotation on all treatment plants (USEPA, 2003).

In April 1994, the first democratic government was elected in South Africa. It immediately emphasised that the Reconstruction and Development Programme (RDP), was part of its political manifesto and foundation of all its new public policies, would be implemented and every effort made to improve public service delivery on all three spheres of government, namely: national, provincial and local. One of the four pillars of the RDP is meeting basic needs, of which access to basic water supply and sanitation services for all citizens of South Africa was made a priority (DWAF, 2004:4). Consequently, the former Minister of DWAF during May 1994 initiated a process to review all water related legislation (Gildenhuys, 1999:10).

The overall objective of this process was to change the South African water dispensation so that socio-economic demands and environmental management requirements would be met in as effective, efficient and economical manner as possible, and equal access for all South Africans would be provided (Pienaar & Van der Schyff, 2005:263).

Moses Kotane Local Municipality is responsible for the management of the potable water supply in Mogwase Township. In line with the requirements of Department of Water and Sanitation, the Moses Kotane Local Municipality has seven water sampling

points in the Vaalkop Dam surface water catchment area where one water sample is taken on a weekly basis, chemically analysed for salts, metals and heavy metals, results sent to a monitoring enterprise for constant monitoring and submission of results to all three government spheres in line with regulations and control by DWA (Magalies Water database, 2009:37).

1.3 THE PROBLEM STATEMENT

According to Welman, Kruger and Mitchell (2005:14), a research problem refers to some difficulty that the researcher experiences in the context of either a theoretical or practical situation, and to which he or she wants to obtain a solution.

The water for Mogwase Township is bought from Magalies Waterand sourced from the Vaalkop Dam by the Moses Kotane Local Municipality. The supply is inadequate because of high consumption, abuse and the supply is interrupted from the dam due to regular electricity interruptions. Mining places significant added pressure on the Moses Kotane Local Municipality's water resources. The mines require large volumes of water for production and disposes waste products into the used water, which is discharged as effluents into rivers and other surface water. Mining wastes, such as overburden, waste rock or slimes all have a negative impact on the life of the people living in and around the area.

One of the most common problems experienced by Moses Kotane Local Municipality has been the supply of water and proper sanitation since the new ANC-led government took over from the former Bophuthatswana homeland. The communities in Mogwase Township were unable to pay for their basic services and this led to an increased deficit. Moreover, many residents could not be traced because they had relocated. The non-payment of services also led to limited development and poor maintenance of water services infrastructures in the Mogwase Township (Magalies Water database,2009:51)

The lack of adequate supply of potable water has hindered and delayed other basic services such as education and health services in Mogwase Township. Water-borne and air-borne diseases are possible health threats to the residents of Mogwase Township due to inadequate potable water supply. The current sanitary conditions, sewage pipe bursts and used water spillage into the streets is an indication of how vulnerable this community is to an unhealthy environment and water related diseases.

In order to manage the supply of potable water in a more effective, efficient and economic manner, the Municipal Manager and the officials of Moses Kotane Local Municipality should adopt a holistic and integrated environment approach (South Africa). Based on the brief afore-mentioned discussion, the research problem for this study reads: how can the Moses Kotane Local Municipality manage its potable water in a more effective, efficient, economic and sustainable manner so that the community of Mogwase Township receives clean and healthy potable water for their survival.

1.4 RESEARCH OBJECTIVES

The aim of this research is to evaluate the nature and the extent of potable water services in Mogwase Township. In view of this broader aim, the objectives of the research are to:

- Evaluate the current legislation and regulatory frameworks that focus on supply, utilisation and management of potable water in South Africa.
- Determine the role-players and relevant stakeholders that will establish the most effective and efficient water resource management in accordance to social, economic, and environmental ways.
- Determine the nature and the extent of potable water supply and the management of it in Mogwase Township.
- Recommend improvements for potable water supply and management thereof in the Mogwase Township.

1.5 RESEARCH QUESTIONS

- What are the statutory and regulatory frameworks that define the use of potable water services in South Africa?
- Who are the role-players and stakeholders that are involved in the management of potable water supply to the Mogwase Township area?
- What is the overall nature and extent of potable water supply and the management of it in Mogwase Township?
- What recommendations can be made to improve the potable water supply and management of it in Mogwase Township?

1.6 CENTRAL THEORETICAL STATEMENTS

Efficient and available provision of water is a human right in the Constitution of South Africa (1996). According to Lindquist and Gerick (1997), the provision of water as the basic need for the holistic functioning of the environment on planet earth is vital; therefore, they maintain that water integrates many aspects of life and it must be given consideration in the context of development.

It can be inferred from the discussion that the significance of safe drinking water and its scarcity in the Moses Kotane Local Municipality and its many rural areas, the municipality should promote water conservation campaigns at their churches, health centres, local schools, environmental clubs and other important gatherings.

Clarke and Kings (2006:19) indicate that water conservation is vital, since the water volume on the earth's surface is fixed, that is, it can neither be increased nor decreased. As the population increases, less water is available per person. This confirms the challenges the Mogwase Township experiences on the increase in housing due to mining in the vicinity. In order to investigate the management of potable water in Mogwase Township, the research briefly describes the organisational structures and public policies pertaining to potable water at the Moses Kotane Local Municipality. The research identifies the source and the route potable water is transported until it reaches the Mogwase Township residents.

Water is the basic necessity for life. According to Biswas (2004:248), the water problems are becoming increasingly interconnected with other developmental-related issues such as social, economic, political, environmental and legal factors at local and national government spheres. Water is transported from the surface water catchment area to the residents through various processes. During this movement, the water is exposed to, amongst others, corrosion of pipes that affect the quality of water and evaporation.

Biswas (2004:248) states that the solutions to the potable water supply service's problem depend on the many factors such as:

- Process through which water is managed.
- Competency and capacities of institutions that manage them.
- Prevailing socio-political conditions that dictate water planning.

- Development and management processes and practice.
- Appropriate and implementation status of the existing legal framework.
- Availability of the investment funds.
- Social and environmental conditions of the country concerned.
- Modes of governance including issues like political interferences, transparency, and corruption.

According to Brooks (2002), community-based water management is important to alleviate the scarcity of water. The Moses Kotane Local Municipality has the challenge of involving the community in the campaign to join hands in order to save water including the present and future generations. Basson *et al.* (1997:5), regard integrated water management as vital to preserve the limited water that is available since the country is relatively semi-dry, with scarce and limited water resources in global terms. Prasad (2003:3-4) indicated that the key characteristics of the world's freshwater supply is their uneven distribution in time and space.

1.7 RESEARCH METHODOLOGY

This is a descriptive research that focuses mainly on the management of potable water and the challenges hindering the supply of water to the Mogwase Township. This research employed the quantitative and qualitative research methods. The data was collected from primary and secondary sources. A literature review was conducted; a structured questionnaire was distributed to the residents of Mogwase Township and the officials of Moses Kotane Local Municipality. Interviews were conducted with the officials from the Magalies Water as well as the Vaalkop Dam Manager. A semi-structured questionnaire was compiled for this purpose.

1.8 LITERATURE REVIEW

According to Anon (2010:13), a literature review is the exploration of a field of knowledge in order to provide definitions and a framework for a piece of research. The literature review has purposes such as defining and limiting the problem in which one is working on, avoiding unnecessary duplication and evaluating the research methods.

The first step in the literature review will be to identify the relevant sources needed to inform an accurate study (Fouche & Delport, 2005:127). These sources need to provide information about the research problem or research question, enable the formulation of

accurate conclusions and finally they need to be credible (Fouche & Delport, 2005:127). Therefore, it is clear that the research study literature provides an understanding of potable water services and management to Mogwase Township. According to Van der Waldt *et al.* (2002:346), the research should first outline and indicate what should be achieved towards the end of the research. The purpose of this research is to undertake a thorough study of the literature review of potable water management in South Africa.

The following literary sources were consulted:

- Scientific books
- Articles in professional journals
- Government reports
- Internet
- Articles
- Newspapers, magazines and periodicals
- Catalogue of Theses and Dissertations of North-West University

1.9 RESEARCH DESIGN AND DATA COLLECTION

Selltiz *et al.* (1996:32), describes a research design as the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. The quantitative and qualitative research designs are used during this research. The research designs are used to enable the triangulation of data. The two research designs are discussed below:

1.9.1 Quantitative research design

According to Neuman (2000:10), quantitative research can include experiments, surveys or content analyses. For the purpose of this research, quantitative research entails questionnaires. The purpose is to establish thorough background knowledge of the subject under review in order to conduct a meaningful piece of research (Fouche & Delport, 2005:123-124).

For the purpose of this research, a 5 point Likert scale type questionnaire was compiled and utilised for data collection. This type of questionnaire can be used for quantitative research and also combines the approaches in the analyses of the data.

Approximately 20 to 50 questionnaires were distributed to the professionals at schools in Mogwase Township, health centres, post office, RDP houses in Zone 3 and other stakeholders who reside in the Township.

1.9.2 Qualitative research design

The qualitative research method was utilised to obtain the desired and relevant information for research process. According to Denzin and Lincoln (1994:201-202), many qualitative researchers employ purposive, and not random, sampling methods. Qualitative research seeks to investigate human activities from the human actor perspective. It is important to note that this research focused on the residents of Mogwase Township; therefore, the qualitative research approach was important.

Interviews with approximately 5 to 20 knowledgeable role-players such as the Municipal Manager from the Moses Kotane Local municipality, municipal officials and engineers responsible for the potable water service, Magalies Water officials and the Manager from Vaalkop Dam were conducted during the data collection process. The purpose was to establish a basis of information on the present provision and management of potable water services in Mogwase Township.

The following role-players were interviewed:

- Twenty (20) officials from the Moses Kotane Local Municipality's Municipality;
- The Magalies Water officials at Mogwase of water service division;
- Forty (40) community members from Mogwase Township; and
- The Manager of Vaalkop Dam.

1.10 DATA ANALYSIS

The data obtained from the individuals who were interviewed and those who responded to the open-ended questionnaire were analysed by identifying the common themes that emerged from the participant's responses. The responses that spoke to the same theme were clustered into categories.

According to Welman *et al.* (2005), descriptive statistics are concerned with the description and summary of the data obtained for a group of individual units of analysis. The data analysis and empirical findings are presented in Chapter 4 of this study in

tabular form and pie-charts. These were used to describe the management of potable in Mogwase Township in the Moses Kotane Local Municipality.

1.11 THE SIGNIFICANCE OF THE STUDY

South African society should become knowledgeable and understand effective water resources management. This is an important basis of life as it assists in water conservation. Water conservation and management thereof in South Africa is politically, socio-economically, and environmentally connected.

This research is important as it also seeks to improve and level the process of potable water supply management by offering a process map for managing potable water in the responsibility area of the Moses Kotane Local Municipality. This implies that the challenges that would be identified and necessary measures would be employed to manage potable water sustainably.

The community of Mogwase Township in the Moses Kotane Local Municipality's area of responsibility and the surrounding mining communities need safe and clean potable water for consumption. The study endeavours to provide a clearer understanding of proper management and provision of potable water, sustainable usage and water conservation.

1.12 CHAPTER LAYOUT

The mini-dissertation comprises of five chapters which are presented below:

Chapter 1: Introduction and Orientation of the study area.

In this chapter, an orientation on the potable water services provision and management in Mogwase Township is outlined. The research objectives, questions and the importance of the study are explained. Furthermore, the research design and the methodology that would be followed in the collection of data are discussed.

Chapter 2: The theoretical overview of potable water services management

This chapter discusses and analyses the origin of potable water services and management thereof by the Moses Kotane Local Municipality in its geographical area with reference to Mogwase Township.

Chapter 3: The legal framework of potable water services management in South Africa

In this chapter an attempt is made to identify and analyse the current legislation on the management of potable water services in South Africa with specific reference to potable water supply services in local municipal areas.

Chapter 4: Empirical findings and analyses

This chapter contains the empirical findings with specific reference to the management and provision of potable water supply services in the Moses Kotane Local Municipality geographical area and its effectiveness in delivering a potable water supply to Mogwase Township.

Chapter 5: Summary, conclusions and recommendations

The final chapter consists of a summary and conclusion of the major findings and the results of the research. It also gives a summary of the provision of potable water services and the management by Moses Kotane Local Municipality to Mogwase Township, the recommendations for the improvement of the current services and the approach to be followed by the role–players and community of Mogwase Township.

1.13. CONCLUSION

In the next chapter, the literature review outlines the theoretical overview of the management of potable water supply services in South Africa as part of the objective of this research. The literature review is necessary in order to gather important information for the development of a water supply management framework in the Mogwase Township.

CHAPTER 2

THEORETICAL OVERVIEW OF THE MANAGEMENT OF POTABLE WATER SUPPLY SERVICES IN MOGWASE TOWNSHIP

2.1 INTRODUCTION

This chapter presents a review of the literature following the route that was outlined in the preceding chapter. Theory regarding the role of water in municipal development will be outlined. A description the state of water management in South Africa in general and North West Province in particular, focuses specifically on the Moses Kotane Local Municipality's geographical area of responsibility with reference to Mogwase Township.

Prosperity for South Africa and other countries depends on the sound management and utilisation of many resources, and water plays an important role. The industrial development of any country depends on the accessibility of adequate water resources. Therefore, water is life; water is development (Basson, 1997:1). Everyone needs access to water for domestic use, drinking, washing and sanitation purposes. The focus of this research is on how the Moses Kotane Local Municipality manages the water resource services regarding potable water supply in the Mogwase Township. A definition of potable water is provided, how water is managed and other factors that threaten its availability will be discussed. The water cycle will be discussed to highlight the natural journey of water.

2.2 HYDROLOGICAL CYCLE

The hydrological cycle is the pathway that water travels as it moves through its various phases to the atmosphere (NRC, 1999:43). This cycle has no beginning or end and water is present in three phases namely, liquid, solid and gas (NRC, 1999:43). The science of hydrology primarily deals with the land portion of the hydrological cycle, and the interactions with the oceans and the atmosphere (Thompson, 2005:5).Problems occur when the hydrological cycle interacts with the land, as this causes problems such as water stress or scarcity, both of which impact directly on the availability of potable water. The hydrological cycle considers the motion, loss and replenishment of all the water on earth (NRC, 1999:44). This includes processes and concepts such as evaporation, precipitation, runoff, groundwater, stream flow, to mention only a few.

Figure 1 below depicts a hydrological cycle:

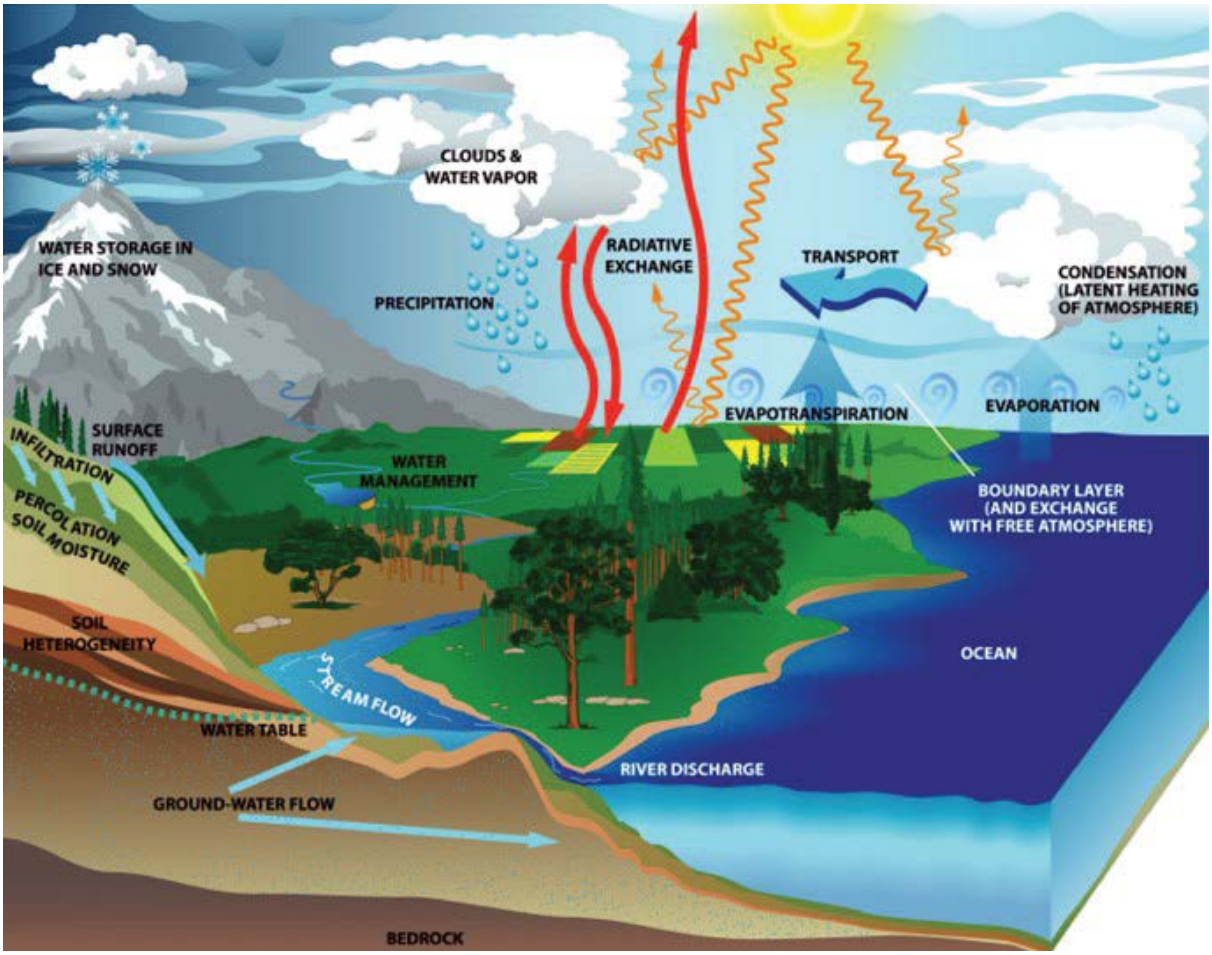


Figure 4: Hydrological Water Cycle (DWA, 2010)
Source: Department of Water Affairs and Forestry (DWAF, 2007)

As depicted in the Figure: 4 above, the continuous exchange of water between the ocean, land and the atmosphere can be best described as a ‘’turnover’’ which is essential to life (Shikhlomanov, 1999:46). For the purpose of this study, the hydrological cycle cannot be discussed in isolation because any alterations affecting these natural processes impact on the availability of potable water.

In addition, UNESCO (2006) has revealed that the roles and interdependencies of the different hydrological components are often not fully appreciated. When the natural water cycle and its relationship on earth are overlooked, the availability of water is compromised (Thompson, 2005: 3). According to Claussen, Brovkin and Ganopolski (2003:99), water is essential for life and is central to society‘s welfare and sustainable economic growth. Plants, animals, natural and managed ecosystems, and human

settlements rely on the water cycle and are very sensitive to variations in the storage changes and evaporative fluxes to and from the land respectively.

Human activities have brought about changes to the water cycle and this has threatened the availability of water. In addition, climate change has also changed the dynamics of the water cycle. According to Owen *et al.* (1998:177), the hydrological cycle is powered by solar energy and gravity. Global warming is an aftermath of climate change (Maynard *et al.*, 2002:19). It has increased solar energy, hence increasing the rate of evaporation and rainfall pattern.

According to NRC (2011), it has become increasingly clear that some of the most likely and unavoidable impacts of changes in climate to the South African society will be changes in water availability, supply, quantity and demand. South Africa is already regarded as one of the 30 driest countries in the world, thus climate change may pose a serious threat to the supply of potable water to the general populace. Taking a closer look at the elements of the hydrological cycle and sensitivity to climatic change will be of paramount importance to present day and future water managers.

2.3 DEFINITION OF POTABLE WATER

Potable water is a common pool of natural resource that is safe enough to be consumed by humans for whom everyone is responsible (Musingafe & Chidamoyo, 2013:26). Potable water that has been used by humans is referred to as used, waste and grey water respectively. According to sections 9 and 10 of the Water Services Act, grey water is water that does not contain significant amounts of faecal pollution. Grey water can be recycled and boost water availability whereas used water that contains a great significant of faecal pollution cannot be reutilised.

The Oxford dictionary (2014:512) defines water as a colourless, transparent, odourless, liquid which forms the seas, lakes, rivers, and rain and is the basis of the fluids of living organisms. Water that comes from rain or snow melting and does not soak into the ground but rather flows into surface water ways is referred to as storm-water. Storm-water greatly influences the availability of fresh water on earth.

According to Thompson (2006:578), it is the responsibility of the local government authorities of a specific area to manage storm-water. Storm-water is delicate and vulnerable to pollution and contamination. Gorbachev (2005:7) believes that “all life is

dependent on water to survive" and thus "water sustains all. Although it is agreed that water is "life", it can also spread diseases, breed mosquitoes, and cause floods, which are just a few of the adverse aspects of water".

Potable water is treated, cleaned or filtered and meets established drinking water standards, or is assumed to be reasonably free of harmful bacteria and contaminants, and considered safe to drink or use in cooking and baking. According to Gorbachev, in Turton and Henwood (2002:63), those charged with making decisions regarding the management of water have an enormous responsibility to their constituents. A moral decision regarding fresh water can improve the lives of every individual, community, boost the economy and safeguard the natural environment, whereas a poor decision, can wreak havoc on nature, exacerbate poverty and diseases and create conflict (Musingafe & Chidamoyo, 2013). This research endeavours to determine the characteristics, quality and the extent of potable water services in Mogwase Township.

2.4 WHAT IS POTABLE WATER SUPPLY MANAGEMENT?

Management can be defined in simple terms as the process of dealing with or controlling things (Oxford dictionary, 2014:369). However, water supply management is a demanding task that involves controlling water usage and water quality. According to UNWVLC (2003), potable water supply management is the range of political, organisational, administrative and environmental management processes through which communities articulate their interests in the development and management of potable water resources and delivery of potable water services.

Potable water supply management can determine the health and social welfare of the community. According to Thompson (2006: 212), each service authority has the duty to all consumers or potential consumers in its jurisdiction to progressively ensure efficient, affordable, economical and sustainable access to water services.

According to UNESCO (2006), potable water supply management involves the formulation and adoption of sustainable legislation, policies, and institutions; enforcing the implementation of adopted policies and legislation as well as clarification of the roles and responsibilities of all participating stakeholders regarding ownership, administration and management of water. In a narrow sense, management can be described as a process that involves structuring (facilitation) financing, controlling,

communicating, cooperative governance and embracing the Integrated Water Resource Management (IWRM) approach comprehensively. According to Folifac (2007:6), Southern Africa faces severe and increasing challenges in the management of its potable water supply.

In countries such as South Africa, cities and bigger towns have access to good water quality as a result of good drinking water quality management practices (DWAF, 2007:5). As expected, a situation assessment undertaken by the Department of Water and Sanitation indicated that certain drinking water quality challenges usually occur in smaller municipal areas and townships (DWAF, 2007:6). There are endless challenges that compromise the management of potable water supply in municipalities in South Africa. These encompass inadequately skilled human resources, insufficient funding made available for drinking water, quality management and inadequate access to credible laboratories.

Solanes and Villarreal (1999:121) identified important factors highlighted in the 1992 Dublin Principles, namely: water should be treated as a finite and vulnerable resource that is essential to sustain life; hence it requires effective management and demands a holistic approach. In addition, water development and management should be based on a participatory approach, involving all stakeholders at all levels. It was also identified that women play a central role for the provision; management and safeguarding of water, but some municipalities do not really take this fact into cognisance (Solanes & Virarreal, 1996:122).

It is, however, important to note that potable water supply management should not be treated as a rigid prescription (Musingafe & Chidamoyo, 2013:28). It is a broad and elastic framework that should be contextualised.

Growth in population means mounting demand and competition for water for domestic, industrial and municipal purposes. According to UNDP (2006:Online), only one percent of the world's water can be used for human needs. This amount has to be shared by many competing users. Stress on fresh water resources due to rising demand is leading to scarcity in several areas (UNDP, 2006: Online). South Africa is classified as one of the most water-scarce countries in the world. The most water-scarce or stressed areas are typically those with fewer water resources, high population densities and high population growth rates (UN-Water and FAO, 2007).

The Housing Act 107 of 1997 emphasises that “everyone has the right to have access to adequate housing and the State must take reasonable legislative and other measures within its available resources, to achieve the progressive realisation of this right”. Therefore, it is Government’s duty to work progressively towards ensuring that all South Africans have access to secure tenure, housing, basic services, materials, facilities and infrastructure on a progressive basis. It is the obligation of the government to ensure that everyone has access to clean water. In view of this Housing Act, The Public Official within the state, Provincial and Municipal department to perform, implement and modify government policy to meet the needs of the community.

2.5 PUBLIC MANAGEMENT

The concept of Public Management comprise of the following processes:

- Public policy-making and implementation
- Planning
- Organising
- Financing
- Human resource and motivation
- Procedures and methods
- Control

Integrated Water Resource Management (IWRM) should implement the above-mentioned processes to effect about good governance.

2.6 IMPACT OF MINING ON THE POTABLE WATER SUPPLY OF MOGWASE TOWNSHIP

Mining is an important sector of the regional economy since it plays a major role in the degradation of the quality of water and in turn requires a great deal of water to meet its day-to-day operations. According to IPCC (2007), water degradation can cause water scarcity. Mining has direct implications on the hydrological cycle as it disturbs the surface water catchment area and the groundwater aquifers. According to Glazewki (2005: 458), one of the causes of water scarcity in South Africa is mining. Its enormous water use is exacerbated by the fact that mining activities mostly occur in the dryer parts of the country, compelling mines to use water as efficiently as possible.

The North - West Province is generally one of the driest provinces in South Africa and has a very low annual rainfall (DWA, 2012:302). The biggest platinum mines are located in this province which requires water for their operations. However, the need for the large amounts of water has triggered water stress followed by an acute scarcity. The primary minerals mined at present include platinum, associated platinum group minerals as well as gold, iron ore, granite and limestone (WMA, 2012:120). Other minerals mined include: palladium, chrome, manganese, mineral sands and vanadium. Some of the old mine dumps are being reworked and the impact of thereof is unknown, but is assumed to be negligible on the rainfall runoff relationship.

New mines are being developed along the axis between Pretoria, Rustenburg and Sun City. Mines have approached Rand Water for the supply of water from the Vaal River System (WMA, 2012: I28). Dewatering mines, especially between Brits and Rustenburg is of great concern for local citrus farmers, who believe that the groundwater, their main source of supply, is being depleted. According to UNWWD (2009), there has been a notable decline in domestic water sources owing to mining activities. Although the supply of water is a basic human right, its distribution can be subject to affordability. Therefore, when there is a scarcity those who can afford to will get the supply at the expense of those who cannot. Townships such as Mogwase and rural communities are usually victims of such circumstances.

The development of economic activities around Mogwase Township, such as mining, has contributed to water pollution. Pollution as a result of mining activities has serious implications on potable water. Pretorius and Dennis (2003) highlighted that mining activities can result in the emission of nitrates in water which are difficult to deal with during purification, thereby compromising the quality of potable water. The Batlhako Mining Company (Batlhako Mining Ltd.) owns and operates the Ruighoek Chrome Mine on the farm Ruighoek 169 PJ, Pilanesberg Game Reserve and Mogwase Township. The farm where the mine is located is near the western border of the Pilanesberg National Park. The area is about 62 degrees north-west of Rustenburg (see Figure 5).

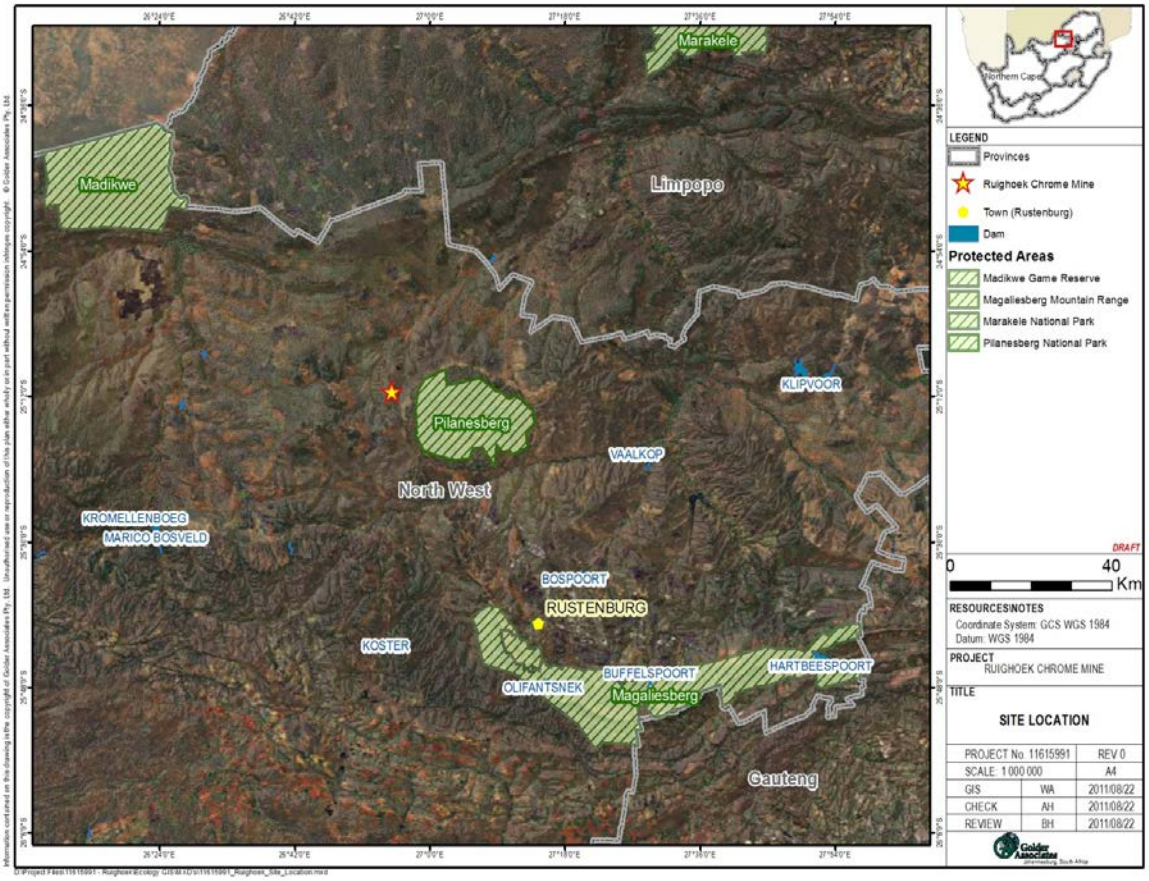


Figure 5: Batlhako Mining Company
Source: Adapted from the North West Municipal Report 2001

Mogwase Township is in the middle of a corridor of platinum mines. The Wesizwe Project called Bakubung Platinum Mine that is located directly south of the Pilanesberg National Park has caused a serious water stress in the area. The main shaft is planned to have a hoisting capacity of 230 000 tonnes plus 40 000 tonnes of waste per month. Wesizwe has secured a temporary water supply of 200 000 litre per day, which is sufficient for the purpose of shaft sinking. However, the company requires a supply of 6000000 kilo litres per day of fresh water feed at full production.

Mining and its associated industries also have an impact on the water resources through usage by the employees. Often the mines have associated "mining villages" with their own sewage and water provision infrastructure. These associated services are not part of a mining entity's core business and may operate under severe budgetary constraints. Depletion of surface water resources in the North West Province as a result of mining activities is difficult to differentiate from the depletion of the groundwater, as information on the individual components of a mine's water balance are generally not measured. In terms of mine waste, material that are stored on the surface, either

temporarily or permanently, hinders the development potential of the surface water streams, marshes, dams and rivers, as they are likely to become polluted.

North West Province is a high-risk area because the composition of the waste material produced by the mines contains heavy metals, which cause acid leachate when exposed to water and air (oxidisation). Because platinum is found in a low grade ore, huge quantities of rock waste is produced for a return of a relatively small amount of the mineral. Consequently, mining waste covers vast areas around Rustenburg in the form of slime dams, tailings facilities, rock and sand waste facilities. The final pH (measure of the acidity or alkalinity of a solution) of the leachate that emanates from the waste facility is a determining factor.

Mine effluents of low pH are problematic because the surface, and groundwater in the platinum producing area under review is therefore at risk from acid mine drainage. Below is a pictorial view of the area under threat of mine effluents. *The natural topography is predominantly rolling flat, with isolated ridges and hills. The Pilanesberg mountain range is visible in the background* (Refer to figure: 6).

Figure 6: Topography of Pilanesberg
Source: North West Municipal report 2001

In 2008, a potable water monitoring system was acquired by the Moses Kotane Local Municipality through the cooperation with environmental agents and has proven to be a valuable “early warning system” for detecting the groundwater pollution in the rural villages. Since the transfer of the potable water testing laboratory from Lahti to BPDM,

Moses Kotane Local Municipality has been able to independently test the quality of their ground- water.

This has also created a platform for the other local municipalities to observe the importance of independent monitoring of the quality of water and become pro-active in the event of water contamination. In 2009, another machine to monitor potable water was delivered to BPDM and erected in Moses Kotane Local Municipality to improve the monitoring of the quality of the final discharge of the waste water from the Mogwase Town waste water treatment plant.

In order to secure the water monitoring capacity in the Moses Kotane Local Municipality's area, with the aim of preventing health risks and pollution of water sources, water monitoring upgrading was conducted by providing two new potable field laboratory devices in 2010. These devices are used in the rural areas of the Bojanala District Municipality.

2.7 GROUNDWATER

South Africa is a semi-arid country with limited rainfall, which has an adverse impact on the availability of potable water. In trying to understand the contribution of groundwater in ensuring the availability of water in South Africa, it is important to define surface water. Surface water is a term that is used to differentiate all the resources on the surface from the underground water (Kelber & Germishuyse, 2010:25).

Surface water is considered fresh and it is found mainly in, *inter alia,* rivers, streams, lakes, dams, only to mention a few. It is believed that surface water resources are the largest and the most important resources in South Africa (Thompson, 2001: 11). Groundwater is located beneath the earth's surface in soil pore spaces and in the fractures of rock formations (Fuggle & Rabie, 2005:304). Generally, the quantities of groundwater are determined by the rock type. Thompson (2006:11) reiterated that groundwater is one of the important sources of water in South Africa although it is rare because of the commonness of hard rocks.

Mining and other human activities have serious groundwater implications. . In South Africa, almost two thirds of the population depend on groundwater for domestic water needs (DWAF, 2000:11). The protection of groundwater supplies is essential in developing countries as it is an essential source of fresh water (DWAF, 2000). Although

people and some sectors of the economy rely on groundwater, it is accepted that people do not have enough data on the nature and extent of groundwater and aquifers, particularly in developing countries because of inadequate water quantity and quality monitoring programmes (UNESCO, 2008).

Groundwater is particularly replenished by surface water from precipitation or snow, which then moves through the soil into the groundwater system where it recharges the groundwater table (DWAF, 2002). In small townships and areas where there is minimal infrastructure, rural communities often rely on more informal' traditionally developed groundwater sources such as hand dug wells, springs and groundwater abstraction boreholes (DWAF, 2000:67). Groundwater is neither a liability nor a requirement for the mining industry. At times it hinders progress and at times it is a key for production.

Human activities and the mining industry rely on groundwater despite the fact that there is a serious lack of information on how to appropriately manage this resource. According to DWAF (2002), most groundwater quality and quantity problems in South Africa are related to human activities such as industry and mining. Deteriorating standards in water treatment, agriculture drainage, land use patterns and waste disposal intensify the problem. Although groundwater is a vital source of water for many and has given rise to several short and medium-term socio-economic benefits, the additional pressure on the resource has put many sub-ground surface located groundwater aquifers at risk due to higher extraction (DWAF, 2000).

In a community satisfaction survey undertaken by G3 Business Solutions and the North-West University, farmers accused Lonmin of, amongst other things. "… stealing water from the Buffelspoort Dam," and that "the boreholes had dried up as a result of mining operations" (Chenga, Cronje & Naude, 2005:15). The mines use huge quantities of water in their operations. This water is polluted during almost every step in the mining operations. The mines find it difficult and costly to purify the water beyond the C grade status. The mines pump water from underground located groundwater aquifers as these pose a potential risk to mining operations. This further depletes the underground source of water. DWAF (2000) cited the lack of education, awareness and collaboration between stakeholders on the importance of sustainable and efficient use of groundwater.

For the purpose of this research, it is also important to discuss geo-hydrology aspects of potable water. The availability of surface and groundwater is linked to the surface catchment area of a specific area (Nealer & Raga, 2007:168). The understanding of geo-hydrology is crucial for water managers and planners.

North West Province is mainly characterised by dolomite rocks and this has an impact on groundwater erosion to certain types of soil and the development of certified or uncertified groundwater aquifers. According to Cech (2010:108), the movement of groundwater depends on the surface rock materials in a given area. A closer look at the awareness and understanding of it might be the first appropriate step that will pave way for a timeous assessment of the occurrence and extent of pollution and proactive management of groundwater in South Africa.

2.8 POTABLE WATER SUPPLY, WOMEN AND POVERTY IN COMMUNITIES

Sufficient water for washing and safe, private sanitation facilities are central to the basic right of every human being for personal dignity and self-respect (UNDP, 2004). It is recognised that water and sanitation are fundamental to poverty eradication and overall sustainable development. Women are directly involved in the day-to-day use of potable water.

The shortage or unavailability of clean water may result in adverse effects to the general populace. Women, in particular, will mostly be affected by these additional burdens. Women and girls in developing countries are largely responsible for obtaining family water supplies and may have to walk long distances to reach a water source (WHO & UNICEF, 2005:22).

Women are usually responsible for household hygiene and nursing sick children, who frequently become ill with diarrheal disease without clean water (WHO & UNICEF, 2005). Girls may be taken out of school to help fetch water when it is not readily available at a nearby source. This course of events has an extremely negative impact on their education. The picture below illustrates the role played by women when there is a shortage of or poor management of potable water in a community.

Women and female children are largely responsible for fetching water for domestic use, even in urban communities, when systems fail (Musingafi & Chidamoyo, 2013:29). Women play a central part in the provision, management and safeguarding of water.

Therefore, they should be fully involved in all decisions concerning the management of the potable water supply. Little has been done to include women in public decision-making, especially in developing nations. This might be the reason why water shortages are chronic.

Figure 7: Women and girls fetching water for domestic use
Source: Adapted from Google Images: accessed on 20 July 2014

It is also believed that a lack of clean water and sanitation facilities exacerbates an already vicious poverty cycle by robbing girls of educational opportunities, causing disease and malnutrition, and ultimately reducing lifelong productivity (WHO and UNICEF, 2005: 28). This is common in most informal settlements in South Africa. An increase in job opportunities in areas around Mogwase Township has led to the development of informal settlements and an increase in water demand.

UNDP (2004) affirmed that the provision of potable water is a key to poverty alleviation. Consequently, the UNDP made it obligatory for the service providers to devise techniques to overcome water challenges and achieve sustainable development in their communities.

2.9 THE BLUE-DROP STATUS OF MOSES LOCAL KOTANE MUNICIPALITY'S POTABLE WATER

The blue-drop system is the brain-child of the Department of Water and Sanitation Mtsweni (2012). It was developed in a bid to promote incentive based regulation and acknowledge excellence in drinking and waste water quality management (DWA, 2012:35). According to the Water Supply Authority (WSA)Blue Drop report (2011), Moses Kotane Local Municipality is rated amongst the lowest performers in the North West Province in terms of the supply of drinking water, quality standards and management thereof..

According to the Department of Water and Sanitation, the lack of a water safety plan compromises a municipality's ability to effectively implement a proactive management approach and the lack of a Drinking Water Incident Management Protocol and Water Quality Incident Register is also a cause for concern. Below is a figure 8 chart that summarises the percentages of the blue-drop score in the North–West Province.

Figure 8 below reveals that the Moses Kotane Local Municipality has failed to meet the stipulations of the Water Service Act with regard to the overall management and supply of quality drinking water to its inhabitants. Against this background, this research also determines the nature and the extent of potable water supply and the management thereof in Mogwase Township. The current "Blue-Drop" score is extremely low. There is much room for further research before recommendations can be provided to improve the current water quality.

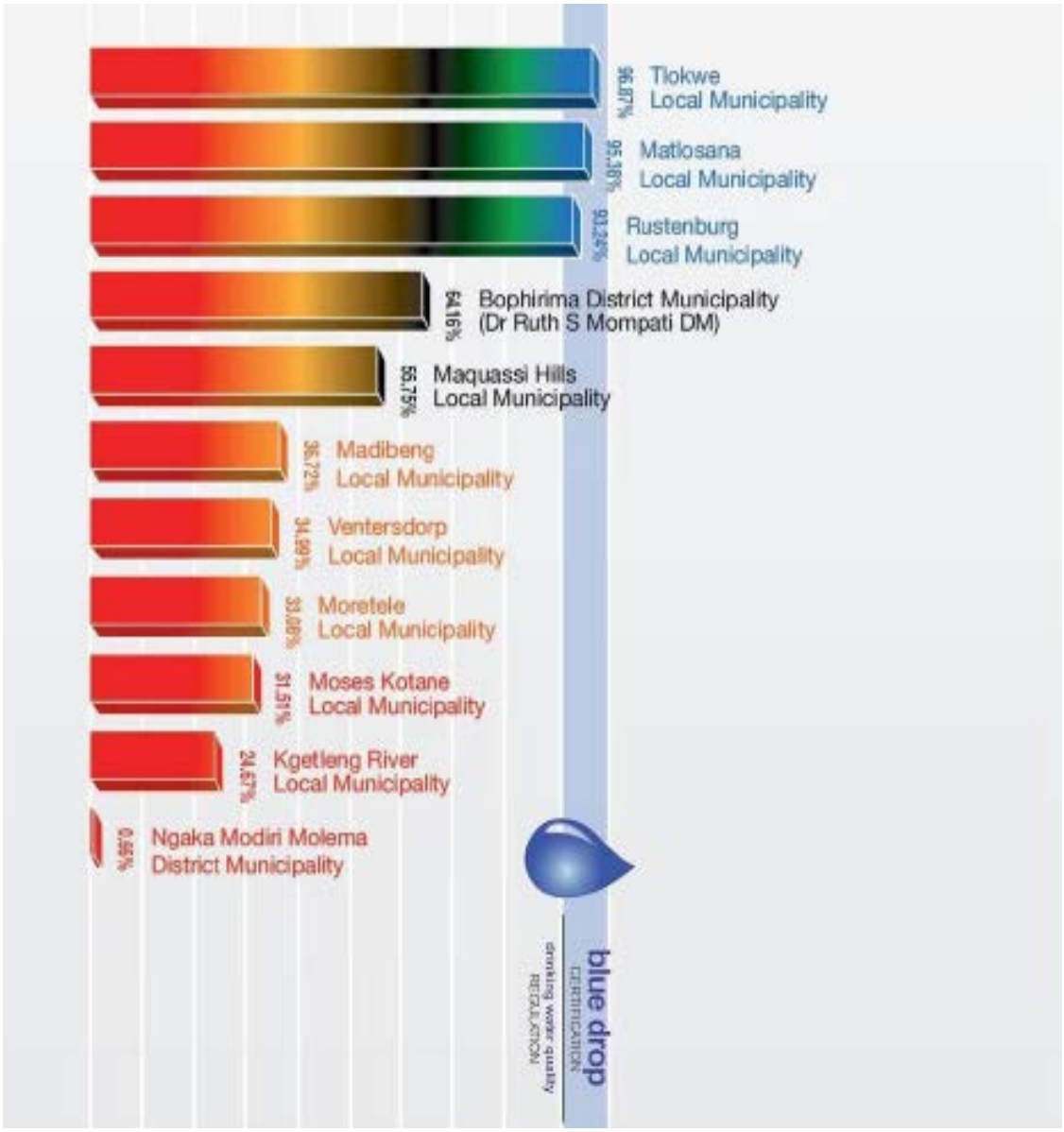


Figure 8: Blue Drop status of the Local Municipalities in the North West
Source: Adapted from the Blue-Drop Certificate Draft for North West 2012 (WSA Blue Drop Report, 2011)

In South Africa, the National Government is the custodian of water resources through the Department of Water and Sanitation (DWS) and it forms the highest level of water management in the country. Thus, the DWS has a constitutional obligation in terms of section 25(4) (a) of the Constitution of 1996 to ensure that everyone has access to clean water. The provincial government is a service provider and the actual task of providing water services to the communities is allocated to the local government as stipulated in the Local Government: Municipal Systems Act 32 of 2000.

2.10 CONCLUSION

The literature survey highlighted a number of factors that influence the management of potable water in Mogwase Township. Amongst the factors were the lack of knowledge and understanding of the hydrological cycle in the communities and those responsible for water supply, the development of mines in the areas around Mogwase Township, the gender roles and the implications in the management of water supply and the Blue Drop status of the Moses Kotane Local Municipality. The transformation with regard to water services in South Africa is influenced mainly by legislation prescribed in the Constitution and strategies related to water.

In the next chapter legislation of water resource management in South Africa will be analysed. The legislation includes the relevant strategies of water resource management; *inter alia,* the South African Constitution (1996).

CHAPTER 3

POLICY AND LEGAL FRAMEWORK FOR POTABLE WATER SERVICES IN LOCAL GOVENRMENT IN SOUTH AFRICA

3.1 INTRODUCTION

The Republic of South Africa Constitution of 1996 stipulates that everyone has the right, amongst other rights, to have access to sufficient food, water, and social security. The Constitution grants every citizen the right to have access to sufficient water and obliges the state to take steps to achieve the progressive realisation of this right. The responsibility for water and sanitation services lies with the local government, (i.e. it is responsible for the planning and delivery of potable water supply and domestic water systems). The Constitution also places much emphasis on the importance of participation by communities in planning service provision.

The significant political change in South Africa brought about a set of principles which are entrenched in the Constitution of 1996 (Abrams, 1996:35). Therefore, it is important to put in place an effective framework in order to ensure that the country's water resources are protected, used, developed, managed and controlled in a sustainable and equitable manner over the long term for the benefit of all. The framework should include the provision of the necessary services and economic benefits for people, plants and animals (Thompson, 2006:13).

The free Water Policy was officially launched in July 2001. Some of the 155 out of the 170 Water Services Authorities indicated that they were providing Free Basic Water. Through the Free ASI Water Policy, each household receives up to 6000 litres of clean water per month (Burger, 2004/5:63).The backlog of people without access to safe drinking water is being addressed by means of the provision of access to water, either direct to houses, or by providing access within a reasonable distance of the people's dwellings (Kido, 2008:84).

According to the Local Government Municipal Systems Act 32 of 2000, a municipality must give priority to the basic needs of the local community and ensure that all residents of the local community have access to the minimum services (RSA, 2000).

This chapter provides an overview of the important legislation on water resource management in South Africa.

3.2 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of 1996 gives every person the right to have access to the clean water. This framework functions within the legislation of the country, on the basis that the Department of Water and Sanitation (DWS) serves as the body that formulates and implements the policy with regard to water supply and sanitation programmes. Section 27 of the Constitution ensures that all South Africans have access to clean, sufficient water and a healthy environment within their areas. In this regard, the Moses Kotane Local Municipality commits itself to the people-oriented service delivery to ensure that everyone in its jurisdiction has access to functioning basic water services.

According to the South African Constitution Act 108 of 1996 and the Water Services Act 108 of 1997, the responsibility of water service delivery lies with the local government, either as a water service point authority or as a water provider to the communities in their services in a sustainable manner. Moreover, the Constitution stipulates that a municipality must structure and manage its processes in order to give priority to the basic needs for its communities and to promote the social and economic development (Constitution of SA, section 153 of 1996).

Since water and sanitation is the responsibility of local government, (responsible for the planning and delivery of the potable water supply and domestic water system) the Constitution also places much emphasis on the importance of participation by communities in planning service provision.

The water services industry in South Africa is faced with challenges that are mostly associated with the social and the political history of South Africa. The following are the major challenges of the water services sector:

- The backlog of water services. It is estimated that approximately 25% of the country's population are without basic water services.
- The financial viability of the water Services Act. It is estimated that more than 50% of authorities are in financial troubles by inefficiencies and the non-payment of services.

According to Bekink (2006:71), poor coordination could severely undermine the new development efforts. An important method to ensure improved coordination and commitment is through the process of the Integrated Development Planning.

The Strategic Framework for Water Service provides a summary of policy with respect to the water services sector in South Africa. It outlines the vision, goals and targets to be achieved by the Water Service Sector over the next decade and set up norms and standards for water services (Mvula, 2005:271).

The water service sector consists of the following goals:

a. All South Africans have access to appropriate, safe, acceptable and affordable basic water supply and sanitation.
b. All South Africans must be educated live a healthy life style and proper usage of water.
c. Water and sanitation services should be provided

- equitably;
- effectively;
- affordably;
- efficiently;
- sustainably and with a sensitivity to gender.

d. All Water Service Authorities are responsible and accountable to the residents living in their areas. They are required to regulate water services according to the Bill of Rights as provided for in the Constitution.
e. All the water service providers should be accountable, cost effective, efficient and viable.
f. The cost effective measures with regard water services and sanitation should be socially and economically viable (i.e. reflect the financial sustainability and encourage proper utilisation of resources).

According to Thompson (2006:13), it is necessary to establish an effective framework to ensure that the country's water resources are protected, used, developed, managed and controlled in a sustainable and equitable manner in the long term for the benefit of all the people in South Africa. The Framework should include the provision of the necessary water services that is essential for achieving optimum long-term, environmentally sustainable, social and economic benefit for people, plants and animals.

All South Africans should have access to a minimal level of service to water and sanitation. The Bills of Rights stipulates the afore-mentioned rights an obligation, not a goal. According to Bekink (2006:283), all the imbalances that still exist with regard to equal access to water services should be addressed through the development of new infrastructure and the rehabilitation and upgrading of existing infrastructure.

The government of South Africa is committed in ensuring that its people are provided with the services of basic water supply and sanitation in a sustainable manner by 2010 (SA Yearbook, 2007/08:587-8). This obligation has not been achieved in all respects. This was due to the backlog and maladministration of finances in government.

Mogwase Township is unable to provide water service as stipulated in the Bill of Rights. The water assets transferred to Moses Kotane Local Municipality in 2006 are old and require an urgent upgrade. The funds that were provided by the former Department of Water Affairs and Forestry to rectify the water services and supply problems were inadequate to address the magnitude of the problem. Furthermore, there is no system in place to determine water balance and loss. This is a serious challenge for the Moses Kotane Local Municipality. Cost recovery is affected by unstable water supply, illegal water connection sand control equipment theft (IDP, 2006:08).

The Water Services Act requires water service providers to set conditions which deal with the:

- Circumstances and conditions at which water services may be discontinued and outline the procedures with regard to water services.
- The conditions and procedures must be known and understood by the residents.
- The conditions must be fair to society.

According to Ismail *et al.* (1997:66), the local authorities should strive to achieve the following objectives in their financial and administrative capacity:

- The promotion of democratic and accountable government for local communities.
- The provision of services to citizens in a sustainable manner.
- The promotion of social and economic development.
- The promotion of a safe and healthy environment.

All the citizens need to be encouraged to participate in local government matters.

3.3 HOUSINGACT 107 OF 1997

Section 26 of the Constitution of the Republic of South Africa, 1996, enshrines the right to housing, as follows: “(1) everyone has the right to have access to adequate housing. (2) The State must take reasonable legislative and other measures within its available resources, to achieve the progressive realisation of this right”. Government’s human settlement development mandate emanates from the Constitution of 1996.

Therefore, it is government’s duty to work progressively towards ensuring that all South Africans have access to secure tenure, housing, basic services, materials, facilities and infrastructure on a progressive basis. Government will have to apply legislative, administrative, financial, educational and social measures to fulfil its housing obligations.

The housing vision is the establishment of viable, socially and economically integrated communities, situated in areas allowing convenient access to economic opportunities as well as to health, educational and social amenities in which all South Africans will, on a progressive basis, have access to:

a) permanent residential structures with secure tenure ensuring internal and external privacy and providing adequate protection against the elements; and
b) potable water, adequate sanitary facilities and domestic energy supply.

The housing vision is underpinned by principles of sustainability, viability, integration, equality, re-construction, holistic development and good governance. South Africa’s housing policy and strategy must contribute to a non-racial, non-sexist, democratic integrated society. The goal is to improve the quality of living of all South Africans with an emphasis on the poor and those who cannot independently satisfy their basic housing needs.

3.4 WATER SERVICES ACT 108 OF 1997

The Water Service Act 108 of 1997 creates a regulatory framework within which water services should be provided, which is basically regulating the use of water resources and issues affecting the water resources.

Schedule 4 of the Constitution authorises the responsibility of water and sanitation services to the local municipality. This allows for the development of water utilities in the local municipality and the provision for concessions and Private-Public Partnerships to be developed.

The aim of the afore-mentioned Act is to ensure and define the right of access to basic water supply and basic sanitation services necessary to secure sufficient water, an environment not harmful to human health or well-being, and to set out the rights and duties of consumers as well as those who are responsible for providing services. This also allows the Minister of Water and Sanitation to set national standards (including norms and standards) to ensure sufficient, continuous, affordable and fair water services.

The Act requires Water Services Institutions to take reasonable measures to realise the right of access to basic water supply and sanitation. Specifically, the Act requires every Water Services Authority to prepare and adopt a water services development plan, taking into account the right to basic access. Although local government is part of cooperative governance, it has the overall responsibility of ensuring that all citizens in its area have access to basic water supply and sanitation services.

The Water Services Act 108 of 1997 provides for the right of access to basic water supply and sanitation service prior to 1994, the former Department of Water Affairs and Forestry was the water services authority. The powers were delegated to the District Municipalities who later delegated these duties to the local municipalities. Magalies Water was appointed as a services provider by the Moses Kotane Local Municipality.

According to Bekink (2006:315-316), the provision of water and more specifically drinking water to the local residents, is generally considered to be one of the basic services that a municipality must provide. Without water and basic sanitation infrastructure and services, it is difficult to imagine how a human settlement can be sustainable and survive. Accordingly, water and sanitation services seem to tie in

strongly with the development duties and objectives of municipalities that have been entrenched in the Constitution.

It is important that municipalities facilitate the provision of higher levels of services for domestic users and promote services which support sustainable livelihoods and economic development. According to the Water Services Act, each water service authority must draft a water services development plan. This plan must articulate that of the particular municipality. The Act also emphasises that the Water Services Authority take into consideration all suggestions and comments before adopting a developmental plan. The plan takes into account all the water users and bodies to work together in a sustainable manner in a municipality.

An Integrated Development Plan (IDP) is defined, in the Local Government Municipality System Act 32 of 2000 as the principle strategic instrument through which all municipal planning, development and decisions are guided and informed. The purpose of an IDP is:

- To enable a municipality to align and institutional resources behind agreed policy objectives and programmes.
- It is a vital tool to ensure the integration of local government activities with other government spheres.
- It serves as a basis for engagement between local government and the citizen at the local level.
- It enables a municipality to weigh up its obligations and systematically prioritise programmes and resource allocations.

A municipality is required to address all water and sanitation problems in its geographical areas. This includes those priorities outlined in its Integrated Development Plan (IDP). The Municipal Systems Act 32 of 2000 stipulates the steps required for the preparation of an IDP which is a legal requirement/obligation on the part of municipalities.

The Water Services Act 108 of 1997 and the Local Government Municipal Systems Act 32 of 2000, stipulate that a Water Services Authority formulate and implement by-laws that prescribe the guidelines for the provision of water services. These conditions include the following:

- Applications for water supply.
- Consumer services agreements.
- Tariffs and charges.
- Special conditions or provisions relating to the supply of water.
- Cutting off the water supply and related water services.
- The termination of consumer agreements.
- Disconnection of water supplies.
- Special restrictions.
- Strategies for dealing with failures to supply water.
- Sale of water by consumers.
- Special provisions governing the supply of water with water meters
- Water supplies for building purposes.
- Alternative methods of supply.

The management and provision of water services functions rests with the municipalities which are officially assigned as Water Services Authorities. Section 21 of the Water Service Act 108 of 1997 stipulates that a Water Services Authority have by-laws which explain the conditions for the provision of water services. The Moses Kotane Local Municipality formulated its water supply services by-laws in terms of the Water Services Act 108 of 1997 and the Local Government: Municipal Systems Act 32 of 2000. The municipality implements such by-laws to ensure healthy environment exists for the supply of fresh, clean, running water and imposes a penalty if any by-laws are contravened.

3.5 THE NATIONAL WATER ACT 36 OF 1998

The National Water Act 36 of 1998 aims to ensure that water resources are protected, used, developed, conserved, managed and controlled in a sustainable manner and takes the following into account to ensure that all South Africans benefit in:

- Meeting the basic human needs of present and future generations.
- Facilitating social and economic development.
- Redressing the results of past racial gender discrimination.
- Promoting equitable access to water.
- Providing for growing demand.

- Facilitating social and economic development.
- Promoting the efficient, sustainable and beneficial use of water in the public interest.
- Protecting aquatic and associated ecosystems and their biological diversity.
- Reducing and preventing pollution and degradation of water resources.
- Meeting water management obligation.
- Managing floods and droughts and.
- Promoting dam safety.

According to Burger (2004:603), the National Water Act also aims at integrating the management of surface and ground-water and foster sustainable use of surface and ground-water. The Act also provides a policy framework for water markets in the country as a means to address issues of water allocation and demand. The Act also provides the Minister of Department of Water and Sanitation to establish a pricing strategy for the usage of water (Blignaut & De Wit, 2004:212).

The quality of water for the residents of The Mogwase Township is required improve the quality of water for its residents. This could be achieved by implementing Water Quality Management in the Vaalkop Supply System as well as at the overall Drinking Water Quality in Moses Kotane Local Municipality. The Water Services Act urges the implementation of a programme of preventative maintenance and ensures adequate reporting and record-keeping of all maintenance issues by Municipality in its geographical area of responsibility.

The residents of Mogwase Township have inadequate supply of water for domestic use because the Moses Kotane Local Municipality has been experiencing water interruptions for several years in areas supplied by the Vaalkop Dam. This scenario has left the residents of Mogwase Township in distress. The Moses Kotane Local Municipality is required to provide basic water services to the communities. According to the legislative mandate of the Department of Water and Sanitation a municipality must ensure that the water provided complies with the quality and standards of drinking water.

3.6 NATIONAL ENVIRONMENTAL MANAGEMENT ACT 107 OF 1998

National Environmental Management Act 107 of 1998 (NEMA) provides a framework for the provision that everyone has the right to have a healthy environment that is not harmful and should be protected for the benefit of the present and future generation.

The NEMA's Principles aim is to substantiate the environmental right in the Constitution. It creates a basic framework in which the Act can be interpreted in its application, and through which any action can be tested for administrative justice. The following principles reflect the core values of NEMA:

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, development, cultural and social interest equitably.
- Development must be environmentally, socially and economically sustainable (RSA, 1998).

Finally, the NEMA principles require intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment. According to Steyn (1999:2), NEMA is a primary or parent environmental statute because it guides decision-making or administration of all legislation in South Africa concerned with the environment. Since the environment is vital to health, the well-being of the people should be given priority.

Most water uses also impact on the environment, and the cost hereof must be accounted for in assessing the economic benefits of alternative water uses and development. To sustain the established use of water, the natural resource base must be suitably protected. However, within a safeguarded natural environment, the water available to support tourism and recreation also has great potential for job creation (Bond, 2003:89).

Section 152 of the Constitution, together with schedules 4B and 5B in the Constitution refers to local government matters of which the following are of particular relevance to the management of the environment:

- Water and Sanitation Services (limited to potable water supply systems and domestic waste water and sewerage disposal system).

- Storm-water management in built-up areas.
- Air pollution.
- Fire fighting services.
- Municipal planning.
- Cleansing.
- Municipal parks and recreation.

The Government's commitment to long-term sustainable development is achieved when explicit recognition is given in its policy-making process that its economic systems are essentially products of and dependent on the social system. The principles of NEMA clearly outline that the natural environment should be maintained in a sustainable manner that will give future generation the opportunity to survive.

According to Fuggle (2000:2), the following principles are proposed for building a sustainable society:

- Respect and care for a community's life.
- Improve the quality of human life.
- Conserve the earth's carrying capacity.
- Minimise the depletion of non-renewable resources.
- Keep within the earth's carrying capacity.
- Change personal attitudes and practices that enable communities to care for their own environments.
- Provide a national framework for integrating development and conservation.
- Create a global alliance

The residents of Mogwase Township have an important role to play in environmental management in their area; the need to conserve and become sensitive to environmental sustainability and protection. Environmental problems such as water, atmospheric pollution and degradation could result in concerns for the residents' health. Public awareness is essential in sustainable environmental management. All institutions of learning could play a major role in spreading the intentions and actions of government policies in order to create a sustainable society.

3.7 LOCAL GOVERNMENT: MUNICIPAL STRUCTURES ACT 117 of 1998

The Municipal Structures Act 117 of 1998 stipulates the powers and functions of municipalities, in particular their role as Water Services Authorities to ensure water provision in their area of jurisdiction. The Local Government: Municipal Structures Act 117 of 1998 was also established to focus on the responsibility of municipalities in terms of basic service delivery which includes potable water supply to their respective communities. According to Nealer and Eden (2010:133), the role of a developmentally orientated local government sphere was clearly defined for the first time with the implementation of the Local Government: Municipal Structures Act 117 of 1998.

According to Van der Waldt *et al.* (2007:54), the Local Government: Municipal Structures Act 117 of 1998 provides for the different categories and types of municipalities; the division of powers and functions; and the regulation of internal systems, structures and office-bearers of a municipality as well as the appropriate electoral systems.

3.8 LOCAL GOVERNMENT: MUNICIPAL SYSTEMS ACT 32 OF 2000

The Municipal Systems Act differentiates between the functions of a water services provider and a Water Services Authority. The Act regulates the provision of services either by a municipality or the appointment of external service providers under section 78. The Constitution of South Africa (1996) provides for the Municipal Systems Act 32 of 2000 to move progressively towards the social and economic upliftment of local communities and ensures universal access to essential services that are affordable to all.

The Municipal Systems Act 32 of 2000 was implemented with the aim of enabling municipalities to move towards the social and economic upliftment of local communities. It also intends to ensure universal access to essential services that are affordable to all citizens of South Africa, regardless of race, gender and age. Aspects such as maintenance of the municipal infrastructure regarding basic services such as potable water must be given priority by the municipal authorities to enable effective and efficient service delivery.

In accordance to this Act, a municipality must develop a culture of municipal governance that complements formal representative government with a system of

participatory governance and encourage community participation. The Act also expects a municipality to apply the following as a means of encouraging public participation:

- Encourage and create conditions for the local communities to participate in the affairs of the municipality.

- Contribute to building the capacity of local community, councillors and staff.

3.9 THE SOUTH AFRICAN DRINKING WATER QUALITY FRAMEWORK

The supply of water by the Moses Kotane Local Municipality is guided by the South African Drinking Water Quality Framework, which provides set norms and standards that obliges a municipality to ensure that the water must be treated and tested before it is declared as safe drinking water.

Safe drinking water should comply with the drinking water regulation and the specifications should not pose a significant risk to health over a human being's life time of consumption (RSA, 1997a). If poor quality water is supplied to the community, it will create unhealthy and unsafe environmental challenges for the inhabitants and probable pressure on health services such as clinics and hospitals.

3.10 INTEGRATED DEVELOPMENT PLAN (IDP)

The participation and cooperation of the communities in determining the services to be provided is an important one. According to the Municipal Systems Act 32 of 2000, section 23:1 stipulates that a municipality is required to implement the direct participation of the local communities in the drafting of its IDP. The Act outlines that a municipality should:

- strive in achieving the objectives of the local government set out in section 152 of the Constitution of South Africa; and
- give effect to its development and responsibilities as outlined in section 153 of the Constitution of South Africa.

In view of the Batho Pele Principles, the communities should be taken into account when decisions are taken about services that should be provided (RSA 1997).

An IDP is set out to enable a municipality to manage the process of fulfilling its developmental responsibilities. It sets out the problems of a municipal area and takes into account the available resources that enable the development and implementation of appropriate strategies to address the problems. Unfortunately, the Moses Kotane Local Municipality utilises its IDP as a document to compile its budget. When the funds are received, the money intended for the allocated projects is used contrary to the stipulations of the Municipal Finance Act.

3.11 ROLE OF COMMUNITY PARTICIPATION

According to the Municipal Systems Act 32 of 2000, (section 16(1), a municipality should develop a culture of municipal governance that complements formal representative government for the following purpose:

a. Encourage and create conditions for the local community to participate in the affairs of the municipality, including:

    - the preparation, implementation and review of its integrated development plan in terms of Chapter 5 of the Act.
    - the establishment, implementation and review of its performance management system in terms of Chapter 6
    - the monitoring and review of its performance, including the outcomes and impact of such performance; and
    - the preparation of its budget, and strategic decisions relating to the provision of municipal services in terms of Chapter 8.

According to Basset (2006:7), participatory communication is helpful in identifying solutions to conflict situations in villages, their capacity to address problems and find their own solutions, than wait for external assistance.

It is important for the National and Provincial Government to support and strengthen the capacity of municipalities to manage affairs (Motshekga, 1996:11).Therefore, it is necessary that the Department of Water and Sanitation which is the custodian of water resources ensure that only the skilled who have the knowledge of water and sanitation service delivery skills are employed by the municipalities. The transfer of skilled personnel to local municipalities could ensure that water services and sanitation delivery are attended to effectively, efficiently and economically.

3.12 CONCLUSION

Based on the above discussions, it is clear that water is essential for sustainable life. It is critical that the well-being of the people is given recognition, and foster the level of commitment to influence a sustainable water supply. This means that reasonable measures need to be taken by all consumers to ensure that water is not polluted or wasted, or it could put the lives of people at risk.

It is clear that to make the provisioning of water more sustainable, the Moses Kotane Local Municipality needs to implement its by-laws and control the usage of water. As part of water resources management, it is vital to manage the people who use the river systems as a water resource.

The Moses Kotane Local Municipality itself cannot address the issue of water supply alone since it requires an integrated effort by all stakeholders. It is possible if the local municipality establishes a relationship with all the stakeholders and develop a shared vision to act responsibly in finding a possible solution to managing and conserving the water resources.

The relevant legislative frame work for water as outlined above, including those related to water strategies, provide a foundation for potable water supply management with more emphasis on the local government sphere of South Africa. The next chapter focuses on the empirical findings on the management of potable water in Mogwase Township.

CHAPTER 4

THE MANAGEMENT OF POTABLE WATER IN MOGWASE TOWNSHIP: EMPIRICAL FINDINGS

4.1 INTRODUCTION

This chapter provides an analysis and interpretation of the research data collected. The chapter focuses on the research methodology, outlines the approach of the study, research design, the target population; procedures for data collection and analyses whilst providing probable answers to the problem statement. This chapter reflects on the objectives of the study.

A five-point Likert scale type questionnaire was used for data collection from the residents of Mogwase Township and the officials of Moses Kotane Local Municipality. The participants in the research were selected from a relevant population sample in the management of potable water of the above mentioned community (from zone 1- 5), the local municipality and Magalies Water employees.

The questionnaire was utilised to collect data. The questionnaire was designed such that the responses provided would enable the researcher to determine the respondents' nature and extent of familiarity of the management of potable water supply in Mogwase Township. The required knowledge included the effectiveness and efficiency in the way potable water is managed, the level of participation and the commitment by the Mogwase Township residents in management of water affairs. Information was also sought on the impact underground mining activities as well as underlying rock have on potable water supply in Mogwase Township.

4.2 RESEARCH METHODOLOGY AND DESIGN

Saunders, Lewis and Thornhill (2003:8) define methodology as a framework of theories as well as principles upon which methods and procedures are based. There are two main research methodologies researchers use in their research design namely: qualitative and quantitative. In this research the quantitative approach was adopted. Cohen (1998:26) describes quantitative methodology as a formal and objective way of determining quantity or amount. In quantitative research, formal, objective and logically systematic steps are used to gather data. Sekaran (2003:145) defines quantitative methodology as a research design that involves statistical analysis of measurements to

describe social phenomena. The quantitative methodology was used in order to gather relevant and appropriate data to answer the research questions.

4.3 ADVANTAGES OF THE QUANTITATIVE METHODOLOGY

Quantitative research methodology involves a large number of participants and the analysis of the results thereof is based on the statistics (Welman *et al*., 2005:9). The following are the advantages of the quantitative research methodology:

- The research approach is usually relevant since its purpose of being able to accumulate sufficient knowledge which leads to better understanding.
- The quantitative research method has the ability to minimise or eliminate subjectivity through use of predetermined and standardised set of rules. This means that research findings are independent of the researcher hence can be verified at all levels of objectivity.
- Quantitative research also focuses a narrow extend of inquiry which allows a thorough understanding of issues under study and tends to be more of an objective research design.
- Quantitative research allows the use of questionnaires which is a convenient way of data collection and has high credibility with administrators and most office holders.

4.4 TARGET POPULATION

Blumberg *et al*. (2005:132), define a population as the entire group of persons or objects that are of interest to the researcher. In this study, the target population consists of the residents of Mogwase Township; officials at the Moses Kotane Local Municipality and Magalies Water and the Manager at Vaalkop Dam. This population is familiar with the functions of Moses Kotane Local Municipality hence a high probability of providing the researcher with information about the management of potable water in Moses Kotane Local Municipality and how it impacts on service delivery at Mogwase Township.

4.5 SAMPLING AND SAMPLE SIZE

According to Blumberg *et al.* (2005:156), a sample is the number of elements picked out of the population being studied. Sampling is important as in all research designs, it is practically impossible in terms of money and time to investigate all members of a

population. The sample is carefully chosen to provide a true representation of the population. The sample size consisted of 40participants from the Mogwase Township and 20 officials from the Moses Kotane Local Municipality, and Magalies Water supply. The identified participants from Moses Kotane Local Municipality were afforded an opportunity to participate in the study.

4.6 SAMPLING STRATEGY

A simple random sampling strategy was used to select members of the population to be included in the sample. In a simple random sampling, every member of the population has an equal chance of being selected to participate in the study (Saunders *et al*., 2003:152). Mogwase Township, the target population, consists of five zones with an estimated 11 000 residents, from which the sample population was chosen. An equal number of questionnaires were distributed evenly in the five zones.

4.7 DATA COLLECTION

Data was collected using questionnaires. A questionnaire is a self-report instrument on which respondents write their responses to printed questions on a document (Saunders *et al*., 2003). According to Patton (1990:12), a questionnaire is a formalised plan for collecting data from respondents. McDonough *et al*. (1997), stress that a good questionnaire should be unambiguous, easy to answer, evaluate and record. Questionnaires may range from open ended to highly structured questions using the Likert scale format.

A highly structured questionnaire format enables the respondents to select from a set of predetermined answers or scale points such as indicating the extent to which they agree or disagree with a statement about a given subject. However, the scales still leave room for the respondents' insight on their experiences (Saunders*et al*., 2003:310).

The study utilised the open-ended and close-ended questions. In an open-ended questionnaire, the respondents formulate their own answers, whereas in a closed-ended question, the respondents are provided with options from which they select the most suitable answers to the questions. The response options for a closed-ended question made it possible for this study to remain confined to the objectives and the research questions.

One hundred questionnaires were distributed to the residents of Mogwase Township, Moses Kotane Local Municipality and Magalies Water supply. The main purpose of the questionnaire was to establish the familiarity and nature of potable water supply management in the Moses Kotane Local Municipality. Only sixty questionnaires were completed and returned. According to Babbie and Mouton (1998:37), a questionnaire response rate considered to be adequate enough to reach a consensus in a survey research is a response rate of fifty percent, while the sixty percent and seventy percent response is considered above average.

4.8 ADVANTAGES OF USING QUESTIONNAIRES

Affordability is the primary advantage of written questionnaires because they are least expensive means of data gathering. These include the following:

- Questionnaires are an efficient and easy way of generating data in most research tasks.
- Questionnaires limit some of the bias that are associated with interviews, which result from the way the interviewer asks questions and how the interviewer may react to responses. These biases can be completely eliminated with written questionnaires.
- Questionnaires allow the respondents sufficient time to think questions over before responding.

Questionnaires reach many people in the least time and cost if they are emailed or administered through the post (Wisniewski & Stead, 1996:24).

4.9 DISADVANTAGES OF QUESTIONNAIRES

Against all the advantages mentioned above, questionnaires have their own limitations. These are the following:

- First and mostly, as noted by Wisniewski and Stead (1996:26), questionnaires do not provide the flexibility of interviews.
- Questionnaires do not allow ideas to be explored as is the case with interviews. This makes it impossible to gauge how people interpret the questions or statement. Moreover, questions in a questionnaire may be misinterpreted.

- Some people generally express themselves better verbally than in writing and questionnaires may be ignored, especially when they are administered through post or to be collected on a later date.
- Respondents may leave some questions they feel are too long or boring, choosing to answered only questions they feel are sufficiently easy and straightforward to be understood with the given instructions and definitions.
- Questionnaires may, therefore, yield lower response levels than interviews.

4.10 DATA ANALYSIS

In this research data gathered through questionnaires 40/20 and semi- structured interviews was analysed and presented in the form of pie-charts and tables. The researcher tallied the number of times a measurement occurs on the scale and the frequency was then used to evaluate the impact of management aspects related to potable water service delivery by the Moses Kotane Local Municipality, producing a frequency distribution. Cohen (1995:168) refers to the number of times a measurement occurs in a group or an individual as frequency distribution. Microsoft Office software, such as Excel and Word are useful to analyse data. These programmes assist the researcher in designing diagrammes, tables and charts in analysing the research and gathering data.

4.11 VALIDITY AND RELIABILITY

The most useful instrument for research is both valid and reliable, this include measure to ensure integrity. The two concepts are defines as follows:

4.11.1 *Validity*

Cohen (1995:159) defines validity as the degree to which an instrument adequately measures what it is supposed to measure in a given context. Saunders*et al*., (2003:492) regard validity as an indispensable characteristic of measuring devices in an attempt to provide worthwhile measurements to a given situation.

A valid instrument reflects the true state of affairs, or at least provides answers that are approximate to the truth. Therefore, a valid research instrument should be able to detect some “real” ability and attitude of a prevailing situation that the researcher can identify and characterise. Cohen (1995:159) contends that if the ability or attitude is itself stable,

and if a respondent's answer to the items is not affected by other unpredictable factors, then the administration of each instrument should essentially yield the same results.

4.11.2 *Reliability*

Reliability refers "to the degree to which an instrument always gives the same score when used to measure unchanging value" (Sekaran, 1996:129).To increase the reliability of the measuring instruments, the researcher ensures that questions on a test items on the questionnaires are not ambiguous, tricky, or confusing. The research explores the management of potable water supply in Mogwase Township in the Moses Kotane Local Municipality.

Saunders *et al*. (2003:206), state that reliability is a statistical concept that relates to consistency and dependability. Consistency involves obtaining the same answers repeatedly when measuring a phenomenon that has not changed. However, in as much as reliability refers to consistency, consistency does not guarantee truthfulness. According to Sekran (2003:75), the reliability of the question does not prove that the answers given reflect the respondent's true feelings.

4.12 ETHICAL CONSIDERATION

Saunders *et al*. (2003: 219), reported that ethics refers to the appropriateness of one's behaviour in relation to the rights of those who are the subject of one's work, or are affected by the study. Ethical considerations are necessary to ensure research does not infringe upon respondents' rights and privacy. Ethical considerations would guarantee healthy relationships with the respondents hence aid in obtaining required credible data as respondents would participate freely.

4.13 RECRUITMENT

The researcher recruited participants personally. They were informed in advance about the aim, purpose and objectives of the study. Moreover, the respondents were assured that the data provided would be used exclusively for educational purposes and the respondents' anonymity and confidentiality would be guaranteed.

4.14 PARTICIPATION

Participation in the study was voluntary. The participants, who felt uncomfortable after agreeing to participate, were allowed to withdraw from the study.

4.14.1 *Informed consent*

The prospective respondents agreed to participate after they were handed information about the study and a letter of consent. The following information was included in the consent form:

- Nature and purpose of the study.

- The requirements for participating in the study such as how data would be collected and the time it would take to complete the questionnaire.
- The probable implications for the respondents participation in the study, their rights, for example, voluntary participation and guarantee of participants' anonymity and confidentiality as well as withdrawal from the process at any given time.

4.14.2 *Harm and benefits*

There was no harm to the participants. Their anonymity was guaranteed as well as confidentiality of their responses was ensured.

4.15 LIMITATIONS OF THE STUDY

The study assessed the management of potable water in Mogwase Township which was confined specifically to the residents who fall under the jurisdiction of the Moses Kotane Local Municipality. Questionnaires were distributed to the employees of Moses Kotane Local Municipality, Magalies Water Supply and the residents of Mogwase Township.

The study was confined to the management of potable water because the findings cannot be generalised to other aspects of service delivery in Mogwase Township. The respondent's response rate to the questionnaire was time consuming. Some of the respondents were not available when the questionnaires were distributed.

4.16 DATA INTERPRETATION AND PRESENTATION

The data obtained from the respondents is presented in line with the following responses: Totally Agree, Agree, Disagree, Totally Disagree and Do Not Know respectively. It is, however, important to note that those who 'do not know' were for the purpose of this research considered dissatisfied with the overall performance of the Moses Kotane Local Municipality. Moreover, this response was interpreted as a failure as a result of the Council let-down to inform the residents of Mogwase Township about their basic right to access drinking water and poor implementation of the integrated development plan. The data below was interpreted per question.

The following statements were put to the respondents.

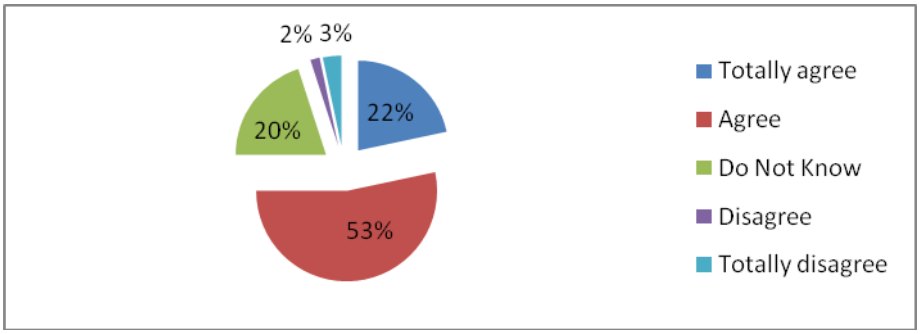
Statement 1

"The water for Mogwase Township is transported in pipelines from Vaalkop Dam to the water purification works, reservoirs and then to the residents''

The following responses were recorded from a sample of sixty (60) participants:

Totally agree	Agree	Do not know	Disagree	Totally disagree
13	32	12	1	2
22%	53%	20%	2%	3%

The responses are depicted as follows:



The data collection criterion was to establish the awareness of the concerned public on the *modus operandi* to available potable water. The responses outlined in the pie chart above, revealed that 75% (53% agree and 22% totally agree) of the respondents

concurred with the statement. The response indicated that the majority of the residents are familiar about how water is transported to their respective homes. However, 20% of the respondents do not know, 3% totally disagree while 2% disagreed.

In light of that, 75% of the respondents are aware while 45% represent individuals who work for the municipality. The remaining 30% represent the residents who have the general understanding that the local municipality's responsibility is to provide them with clean potable water as prescribed by the Constitution (1996). Those who fail to comprehend constitute 25%. This is an indictment on the municipality's effort to enlighten the community of how water is supplied. Moreover, the residents and the municipality are mandated by legislation such as the Environmental Management Act 107 of 1998 to take responsibility for the natural resources.

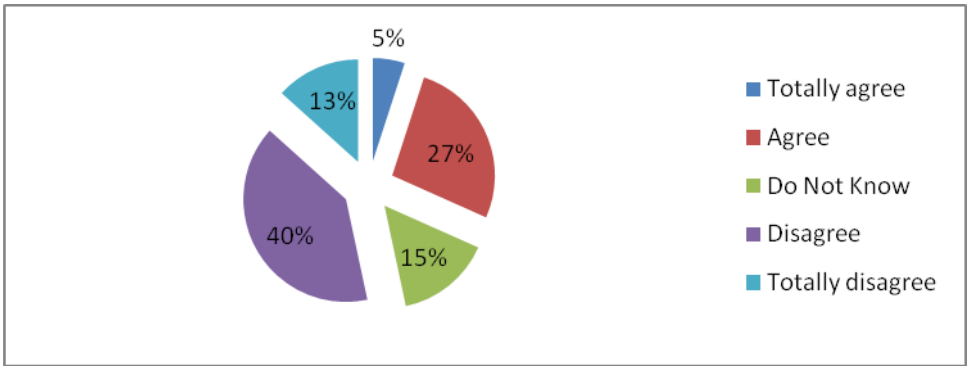
Statement 2

"Residents of Mogwase Township always receive an adequate regular supply of drinking water".

The following responses were collected from a sample of sixty (60) participants:

Totally agree	Agree	Do not know	Disagree	Totally disagree
3	16	9	24	8
5%	27%	15%	40%	13%

The responses are depicted as follows:



A total of 53% of the Mogwase Township residents do not agree with the statement that they receive adequate supply of drinking water without any interruptions. Only 33% of the respondents agree/totally agree that they receive an uninterrupted supply of water.

This percentage may, however, have been influenced by the officials because 33% of the respondents are municipal officials. It is evident that all the residents disagreed with the statement. Therefore, disruptions in water supply are common in Mogwase Township. Lastly, 15% of the respondents do not know. It can be inferred that there is a chronic shortage of potable water characterised by recurrent disruptions in Mogwase Township.

Fifty three percent of the respondents do not have an adequate supply of water as because of the regular disruption in the water supply in Mogwase Township. These challenges could be attributed to a lack of a clear cut road map on how to effectively deliver water or the presence of logistical and infrastructural challenges.

Considerable population growth may also attribute to pressure on the infrastructure; hence the shortage of water. With regard to the respondents who do not know, it can be inferred that they could possibly have no access to water since the majority of the respondents have concurred that they do not have an adequate supply of water.

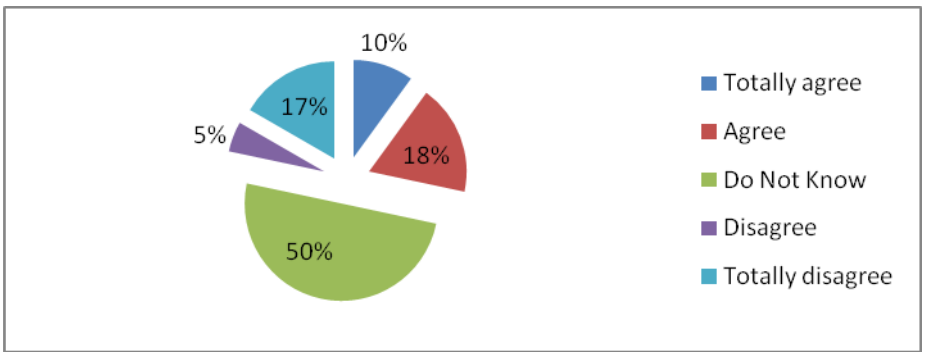
Statement 3

"I am aware of the free basic water supply of 6kl per month per household''

The following responses recorded were gathered from sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
6	11	30	3	10
10%	18%	50%	5%	17%

The responses are depicted graphically below:



Approximately 72% of the respondents do not know (50%), disagree (5%) and totally disagree (17%) with the statement. Basically 72% of the population do not know about their Constitutional right in terms of the Free Basic Water volume. Moreover, the majority of the residents are neither well-informed about *fait* with the quantities of water they are entitled to for free and once they exceed the limit, they are required to pay for the water. This scenario can also be perceived as a general lack of information from the respondents on the quantities of water they need per month which can also impact in the general management of potable water. The pie chart also underscores that 10% and 18% represent those who totally agree and agree respectively. Only a small percentage of the residents are aware of the free basic water supply of 6kl per month per household. This percentage represents the municipal officials. The residents are unaware of the free basic water supply. The lack of knowledge, therefore, can be interpreted in two probable scenarios:

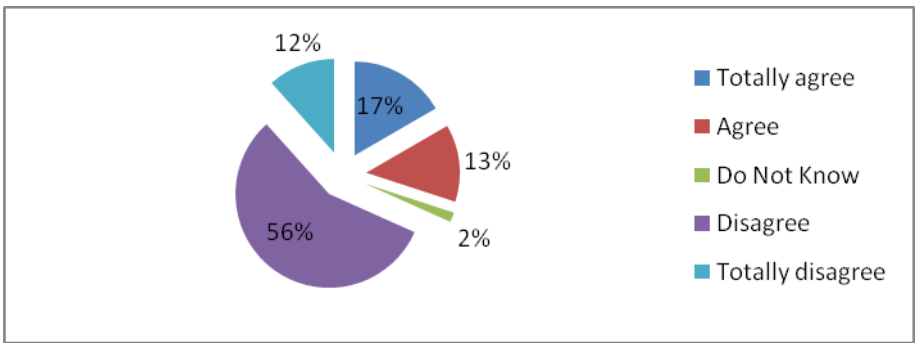
i. The residents need a campaign to make them aware of their constitutional enshrined right to access of clean potable water and how far the local municipality has been living up to that mandate.
ii. The municipality has failed to adhere to their constitutional mandate to the extent that the (citizens) have normalised an abnormal situation

Statement 4

"The members of Moses Kotane Local Municipality pay for drinking water in their area of jurisdiction". The following responses recorded were gathered from a size of sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
10	8	1	34	7
17%	13%	2%	57%	12%

The responses are depicted graphically below:



In view of this, 68% of the population disagree/totally disagree with the above statement. It is inferred that the majority of the residents do not pay for drinking water. At least 30% of the respondents agree/totally agree with the statement. The supply of potable water requires a large amount of resources which in turn requires residents to pay. “The provision of sustainable water requires funding. Financing is intended to come from cross-subsidisation through user tariffs” (Kido, 2008: 86).

Only 2% of the respondents do not know that they have to pay for the provision of clean potable water. In light of the evidence above, it is clear that the residents do not want to participate in insuring that they are supplied with clean water. “The decisions to cut water operation and maintenance budgets for storm-water management, water supply and waste water treatment have led to frequent breakdowns, resulting in untreated effluent and waste in water resources” (Hinsch, 2009:14). The latter statement should not be misconstrued that the residents be denied access to clean water. Every South African citizen has a constitutional right to 6kl free water. Unfortunately, they are not aware of this right. According to Kasrils (2001), many of the rural poor women in South Africa would rather purchase food for their off-spring than water. Consequently, they opt for water from other sources irrespective of the quality.

Statement 5

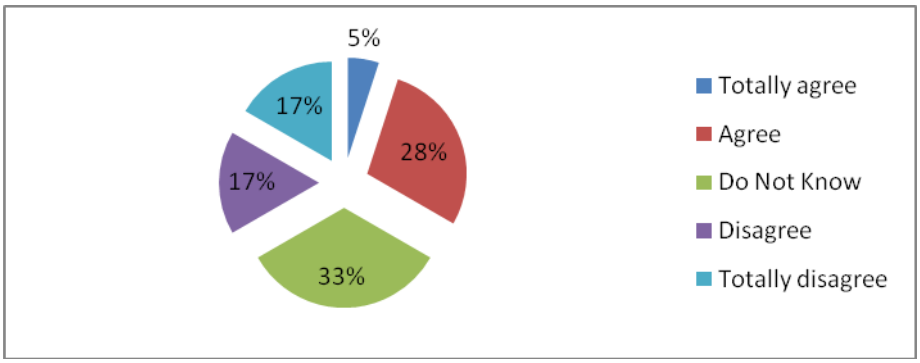
“My involvement in the maintenance of the drinking water supply system could improve the current status of water services by the Moses Kotane Local Municipality’’

The following responses recorded were gathered from a size of sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
3	17	20	10	10

5%	28%	33%	17%	17%

The responses are depicted graphically below:



The results to this statement revealed that 33% of the respondents do not know and 34% of the respondents disagree/totally disagree that their involvement would improve the current status of water services in Mogwase Township. Approximately 67% of the population are unaware of whether they can actively improve the current status of water supply. The respondents claimed that the Moses Kotane Local Municipality is currently working in isolation. An active involvement of the community can change the complexion of the current challenges. The initiative should not be propagated by the community but rather the municipality. Those who agree with the statement see the need from a layman's perspective and are probably unaware of the magnitude of their involvement.

The discourse on IWRM in Southern Africa revealed that individuals should have a clear understanding of what is meant by potable water, which has access to it, for what purpose, and how public decisions regarding allocation, use and management of potable water supply are made (Swatuk, 2008).

Only 33% of the respondents agreed/totally agreed that they should be involved in the management of potable water supply. Bekink (2006:13) notesthat "In order to create and facilitate mutual respect and support, municipalities must work hand in hand with their communities to fulfil their obligations. However, a relationship like this can be

achieved only if local residents feel that they are consulted on important issues and they are included in the decision-making process". Furthermore, "the enhancement of governmental accountability and strengthening of public participation in municipal processes and decisions are, therefore, constitutionally protected principles and must be provided for within a framework of certain minimum standard" (Bekink, 2006:13).

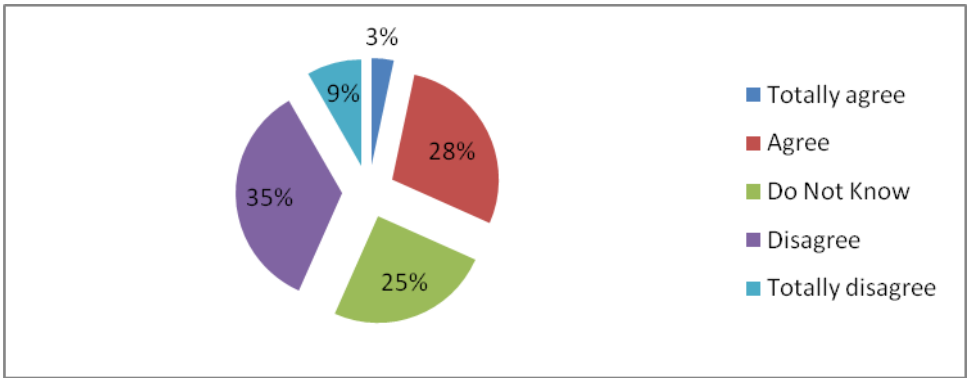
Statement 6

"I know about the drinking water sector legislation and acts in order to save drinking water for the coming generation''

The following responses were gathered from a size of sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
2	17	15	21	5
3%	28%	25%	35%	8%

The responses are depicted graphically below:



The majority of the respondents (69%) are unaware of the legislation regulating the sustainable use of water. This is evident from the responses drawn from the above statement. Thirty five percent of the respondents disagreed while 9% totally disagreed. In addition, 25% of the respondents do not know about the legislation which governs the supply of potable water. Only 31% of the respondents agreed/totally agreed with the statement. It can be inferred that 31% represents respondents who are knowledgeable.

The minority of the residents are familiar with how legislation governs the supply of safe drinking water.

It was highlighted in statement 2 that the residents of Mogwase Township do not have knowledge in terms of the amount of free basic water they receive per month. When residents are familiar with legislation that governs the supply of potable water, it is assumed that the water supply authority and the community will be sharing the same vision guided by the same principle. Without a common understanding it is difficult to manage the supply of potable water effectively, efficiently and economically.

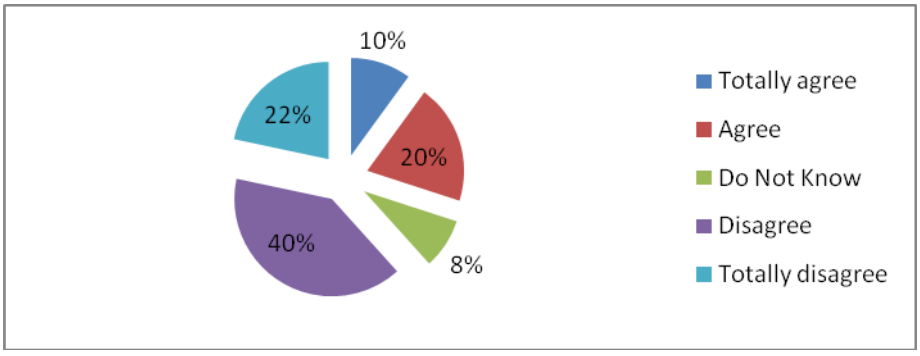
Statement 7

"The residents of Mogwase Township support the IDP process of the Moses Kotane Local Municipality''

The following responses were gathered from a size of sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
6	12	5	24	13
10%	20%	8%	40%	22%

The responses are depicted graphically below:



The responses to statement7 revealed that the residents of Mogwase Township do not support the Moses Kotane Local Municipality IDP process. Approximately 62% of the respondents do not agree with the statement. Only 30% agree while 8% do not know. It is extremely difficult for the municipality to work in isolation. The responses revealed a

distinct lack of cooperation. IWRM is characterised by the integration of society and natural resources (Mulder, 2005). The lack of cooperation can be linked to statement 6. As long as the residents remain ignorant of legislation that governs water management, it will be difficult for them to contribute positively because they are not aware of what needs to be done, hence the chronic water woes.

The integration of society refers to the active involvement of water users in water institutions at the level of clearly defined catchment areas *(*Monashane, 2011: 23). Community participation in local governance is an indication that innovative intervention is necessary to encourage and enable inhabitants to participate in activities affecting their daily lives.

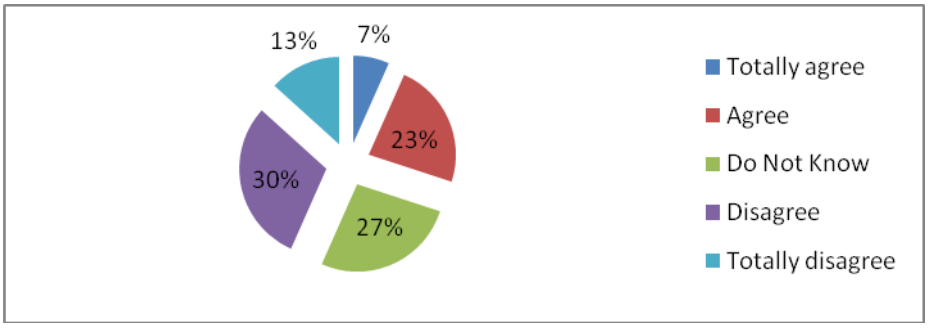
Statement 8

"Moses Kotane Local Municipality has a water resource management strategy''

The following responses recorded were gathered from a size of sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
4	14	16	18	8
7%	23%	27%	30%	13%

The responses are depicted graphically below:



In light of the above, 70% of the respondents are unaware that the municipality has a water resource management strategy. Of the 70%, 27% do not know, 30% disagree while 13% totally disagree. This outcome could imply that the majority of the population is not involved in the management strategy. The municipal officials concurred with the statement. 23% of the respondents agreed while 7% totally agreed. Mulder (2005) is of

the opinion that water resources should be managed actively involving water users in the management and supply thereof.

A community with a greater percentage of the population not knowing about the management of water resource is of concern.

Seventy percent of the residents of Mogwase Township do not know or disagree that the municipality has a water management strategy. This is not surprising because in statement 6, a greater percentage highlighted that they do not know about the legislation. This might be due to the lack of effective communication between the users and the suppliers of water to the Moses Kotane Local Municipality.

People do not know what needs to be done and where. Many people highlighted their willingness to see the municipality play an active role in the management of potable water supply.

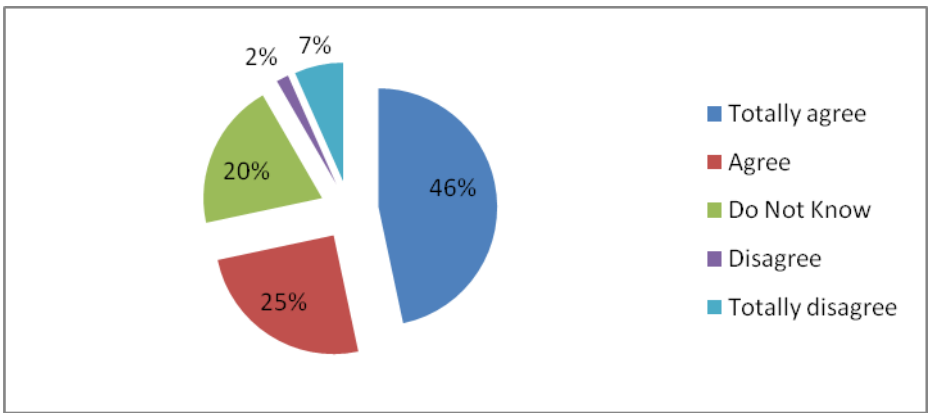
Statement 9

"The Moses Kotane Local Municipality should play a more visible and active role in the implementation of the water resource strategy''

The following responses recorded were gathered from a size of sixty (60) participants.

Totally agree	Agree	Do Not Know	Disagree	Totally disagree
28	15	12	1	4
47%	25%	20%	2%	7%

The responses are depicted graphically below:



In light of the above, 90% of the respondents do not perceive the Moses Kotane Local Municipality playing a leading role. This could be as a result of the challenges in the Moses Kotane Local Municipality. Municipalities as curators of the water management strategies must be visible and active in the implementation of its strategies. Most respondents totally agreed with the statement (71%).This response revealed that the municipality is not playing an active role in the area. On the other hand, 9% of the respondents do not see the need for the municipality to play an active role in the implementation of its strategies.

The remaining 20% represent those who do not know whether the municipality should be actively involved. From the previous statement, it is evident that the inhabitants are unaware of the water management strategy. It is, however, not surprising that 70% the inhabitants (statement 9) perceive the municipality playing an active role. Moreover, 20% of the respondents do not know. This could be attributed to the lack of the visibility of the municipality.

The lack of visibility by a municipality on issues of water management is distinctly against the constitutional mandate of local municipalities and there is need for them to be "directly involved in the daily lives of the communities they serve". Therefore, is municipality is obligated to develop a culture of participatory governance to encourage and empower local communities to participate in the affairs of their authorities (DPSA, 2003:19).

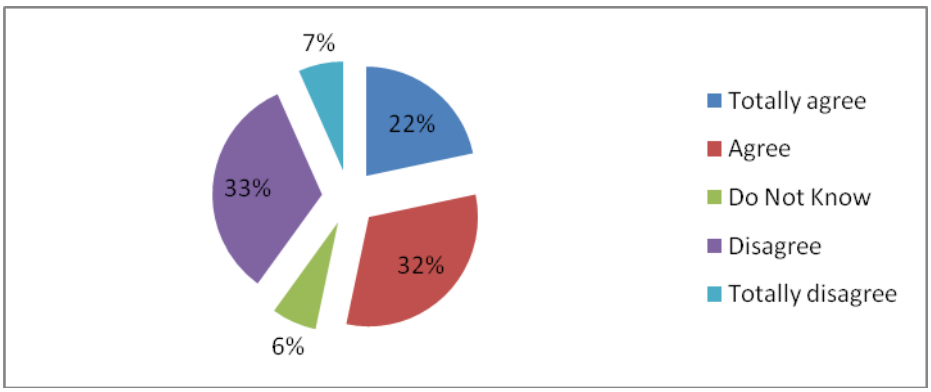
Statement 10

"I believe that all the spheres of government must be involved in the water resource management process in the area''

The following responses were gathered from a size of sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
13	19	4	20	4
22%	32%	7%	33%	7%

The responses are depicted graphically below:



This statement was generally characterised with mixed feelings, therefore, the responses were similar in respect of the percentages of those who agreed and those who disagreed. Approximately 54% of the residents believe that all spheres of the government must actively participate in the water process for the area. On the other hand, 47% of the respondents believe that it is unnecessary. Only 7% of the respondents do not know whether there is a need or not.

The 54% that constitute those who do not believe in government participation revealed a lack of goodwill generated through good public relations communication strategies which are a prerequisite of development and governance. "…participatory communication is helpful in identifying solutions to conflict situations in villages and their capacity to address problems and to find their own solutions rather than waiting for external assistance (Bassette, 2006, 7). Mbomba *et al*. (2008: 58), concur "that the community consultation, involvement and awareness can have a major impact on public confidence in water supply and the organisation's reputation"

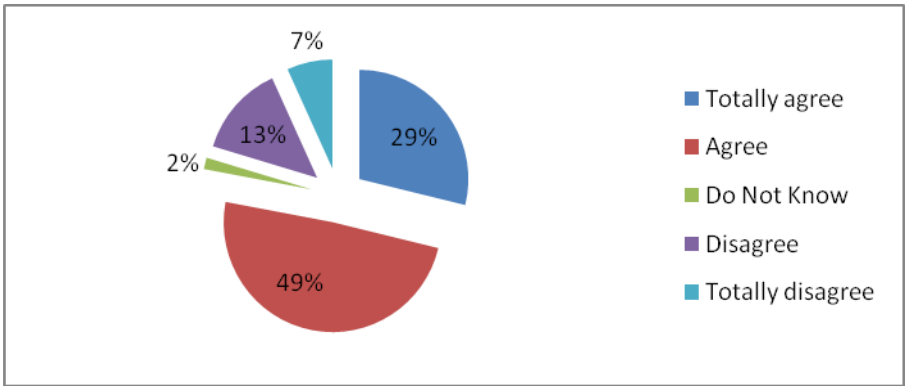
Statement 11

"There have been frequent water cuts in Mogwase Township; hence there is a danger of waterborne diseases in the area''

The following responses were gathered from a size of sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
17	29	1	8	4
28%	48%	2%	13%	7%

The responses are depicted graphically below:



Mogwase Township is characterised by frequent water cuts and this course of events has resulted in the area being prone to waterborne diseases. This is evident from the responses obtained to the above statement. Approximately 48% of the respondents agreed while 28% totally agreed (76%) with the statement. Only a handful of the residents disagreed -13% disagreed and 7% totally disagreed respectively. However, 2% of the respondents do not know.

Therefore, it is imperative to address water related concerns or the situation could cascade into a bacterial anarchy and the present repertoire warrants the notation that; “the goal should not only be to supply sufficient water, but attention has also to be given to the prevention of diseases”.

When a town expands, it has to secure funding to either establish or further develop reservoirs, purification works and waste treatment works (Monashane, 2011:32).There is no expansion in terms of infrastructure prior to water supply although there has been a rapid population growth in Mogwase Township. Water cuts could be due to bursting pipes because of pressure and a slow response to repair the damage. Consequently, the water becomes contaminated. The pipes should be cleaned regularly avoid contamination and water borne diseases.

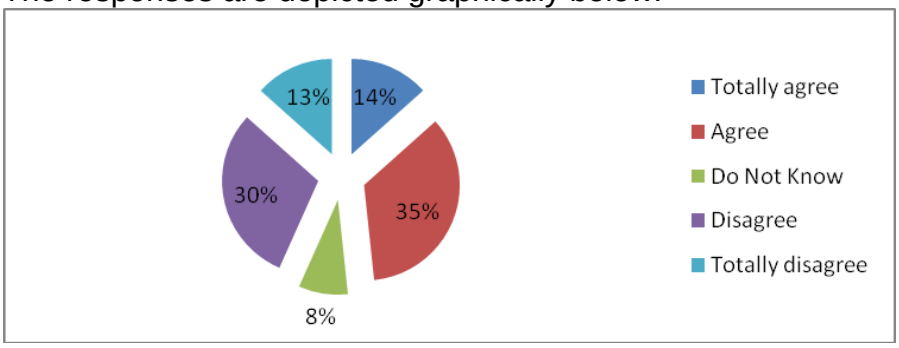
Statement 12

“Political interference has influenced drinking water supply in Mogwase Township”

The following responses were gathered from sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
8	21	5	18	8
13%	35%	8%	30%	14%

The responses are depicted graphically below:



In general, political interference has impacted negatively on the supply of potable water. The data above revealed that 35% of the respondents agreed, whereas 14% totally agreed that political interference has influenced the supply of drinking water as well as the proper management of Mogwase Township. In contrary, 30% of the respondents disagreed, whereas 14% totally disagreed. The total responses for those who agreed and those who differ are slight.

According to Xie (2006:36), political pressure by most decision-makers has largely discouraged the implementation of progressive water management strategies. Service delivery has been largely influenced by politics in South Africa. Moses Kotane Local Municipality is dominated by the role played by political parties. The political interference is not largely visible according to statistics drawn from the questionnaire. However, one could, based on the shortage of water, infer that certain council members and/or official's lack of concern for the supply of water could contribute to the water woes.

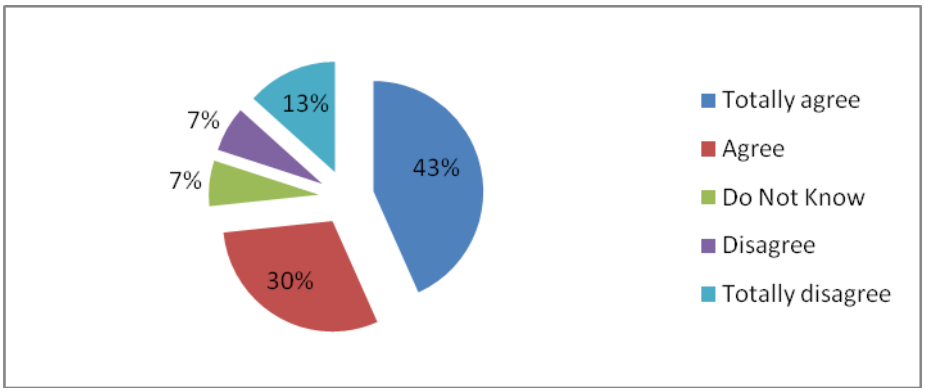
Statement 13

"Sewage, pollution and mining activities in the vicinity of Mogwase Township has an impact on the supply of quality drinking water services"

The following responses were gathered from sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
26	18	4	4	8
43%	30%	7%	7%	13%

The responses are depicted graphically below:



A large percentage of the residents totally agreed and agree with the statement. Approximately 43% of the respondents totally agree while 30% agreed. It can be inferred that the residents are aware that sewage, pollution and mining activities have an adverse impact on the quality of drinking water for Mogwase Township. A total of 20% differ while 7% percentage of the residents does not know.

The response of 73% is an indication that the quality of drinking water is compromised by the resident's activities in Mogwase Township. "Mines and big companies have played an unacceptable and irresponsible role in terms of water pollution, exposing human species to substantial health threats" (Malzbender *et al*., 2005: 3-20). In statement 11 it was noted that water cuts had resulted in water borne diseases.

Many of the residents concur that pollution has an impact on the quality of potable water, which can also be due to water borne diseases. The quality of water is compromised and this has an adverse effect to the availability of clean, running potable water.

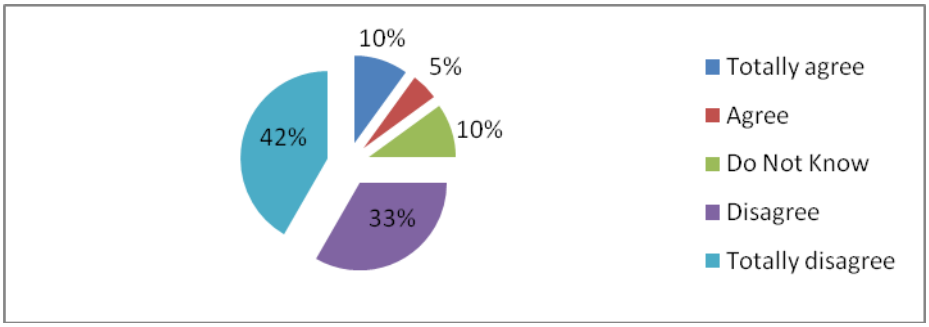
Statement 14

"Grey water and sewage disposal does not end up in the drinking water sources of the Moses Kotane Local Municipality''

The following responses were gathered from a size of sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
6	3	6	20	25
10%	5%	10%	33%	42%

The responses are depicted graphically below:



It is clear that 42% of the respondents totally disagreed with the statement while 33% disagreed. 75% of the respondents disagreed that grey water and sewage disposals do not end up in drinking water. This poses a serious compromise to potable drinking water in the area. However, 15% of the respondents agreed with the statement. The number of respondents who disagreed overwhelmingly exceeded the number of respondents who concurred which is a probable indication that grey water and sewage disposal are serious causes of concern. Only 10% of the respondents do not know.

Regulations need to be enacted and monitored to help because: "Discharging of waste into the water resources, disposing of waste on land in a manner that could impact detrimental on the water resources and using of waste on land should be well regulated to ensure that the water resources stay fit for use" (Thompson, 2006: 209). The lack of knowledge in the control and management of potable water and general sanitation has led to the contamination of drinking water. Moreover, when the residents are unaware of the route that water follows from the origin in the surface water catchment to the taps in their household; it precipitates a dilapidated concerted effort to actively conserve water.

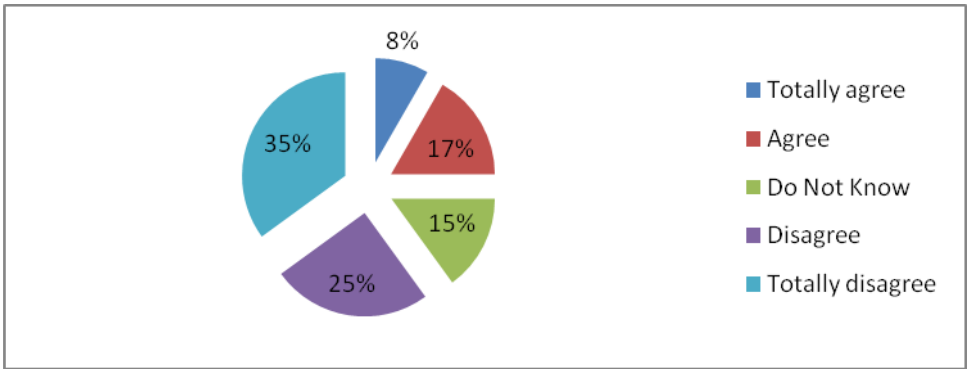
Statement 15

“The residents are informed in advance of water cuts in Mogwase Township’’

The following responses were gathered from a size of sixty (60) participants.

Totally agree	Agree	Do not know	Disagree	Totally disagree
5	10	9	15	21
8%	17%	15%	25%	35%

The responses are depicted graphically below:



A total of 60% of the residents disagree with the statement while 25% of the residents disagree and 35% totally disagree. It can be inferred that the residents are not informed in advance of water cuts. 25% of the respondents agreed with the statement. Only 15% of the respondents do not know. Those who disagree with the statement can be interpreted as distinct shortcomings in the municipality.

There is no direct communication between the residents of Mogwase Township and the Moses Kotane Local Municipality. Abrupt stoppages and lack of a regular supply of clean running water may lead to a rise in the number of residents’ opting for unsafe water. This scenario could lead to an angry community who may feel betrayed because they had been denied direct involvement in water management. This in itself contributes and compounds the current challenges in the supply of potable water which is contrary to what is prescribed by the Constitution of 1996.

Twenty questionnaires were distributed to the officials of the Moses Kotane Municipality who deal with the management and supply of potable water for Mogwase Township on a daily basis. All the questionnaires were completed and returned. The questionnaires comprised 15 close-

ended questions (findings presented above) and five open-ended questions (findings presented below).

The responses below were recorded during the interviews held with the respondents who are familiar with the current supply and quality of potable drinking water.

Question 4.16: Open – ended questions

What do you understand by the drinking water quality regulations of the Department of Water Affairs or the Municipality?

- This question was posed with a view to establishing whether the municipal authorities understand the quality of drinking water regulations. The responses were used to identify the sources of chronic water challenges in Mogwase Township. Below, a list of responses is provided. *I understand that the Department of Water Affairs must ensure that the people of Mogwase have the right to safe and healthy water and ensure that there must not be any water cuts.*
- *Department of Water and Sanitations as custodian of water resources has a mandate to management protect and preserve the country's resources. They have regulations in place to govern these municipalities in dealing with potable water supply.*
- *To ensure that all citizens have access to safe clean, quality drinking water amongst other things.*
- *Water quality must be adhered to and this is governed by the regulations.*
- *The distribution of quality water to the residents of Mogwase.*

It should be noted from the responses that all the municipal officials do know about the drinking water quality regulations. All the respondents gave the correct interpretation of 'drinking water quality regulation' as well as defined the roles that should be played by different stakeholders in the provision of quality drinking water. Surprisingly, it was revealed that people do not know about the drinking water regulations (as indicated for statements 4 and 6). With this in mind, it is evident that there is a lack of communication between the Mogwase Township residents and the municipal authorities.

Question 4.17:

What strategies must the Moses Kotane Local Municipality and the water management authorities implement to improve the supply of drinking water in the Mogwase Township?

This research asserts that, if officials implement specific water related strategies, that challenges exist which need to be addressed in Mogwase Township. Below, several responses from knowledgeable participants to the above question are listed below:

- *Make sure there is enough water for Mogwase residence*
- *Put in place policies that can be understood by every household*
- *Municipality must ensure that they approve and implement strategies such as water and sanitation by-laws, water quality management framework to improve water status*
- *Educate the public on the importance of catchment management*

- *Municipal authorities managed to give an array of array of suggestions prior to this question. These suggestions put to light the need to improve drinking water supply in Mogwase Township.*
- *One respondent suggested that a sampling method should be put in place to identify those with health problems caused by the quality of water and the results should be supplied to the Water Service Authority;*
- *The Department of Water and Sanitation and residents of Mogwase Township should not use the valuable water until the problems of water services and supply are addressed.*

The officials highlighted that the water authorities may have neglected the health challenges faced by the water users. The officials suggested that harsh measures need to be implemented so that the quality of water can be addressed. This response can be linked to the previous questions where the residents identified the continuous occurrence of water borne diseases in the Mogwase Township area. Furthermore, the officials suggested that the Moses Kotane Local Municipality extend pipelines from Vaalkop Dam to ensure that the residents in the villages have access to an adequate supply of water. To reduce water loss they must take care of leaking pipes. Two important issues can be drawn from the two suggestions, namely:

i. Residents of the Moses Kotane Local Municipality's municipal area do not receive adequate safe drinking water because there are areas that cannot be reached. This is also evident in question 1 to which the Mogwase Township residents suggested that they are unaware about water transportation from the Vaalkop Dam.

ii. The officials identified chronic water losses that are orchestrated by leaking pipes which result in water contamination and pollution that also cause water borne diseases.

Question 4.18:

Does the Moses Kotane Local Municipality have the capacity to fully recover the cost of water supply? If so, how?

This question was asked to establish the reason why the municipality is unable to recover the money it uses in the provision of water and how it impacts on the provision of potable water. Below, several responses are listed from the interview. *The Municipality does not have a written recovery strategy in place that can be followed in trying to recover the costs.*

i. *Some residential areas do not have 'meters' in place to bill the amount of water used per household.*
ii. *The Municipal lack financial and human resources to use in addressing the payment backlogs.*
iii. *No. The municipality does not have the capacity to do that as this problem started long back during the time of the homelands.*
iv. *The municipality should improve the water infrastructure so that people can appreciate and pay for the services.*

From the data collected in statement 4, it was brought to light that approximately 70% of the residents do not pay for water supply services. In this regard, the municipal authorities noted a number of challenges listed below:

The municipality does not have a written recovery strategy in place that can be followed to recover the costs.

v. ii Some residential areas do not have water distribution 'meters' to bill the correct amount of water used per household.
vi. iii The municipal lacks financial and human resources to address the backlog of payments.

It is important to note that a lack of payment for the supply and management of potable water in Mogwase Township places severe budgetary constraints the municipality.

Question 4.19:

Do you have a copy of the water related policies and regulations? If yes, state which.

- With regard to the water problems in Mogwase Township, the above question endeavoured to establish whether the municipal officials have the relevant water related policies and regulations. Below, several responses are listed from the interview. *Yes, water and sanitation by-laws*

- *Yes, but I only have the Water and sanitation by-laws*
- *No, I don't have related policies and regulations but I would love to have it and understand it therefore share my knowledge to the community*
- *I do not have the policies and regulations at my disposal but i have heard about them*
- *Yes, I do have all the legislations*

All the respondents stated that they have copies of the water related policies and regulations. In light hereof, it is important to note that much needs to be done to ensure that the residents also have the regulations at their disposal or be conversant with the policies and the regulations.

Question 4.20:

In your opinion, what action should be undertaken to ensure that the municipalities comply with drinking water quality requirements?

This question endeavoured to establish whether the officials are aware of the consequences should they fail to comply. Below, several responses are listed from the interview.

- *The municipal authority must be charged legally and not given an option of fine but rather imprisonment for violation the right to access to clean water*
- *Officials in different department must be charged whenever the municipality fail to comply with the drinking water requirements*
- *There is a need to appraise the performance of each official with regards to competence in the efforts to supply the public with clean water annually and those failing to meet their job description can be charged*
- *Big fines must be imposed to the Moses Kotane Local Municipality if they fail to meet the drinking water requirements.*

All the respondents agreed that if the Moses Kotane Local Municipality fails to comply with the drinking water requirements, they must be dealt with accordingly.

4.2 CONCLUSION

The chapter presented and analysed the data which was collected through primary and secondary data sources. It has been noted that there is a clear strategy in the management of water supply in Mogwase Township. Some of the problems of water shortage are also linked to adverse of financial resources. It has been also brought to light that the residents do not pay their water bills. In the next chapter a summary of the research, major findings, logical conclusions and recommendations are provided.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents the recommendations for the Mogwase Township with the view to an effective and efficient management of potable water. Logical conclusions to the research, recommendations on the way forward, and areas for further research are also presented.

Water is a common good, a free gift from God. Constitutionally, everyone has a right to water in South Africa. It is against this background that the Crisis in South Africa Coalition (2010) argues that the right to safe water contains both freedoms and entitlements. Fresh water is not only vital for human survival, health and dignity but also fundamental and indispensable for development (Cap-Net, 2009). Unavailability of fresh water is not only a threat to human life but also a violation of fundamental human rights in South Africa.

According to Bakker (2010:57-59), the availability of water resources is exposed to many forms of exploitation and pollution due to amongst others the developing nature of the world, rapid urbanisation, industrialisation and mining. In order to facilitate an effective potable water supply to the Mogwase Township, the Moses Kotane Local Municipality should take the integrated water resource management (IWRM) into consideration.

This study sought to evaluate the management of potable water supply in Mogwase Township by the Moses Kotane Local Municipality. The research objectives of the study encompassed the following:

- Evaluate the current legislation and regulatory frameworks that focus on supply, utilisation and management of potable water in South Africa.
- Determine the role-players and relevant stakeholders that establish the most effective and efficient water resource management in accordance to social, economic, and environmental ways.
- Determine the nature and the extent of potable water supply and the management of it in Mogwase Township.
- Recommend improvements of the potable water supply and management of it in the Mogwase Township.

5.2 SUMMARY

The study noted a number of interlinked factors that have impacted negatively on the management of potable water. These factors are a stumbling block to the availability of fresh water of the area in question. Regarding the objectives and research questions, factors that inhibit the effective management of potable water supply in Mogwase Township by the Moses Kotane Local Municipality were brought to light. This was achieved as highlighted below.

The **first chapter** highlighted the important issues of the study. These included the background of the study, statement of the problem, justification and the significance of the study. It was identified that there is a chronic shortage of water in the Mogwase Township owing to factors, *inter alia,* population growth, pollution and mining activities. In light of the afore-mentioned, the current legislation and regulatory framework was evaluated, the place and role of role players and stakeholders was clarified and the nature and extent of potable water supply in Mogwase Township was undertaken. The latter served as the objectives and research questions for the study.

Chapter two presented theoretical information of potable water and the management and provision in South Africa. An analysis of the existing literature was undertaken to identify probable gaps and give a concise overview of what has been researched, argued and established about the management of potable water supply.

The identified gaps in conjunction with the objectives and the research questions inspired the need for an in-depth assessment of the legislation.

Chapter three emphasised the current legislation that control and regulate the provision of water in South Africa. The right to access to fresh water was affirmed in the South African Constitution. This chapter explored legislation relevant to the study, *inter alia*, the National Water Act of 1998, the Local Government: Municipal Systems Act 32 of 2000, the Water Services Act of 1997, and Housing Act 107 of 1997. These policies served as a reference throughout the research and created the basis for the findings of the research.

Questionnaires and an unstructured interview schedule were used as data collection instruments. The facts, figures, statistics knowledge base and the attitude of the respondents was gathered, analysed and presented in **chapter four**. Problems that are linked to the research questions and objectives highlighted in the preceding chapters were identified, analysed and applied in the context of Mogwase Township.

Chapter five provided a summary, conclusion and recommendations based on the findings of the study. Problems were identified in the previous chapters and solutions formed the focal point of this chapter.

5.3 MAJOR FINDINGS LEADING TO CONCLUSIONS

The following major findings were made with regard to the aims of this research:

5.3.1 Legislation on potable water supply by the local municipalities

The preparation and enactment of laws give direction to the general management of potable water in South Africa. The Constitution is the supreme law of the country and legislation should be in line with the demands of the Constitution. In addition to what has been noted above, the management of potable water in South Africa has also adopted the integrated water resources management (IWRM) approach. The Water Services Act of 1997 was formulated in the scope of the IWRM. Legislation was formulated with comprehensive international standards in mind. The study revealed that the residents of Mogwase Township are ignorant of the legislation that governs the origin and management of their drinking and used water. They do not have access to such information and are not -informed about the management and supply of water. It is clear that the Moses Kotane Local Municipality has not done enough to inform the public about the legislation that governs water supply to its residents. For example, the residents of Mogwase Township are unaware of the free basic water volume of 6Kl per month per household.

5.3.2 The route of potable water

The main source of water for the Moses Kotane Local Municipality is the Vaalkop Dam. This is where surface water is collected, stored purified and reticulated into the canal and pipeline systems. Water is transported through pipes to La Patrie and Bodirelo water reservoirs respectively in Mogwase Township. The research revealed that the residents have a general idea that water is transported through pipes, but they do not know about its origin and the route that the water flows till it reaches their homes.

5.3.3 Public policies governing water in Moses Kotane Local Municipality's area of responsibility

The Moses Kotane Local Municipality may even fail to provide free basic water to everyone as a result of the lack of resources because it is expensive to purify and supply water to households.

5.3.4 Role - players and stakeholders

All the role-players must be identified and involved in the quest to IWRM. It is important to identify those who play a negative role (groups, organisations or individuals who directly contribute to the shortage of water) and positive role-players (groups, organisations or individuals who directly contribute to the sustainable use of water). IWRM emphasises a comprehensive approach to the management and supply of water resource.

5.3.5 Other challenges affecting the management of water supply in Mogwase Township.

It was noted with concern that there are serious challenges regarding water services that are faced by residents in the Mogwase Township. Amongst the challenges, water cuts were identified by this research as chronic. The research identified the following sub-ordinate factors as the reasons behind:

- The lack of financial resources to build proper infrastructure to meet the water needs of a growing community.
- A lack of a clear strategy on the management of water supply in Mogwase.
- Chronic water cuts are also linked to the failure of the community to foot their water bills. The authority sighted a lack of money to fund water purification and supply.
- Population growth and urbanisation contribute to water scarcity in the Township. In addition, mining activities require huge volumes of water; hence their impact cannot be overlooked.

5.3.6 ACTIVITIES AND WATER POLLUTION IN MOGWASE TOWNSHIP

The research also revealed that mining activities have compromised water availability and quality in the Mogwase Township area. Mines use an excessive amount of water; therefore, the increased demand has resulted in serious water shortages. On the other hand, mines pollute surface water during their operations. In addition, mines also drain groundwater and this affects the availability of water.

The research also reveals that the water pollution has resulted in waterborne diseases. Since surface and groundwater pollution is common in the Township, the study revealed that the Moses Kotane Local Municipality is failing to arrive at working strategy to deal with the supply of water and environmental health challenges. There is a need to address these challenges effectively so that a smooth and sustainable approach of managing water towards IWRM can be achieved.

5.4 CONCLUSION

This chapter opened doors for future research and it identified the challenges municipalities face in terms of water service delivery because they impact on the service delivery aspect of the plan. There is a serious lack of public awareness with regard to potable water management and the supply thereof in the Mogwase Township area.

The study succeeded in describing the organisational structures and public policies governing potable water supply in the Moses Kotane Local Municipality. The study also identified the challenges that hinder potable water supply to Mogwase Township as well as explored the people's perceptions of the current status *quo*s potable water supply. Therefore, it can be concluded that the appropriate structures required in terms of the Municipal Structures Act 117 of 1998 are in place in the Moses Kotane Local Municipality and the public policies published by the municipality are in line with the realisation of the fundamental rights contained in the following sections of the Constitution of South Africa (1996) (24, 25, 26, 27 and 29).

This research aimed to investigate the management of potable water in Mogwase Township in the Moses Kotane Local Municipality, taking into account the effective potable water supply, data monitoring and capturing, as well as the incorporation of a more holistic and integrated water resource management approach (IWRM), according to the DWA's envisaged demarcated surface water catchment regions.

The implementation of improved co-operative governance and intergovernmental relations could, therefore, contribute to more effective, efficient and economical service delivery in terms of the management of integrated water resources in the Moses Kotane Municipality.

5.5 RECOMMENDATIONS

Based on the afore-mentioned major findings and logical conclusions, the following recommendations are made in order to improve the management of potable water in Mogwase Township by the Moses Kotane Local Municipality:

- Information about origin of potable water must be disseminated to public institutions such as municipal offices, schools and clinics. This will help to create awareness among people of the significance of water for human survival. This is one of the best tools for the achievement of IWRM. When people have in- depth knowledge and understanding of the origin of their water supply, it would be easier to be incorporate it in water service management. This could help to effect cooperative governance which is also the heart of IWRM.

- The Moses Kotane Local Municipality should ensure that the residents are aware of the legislation that governs water management. Legislation forms the basis of water service management. Consequently, all the stakeholders, role-players and the general public should have a clear understanding thereof. Debates in schools, outreach programmes or even radio talk shows can be used to disseminate information to bigger audience. The residents should be made aware that it is their constitutional right to access potable water. Therefore, they are obligated to pay for the services. This could go a long way to help municipalities meet the increasing demand for water.
- Senior councillors and officials in the Moses Kotane Local Municipality should host regular public meetings and road shows to highlight, *inter alia,* that the right to water does not imply that the resource is for free. It is incumbent on each residence to be accountably and pay for the supply of potable water which would ensure sustainability thereof in the future.
- Water awareness campaigns should be introduced to teach the residents of Mogwase Township on how to use the water wisely and how to respect and care for the infrastructure. Awareness campaigns should also help to foster an effective way of communication between the public and the municipality. Posters, brochures and billboards should be strategically placed in public to constantly remind the residents about the significance of responsible water management practices (e.g. report broken pipes or theft of water).
- The Moses Kotane Local Municipality should also share its current, future and developmental water provision projects that need to be implemented. In addition, the municipality should also highlight to the residents how they plan to introduce quality service delivery if they are well capacitated.
- A proper water resource services management strategy that is all inclusive should be implemented. This should clearly define the roles that need to be played by the different role-players. It should include actions that need to be adhered to, effective ways of monitoring the implementation of the management strategy and approaches to evaluate the progress at different intervals.
- The municipality should lead in the development and implementation of public participation mechanisms. This should include all the role-players and stakeholders ranging from individuals to organisations. Various stakeholders and role- players must skilled with regard to the problems associated with unwise water-use strategies. Responsible water-use practices should be encouraged. In addition, the municipality could publish in the local newspapers the names of those who play a positive role in water service management. This could promote effective public participation and create a sense of responsibility amongst the public.

- The Integrated Development Plan (IDP) is of significance because it can be utilised as a tool to plan in order to improve the management of potable water resources by a municipality in its geographical area of responsibility. The residents of Mogwase Township should be included in the implementation of the IDP.
- The legislation that regulates the prevention of water resource pollution should be implemented by the Moses Kotane Local Municipality. Companies and individuals who pollute water must be fined heavily to send out a strong message that pollution of the scare resource would not be tolerated. Moreover, mining companies must give an account to the municipality on the management of their effluent. Whenever effluent contaminates fresh water sources, methods should be devised to prevent further pollution. Failure to do so would result in legal action followed by a hefty fine.
- The residents of Mogwase Township must be encouraged to pay their water bills. They should be informed on the importance to pay their bills. The MKLM should conduct outreach programmes to share the challenges that are exacerbated by the lack of funds.
- Latest statistics on population growth and urban expansion should always be analysed and taken into consideration by the Moses Kotane Local Municipality. This would help in the fostering and implementation of a progressive water management plan that could add value to the overall quest for IWRM.

There is an urgent need to improve the infrastructure in Mogwase Township and possibly extend the water reticulation supply to new settlements. The current water reticulation infrastructure is old and is unable to cope with the increasing potable water and used water demands. The municipality should conduct routine cleaning and maintenance of water related services (potable water and used water) and reservoirs to ensure the regular supply of potable water to prevent the outbreak of waterborne diseases.

5.6 FURTHER RESEARCH

This research revealed the complexity and the evolving need to address recurring challenges in potable water management. The following foci for further research are identified to improve the capacity of South African local municipalities to deal with potable water supply challenges:

- Explore new ways of managing potable water by integrating the latest water services technology. Improved ways of continuous communication between role-players and stakeholders involved with the management of water serves should be investigated.
- The changes in climate and ever-increasing population growth should take centre stage in South African academia.

REFERENCES

Abrams, L. J. 1996. *Policy Development in the Water Sector- the South African experience.* (Paper written for the Cranfield International Water Policy Conference, Cranfield University, Bedford UK. September 1996. p.4). retrieved from: http://www.africanwater. Org/sapolicy.htm. Date of access: 15 June 2013

Anon. 2010. What is a literature Review? (Web) http://unimeb.ligguides.com/lit-reviews/. Date of access: 05 January 2011.

Babbie, E. 2010. The Practice of Social Research. United States of America: Wadsworth Cengage Learning.

Babbie, E. & MOUTON, J. 2002. The practice of Social Research. Cape Town: Oxford University Press Southern Africa Ltd.

Bakker, K. 2010. The Ambiguity of Community. Debating Alternatives to Private-Sector Provision of Urban Water Supply. ***Water Alternatives***.

Bassette, G. 2006. People, Land & Water: Participatory development communication for natural resources management*.* London: Earth scan.

Basson, M. S., Van Niekerk, P. H. & Van Rooyen, J. A. 1997. *Overview of water resources availability and utilisation in South Africa*. Department of Water Affairs and Forestry (DWAF) report P RSA/00/0197. Pretoria

Bates, R.L. & JACKSON, J.A. 1987.Glossary of geology. Virginia: American Geological.

Biswas, A.K. 2004.Integrated Water Resource Management: A Reassessment. IWRA, *Water International*, Volume 29, number 2: 248-256.

Berger, D. (2004/5). South Africa Year Book 2004/5; Pretoria

Bekink, B. 2006. Principles of South African Local Government: Law. Butterworth: LexisNexis.

*Biennial report on freshwater resources 2004-2005 (pp.1-15).*Washington.

Blignaut, J.N. And De Wit M.P. (2004). Sustainable Options; Development Lessons from Applied Environmental Economics. Cape Town; University of Cape Town Press.

Bond, P. *Elite Transition, From Apartheid to Neoliberalism in South Africa* (University of Kwa-Zulu Natal Press, Scottsville, South Africa, 2000, 2003)

Brooks, D. B. 2002. *WATER Local-Level Management*. Ottawa: International Development Research Centre.

Blumberg, B., Cooper, D. R. & Schindler, P. S. 2005.Business research methods. Berkshire: McGraw-Hill Education.

Cap-net, Annual Report, 2009. International network for capacity building for intergraded water resources management.

Cech, Thomas, S.V., 2010. Principles of water resources: history, development, and policy.

Chenga, C.S., Cronje, J.F., & Theron, S.E. 2010. The journal of the South African Institute of mining and metallurgy.

Clarke, J. 1991. Back to Earth: South Africa's environmental challenges. Halfway House: Southern Book Publishers.

Clarke, R. & King, J. 2004. *The Atlas of Water*. UK: Earthscan.

Claussen, M., Brovkin, V., & Ganopolski, A. 2003. Climate change in northern Africa: The past is not the future. *Climatic Change,* 57 (1-2): 99-118.

Clements, M. & Haarhoff, J. 2004. Filter Media Expansion during Backwash- The Effect of Biological Activity. Ninth Biennial Conference of the Water Institute of Southern Africa, 2-6 May 2004, Cape Town International Convention Centre.

Cohen, L. & Marion, L. 1998. Research method in education. London: Routledge.

Cohen, S., & Eimcke, W. 1995. ***The New Effective Public Manager: Achieving Success in a Changing Government***. San Francisco: Jossey-Bass.

Craythorne, D.L. 2006. Municipal Administration: The Handbook. Cape Town: Juta & Co.

Davies, B.D. & Day, J. 1998. Vanishing waters. Cape Town: University of Cape Town Press.

Denzin, N. & Lincoln, Y., eds. 1994. *Handbook of Qualitative Research*. Thousand Oaks. CA: Sage.

DEPARTMENT OF PUBLIC SERVICE AND ADMINISTRATION (DPSA). 2003. The Machinery of government: Structure and Functions of Government. Pretoria: Government Printer.

DEPARTMENT OF WATER AFFAIRS AND FORESTRY (DWAF). 2002. GUIDELINES FOR COMPULSORY NATIONAL STANDARDS. Regulations under section 9 of the Water Services Act (Act 108 of 1997) AND NORMS AND STANDARDS FOR WATER SERVICES TARIFFS. Regulations under section 10 of the Water Services Act (Act 108 of 1997). Pretoria: DWAF

DEPARTMENT OF WATER AFFAIRS AND FORESTRY (DWAF). 2007. Watermark: the last impression of the Ecological Reserve. Pretoria: Water Research Commission.

DEPARTMENT OF WATER AFFAIRS (DWA) 2009. Dolomite Guideline: A short guide to available documents on procedures for developing dolomitic land. Pretoria: Government Printer.

DEPARTMENT OF WATER AFFAIRS AND FORESTRY (DWAF). 2004. “A history of the first decade of Water Service delivery in South Africa 1994 to 2004”. Pretoria: DWAF.

DEPARTMENT OF WATER AFFAIRS (DWA). 2012. Blue-Drop Certificate Draft for North West. Pretoria: Government Printer.

DEPARTMENT OF WATER AFFAIRS 2009. Blue-Drop Certification Draft for North West.

DEPARTMENT OF WATER AFFAIRS AND FORESTRY (DWAF). 2004. “A history of the first decade of Water Service delivery in South Africa 1994 to 2004”. Pretoria.

De vaus, D. 2001.Research Design in Social Research. London: SAGE Publications.

Fast, H. & Engelbrecht, B. 1999. Local Government Transformation: “A guide for health workers” in *Kwik-Skwiz* 18, April 1999, p.2.

Folifac, F.A. 2007. 'National water policies and water services at the extremes: what challenges must be faced in bridging the gap? Learning from the South African experience.*'African journal* (1) 8-23.

Fouch, C.B & Delport, C.S.L. 2005. In-depth review of literature in research at Grass Roots: For the social sciences and human service professions. 3ed. Pretoria: Van Schaik.

Fuggle, R.F. 2002*. Environmental management: an introduction. (In Fuggle, R.F & Rabie, M.A., eds. Environmental management in SA. Capetown)*: Juta & Co, Ltd.

Fuggle, R.F. & Rabie, M.A. 2005. Environmental management in South Africa. Cape Town: Juta & Co, Ltd.

Glazewski, J. 2005. Environmental Law in South Africa. Second Edition. Butterworths: LexisNexis.

Gildenhuys, A. 1999.A new water dispensation”. *Butterworth’s Property Law Digest* (Vol.3, Part).

Gleick, P. H. 2004.The millennium development goals for water: crucial objectives.

GLOBAL WATER PARTNERSHIP (GWP). 2000. *Integrated water resources management: TAC background paper 4.* Stockholm: GWP.

GLOSSARY. Potable Water. http://www.alkenmurray.com/glossarybug.2.html Date of access: 16/07/2008.

GLOSSARY. Vaalkop Dam. http://www.magalieswater.co.za Date of access: 13/06/2012.

GLOSSARY. Water Services. http://en.wikipedia.org./wiki/Mogwase. Date of access: 5/11/2012.

Gorbachev, M. 2002. Special message. In Turton, A.R.& Henwood, R. (Eds).

Hydro politics in the developing world: a southern African perspective. Pretoria: African Water Issues Research Unit

Hinsch, M.2009.Current service delivery challenges for municipalities with regard to water management. Civil Engineering: inadequate commitments. In P.H. Gleick (Ed).*The world's water.*

Ismail, N., Bayat, S. & Meyer, I. 1997. Local Government. South Africa: International Thompson Publishing (South Africa).

IPCC. 2007. Summary for Policymakers: Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability. Geneva: International Panel on Climate Change

IWRA. Water International. Volume 25, Number 1 March 2000.

Law, B.I. 2005.*Potable reuse-what are we afraid of?* IBL Solutions.

Kelbe, B. & Germishuyse, T. 2010. Groundwater / Surface water relationships with specific reference to Maputaland. Pretoria: Water Research Commission. WRC Report No. 1168/1/10.

Kido, M. 2008. *Environmental Law*. Cape Town: Juta.

Leedy, P. D. & Ormond, J. E. 2005.*Practical Research* (8thed). Upper Saddle River: Pearson Education.

Liebenberg, W. Area Manager, Upper-Vaal: Potchefstroom Area Office of the Gauteng Region, Department of Water Affairs and Forestry, Potchefstroom. Personal interview.(18 March 2008). Potchefstroom.

Lundqvist, J. & GERICK, P. 1997*. Comprehensive Assessment of the Freshwater Resources of the World.* Stockholm Sweden: Stockholm Environment Institute.

Malzbender, D., Goldin, J., Turton, A.& Anton, E. 2005. International workshop on 'African water laws: plural legislative frameworks for rural water management in Africa', 26-28 January 2005.

Mcdonough, *et al*, 1997. The research methods for English language teachers, London.

Miguel, S.& Fernando, G. 1996.The Dublin Principles for Water as Reflected in a Comparative Assessment of Institutional and Legal Arrangements for Integrated Water Resources Management. Global Water Partnership.

MOMBA, M.N.B., THOMPSON, P. & OBI, C.L. 2008.Guidelines for the Improved Dissatisfaction of Small Water Treatment.Gezina: Water Research Council.

MONASHANE, S.C. 2011. Water Supply and Sanitation Delivery Problems as Practiser, Limpopo Province.North-West University. (Mini-Dissertation – Masters in Development and Management).

MOSES KOTANE LOCAL MUNICIPALITY IDP Report 2006/2007.

Moses Kotane LM. 2007, Integrated Development Plan 2006/2007. In M. K. L. Municipality (Ed.): Moses Kotane Local Municipality.

MOTSHEKGA, M. 2008. Lessons to be learned from the 19th century on governance, which could enhance our current leadership in the development of local government sector. Boksburg, March 2008.

Motshekga, M. and Harris, J. 1996. The future of local government in the rural area: An evaluation Programme for Northern Cape. South Africa.

MTSWENI, D.K., 2012. The perception of municipal water service official on the Blue Drop programme: the case of Nkangala District Municipality.

MOUTON, J. & MARAIS, H. 1996. Basic Concepts in the Methodology of the Social Sciences. Pretoria: HSRC.

MULDER, M. W. 2005. *A political policy analysis of the integrated water resources management.*

MUSINGAFI, C.C. & CHADAMOYO, P. 2013.Challenges and prospects for potable water supply governance in Zimbabwe; *International journal of Innovative Research in Management (January 2013, issue 2 volume 1).*

Mvula Trust, 2005. Local Government Water and Sanitation Dairy .Pretoria.

NATIONAL RESEARCH COUNCIL (NRC). 1991. Opportunities in the hydrological Sciences. Academic Press: Washington DC USA 1991.

NATIONAL RESEARCH COUNCIL (NRC). 2011. Opportunities in the hydrological Sciences. Academic Press; Washington DC USA 2011

NEALER, E.J. 2008. Knowledge about the origin of a municipality's potable water: A prerequisite for consolidation of more effective local governance. *Journal of Public Administration*: December 2008.

NEALER, E.J. & RAGA, K. 2007. Nature and extent of local governance in South Africa. *Journal of Public Administration*, 42(5):171-182, October.

Nealer, E.J. & Van Eeden, E. 2010. The Essence of Water Services Management According to Surface Water Catchment Regions: A Case Study of Delmas Local Municipality. *Administratio Publica:* 18(3): 133-148.

NEUMAN, W.L. 2000. Social research methods: qualitative and quantitative approaches. Boston: Allyn& Bacon.

OWEN, O.S., CHIRAS, D.D. & REGANOLD, J.P. 1988. Natural Resource Conservation: management for a sustainable future. (7thed). New Jersey: Prentice Hall Upper Saddle River.

OXFORD. 2014. *Oxford advanced learner's dictionary: international students' edition.* London: Oxford University Press.

PATTON, M. 1990.Qualitative evaluation and research methods (pp. 169-186).Beverly Hills, CA: Sage

PRASAD, P. 2005. Crafting qualitative research: working in the Post-positivis tradition/Pushkala Prasad.

PIENAAR, G. J. & VAN DER SCHYFF, E. (in JWN Tempelhoff). 2005. African water histories: Transdisciplinary discourses. Vanderbijlpark: Creda Printers.

PRETORIOUS, J.A. & DENNIS, A. Development of Internal Strategic Perspectives: Groundwater Overview for Middle Vaal Catchment Management Area. Appendix D. Groundwater Report Prepared for Directorate Water Resource Planning DWAF. Pretoria.

REPUBLIC OF SOUTH AFRICA (RSA). 1996. The South African Constitution, Act 109 of 1996. Pretoria: Government Printer.

RSA, 2007. *South Africa Year Book*. Cape Town: Formeses Printers.

REPUBLIC OF SOUTH AFRICA (RSA). 1994. White Paper on Water Supply and Sanitation. Pretoria: Government Printer.

REPUBLIC OF SOUTH AFRICA (RSA). 1998. Local Government: Municipal System Act 32 of 2000. Pretoria: Government Printer.

Statistics SA. 2011. Key Municipal Data. Pretoria: Statistics South Africa.

Saunders, M. Lewis, P.Thornhill, A. (2003).Research Methods for Business

Students. (3rd Ed.) Harlow, England Prentice Hall /Financial Times.

Sekaran. 2003. Research Methods for Business. Skill Building approach. Juta & Co. Ltd, Cape Town.

Sellitiz C., *et al.* 1996. Research methods in social relations, New York: Holt, Rinehart and Wiston.

Shiklomanov, I.A. (1999). World Water Resources and their Use.Database on CD Rom.

Paris, UNESCO.

Steyn, R.1999. *A new era of environmental legislation - forthcoming in vision 1999.* Browman Gillfillan Inc.

Solanes, Miguel and Fernando Conzalez – Villarreal, 1997. The Dublin principles of water as reflected in a comparative assessment of institutional and legal arrangement for integrated water resources management. Global water Partnership (GWP), Technical advisory Committee (TAC), Stockholm, Sweden (http://www.gwp.forum.org).

SOUTH AFRICA (REPUBLIC). 1997b. *Water Services Act 108 of 1997.*Pretoria: Government Printer

SOUTH AFRICA (RSA). 1996. Constitution of the Republic of South Africa as adopted from the Constitutional Assembly on 8 May 1996 and amended on 11 October 1996.

SOUTH AFRICA (REPUBLIC). 1998b. *National Water Act 36 of 1998*. Pretoria: Government Printer.

SOUTH AFRICA (REPUBLIC). 1998c. *National Environmental Management Act 107 of 1998*. Pretoria: Government Printer.

SOUTH AFRICA (REPUBLIC). 1998d. *Local Government: Municipal Structures Act 117 of 1998.* Pretoria: Government Printer.

Swartz, C.D. 2009. A planning Framework to Position Rural Water Treatment in South Africa for the Future. Research Report No. 419/09, Water Research Commission, Pretoria, South Africa.

Swatuk, L.A. 2008. A political economy of water in Southern Africa. Water Alternatives 1(1): 24-47

THE UNITED NATIONS (UN)-WATER AND FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO). 2007. Coping with Water Scarcity: Challenge of the Twenty-First Century. New York, NY: UN-Water and FAO.

THE UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP). 2004. Water Governance for Poverty Reduction. One nation plaza, New York, NY 10017.

THE UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP). 2006. Human Development Report 2006: Beyond Scarcity: Power, Poverty and the Global Water Crisis. New York, NY: UNDP.

THE UNITED NATIONS WORLD WATER DEVELOPMENT REPORT 3 (UNWWD). 2009. Water in the Changing World. United Kingdom. UNESCO Publishing.

THE UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP). 2004. Water Governance for Poverty Reduction. One nation plaza, New York, NY 10017

UNWVLC. 2003. GOVERNANCE AND COMMUNITY BASED APPROACHES MANUAL. UNWVLC

Thompson, H. 2005. Water Law. A Practical Approach to Resource Management and the Provision of Services. Cape Town: Juta & Co Ltd.

Thompson, H., Stimie, C. M. Richters, E. AND S. Perret. 2004. Policies, Legislation and Organisations related to Water in South Africa, with special reference to the Olifants River Basin. South Africa working paper No. 7.

Thompson, H. 2006. Water law: a practical approach to resource management & the provision of services. Cape Town: Juta& Co Ltd.

United Nations. 2009. World Water Development Report 3 (UNWWD). Water in the Changing World. United Kingdom. UNESCO Publishing.

UN-Water and FAO. 2007.

UNWVLC. 2008. GOVERNANCE AND COMMUNITY BASED APPROACHES MANUAL.

USEPA 2003. Long Term 2 Surface Water Treatment Rule – Federal Register / Vol.68, No. 154 / Monday, August 11, 2003 / Proposed Rules.

US CLIMATE CHANGE PROGRAMME. 2008. The effects of climate change on agriculture, land resources, water resources and biodiversity.http://www.usda.gov/oce/climate_change/SAP4_3/CCSPFinalReport.pdfDate of access: 28/06/14.

Van Der Waldt, G., Van Niekerk, D., Doyle, M., Knipe, A. & DU TOIT, D. 2002.Managing for results in government. Sandown: Heinemann.

Wisniewski, M. & Stead, R. 1996. Quantitative Methods for Business.(3rdEd.) Great Britain: Prentice Hall.

Welman, J. C.; Kguger, S. J. & Mitchell, B. 2005. Research methodology. (3rd Ed.) Cape Town: Oxford University Press.

WORLD HEALTH ORGANIZATION (WHO) AND UNITED NATIONS CHILDREN'S FUND (UNICEF).2005.Water for Life: Making it Happen. Geneva: WHO and UNICEF.

WWAP/UNESCO. 2006. A shared responsibility: the UN world water development report 2.Paris: UNESCO Publishing, and New York: Berghahn Books

WWAP/UNESCO. 2008. Water in a changing world: the UN world water development report 3.Paris: UNESCO Publishing, and New York: Berghahn Books

Xie, M. 2006. Integrated water resources management (IWRM): Introduction to principles and practices. New York: World Bank Institute

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POTCHEFSTROOM CAMPUS

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03 June 2014.

TO WHOM IT MAY CONCERN

RE: RESEARCH PROJECT: MR D.K. MOSIME (STUDENT NUMBER: 12680524)

Mr D.K. Mosime is currently enrolled in his third year of the Master's degree in the Development and Management, at the Potchefstroom Campus of the North-West University. The title of his Mini-dissertation is: ***The management of potable water supply in Mogwase Township, Moses Kotane Local Municipality. North-West Province.***

In order to obtain information regarding water management, Mr Mosime is required to conduct interviews and surveys with water services employees in your municipality. The employees will participate in the survey and unstructured interviews on a voluntary basis and the identity of participants and the municipality will be protected. The information collected will not be used to evaluate the municipality in terms of their performance in comparison with others. I humbly request that you grant Mr Mosime the necessary permission to conduct the above-mentioned research.

Should you need more information, you are welcome to contact me

Yours Faithfully

Prof E Nealer
Senior Lecture: Public Management and Governance.
North-West University.

QUESTIONNAIRE ADMINISTERED TO THE RESIDENTS OF MOGWASE TOWNSHIP, MOSES KOTANE LOCAL MUNICIPALITY.

The structured questions were administered to the residents of the Mogwase Township older than eighteen year of age. Twenty five households constituted the sample of this study. The respondents were requested to make an 'X' in the space of their choice.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

Mark with an X in the space provided each objective to show whether you are in favour of or against the statement.

4.1 The water for Mogwase Township is transported in pipelines from Vaalkop Dam to the water purification works, reservoirs and then to the residents.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.2 Residents of Mogwase Township always receive adequate supply of drinking water without any disruptions.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.3 I am aware of the free basic water volume of 6kl per month per household.

1. Totally agree	2.Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.4 The Moses Kotane Local Municipality residents pay for drinking water supply services.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.5 My involvement in the maintenance of the drinking water supply system could improve the current status of water services by the Moses Kotane Local Municipality.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.6 I am aware of the drinking water sector legislation in order to save drinking water for the forthcoming generation.

1. Totally agree	2.Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.7 The residents of Mogwase Township support the IDP process of the Moses Kotane Local Municipality.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.8 Moses Kotane Local Municipality has a water resource management strategy.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.9 The Moses Kotane Local Municipality should play a more visible and active role in the implementation of the water resource strategy.

1. Totally agree	2. Agree	3 .Do not know	4. Disagree	5. Totally Disagree

4.10 I believe that all the spheres of government must be involved in the water resource management process in the area.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.11 There have been frequent water cuts in the Mogwase Township; hence there is a danger of waterborne diseases in the area.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.12 Political interferences has influenced drinking water supply in Mogwase Township

1. Totally agree	2. Agree	3 .Do not know	4. Disagree	5 .Totally Disagree

4.13 Sewage, pollution and mining activities in Mogwase Township has a negative impact on the quality of drinking water supply services.

1. Totally agree	2.Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.14 Grey water and sewage disposal does not end up in the drinking water sources of the Moses Kotane Local Municipality.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.15 The residents are informed in advance before the water cuts in Mogwase Township.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

QUESTIONNAIRE ADMINISTERED TO THE MOSES KOTANE LOCAL MUNICIPAL OFFICIALS

This questionnaire has structured questions. It was administered to the residents of the Mogwase Township older than eighteen years of age. Twenty five households constituted the sample of this study. The respondents were requested to make an 'X' in the space of their choice.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

Mark with an X in the space provided each objective to indicate whether you are in favour or against the statement.

4.1 The water for Mogwase Township is transported in pipelines from Vaalkop Dam to the water purification works, reservoirs and then to the residents.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.2 Residents of Mogwase Township always receive adequate supply of drinking water without any disruptions.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.3 I am aware of the free basic water volume of 6kl per month per household.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.4 The community members of Moses Kotane Local Municipality pay for drinking water supply services.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.5 My involvement in the maintenance of the drinking water supply system could improve the current status of water services by the Moses Kotane Local Municipality.

1. Totally agree	2. Agree	3. Do not know	4. Disagree	5. Totally Disagree

4.6 I am aware of the drinking water sector legislation and measures to save drinking water for the future generation.

1. Totally agree	2. Agree	3.Do not know	4. Disagree	5. Totally Disagree

4.7 The residents of Mogwase Township support the IDP process of the Moses Kotane Local Municipality.

1. Totally agree	2. Agree	3 .Do not know	4 .Disagree	5. Totally Disagree

4.8 Moses Kotane Local Municipality has a water resource management strategy.

1. Totally agree	2 .Agree	3. Do not know	4 .Disagree	5. Totally Disagree

4.9 The Moses Kotane Local Municipality should play a more visible and active role in the implementation of the water resource strategy.

1.Totally agree	2. Agree	3.Do not know	4. Disagree	5.Totally Disagree

4.10 I believe that all the spheres of the government must be involved in the water resource management process in the Mogwase Township area.

1.Totally agree	2. Agree	3.Do not know	4. Disagree	5.Totally Disagree

4.11 There have been frequent water cuts in the Mogwase Township; hence there is a danger of waterborne diseases in the area.

1.Totally agree	2. Agree	3.Do not know	4. Disagree	5.Totally Disagree

4.12 Political interferences has influenced drinking water supply in Mogwase Township

1.Totally agree	2. Agree	3.Do not know	4. Disagree	5.Totally Disagree

4.13 Sewage, pollution and mining activities in Mogwase Township has a negative impact on the quality of drinking water supply services.

1.Totally agree	2. Agree	3.Do not know	4. Disagree	5.Totally Disagree

4.14 Grey water and sewage disposal does not end up in the drinking water sources of the Moses Kotane Local Municipality.

1.Totally agree	2. Agree	3.Do not know	4. Disagree	5.Totally Disagree

4.15 The residents in Mogwase Township are informed in advance of water cuts.

1.Totally agree	2. Agree	3.Do not know	4. Disagree	5.Totally Disagree

4.16 What do you understand by drinking water quality regulations of the Department of Water Affairs or those of the municipality?

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4.17 What strategies must the Moses Kotane Local Municipality and water management authorities implement to improve drinking water supply in the Mogwase Township?

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4.18 Does the Moses Kotane Local Municipality have the capacity to fully recover the cost in water supply? If so, how?

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4.19 Do you have a copy of the water related policies and regulations? If yes, which one?

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4.20 In your opinion, what action should be taken against municipality's that fail to comply with quality drinking water requirements?

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