

UNIVERSITY OF KWAZULU-NATAL

**EVALUATING THE ROLE OF THE STATE AND NON-STATE ACTORS IN
MITIGATING WATER SHORTAGES IN ETHEKWINI MUNICIPALITY**

by

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DECLARATION

I, **Nokukhanya Thobeka Radebe**, declare that

- (i) The research reported in this dissertation, except where otherwise indicated, is my original research.
- (ii) This dissertation has not been submitted for any degree or examination at any other university.
- (iii) This dissertation does not contain any other person's data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
- (iv) This dissertation does not contain any other person's writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:
 - a) their words have been re-written but the general information attributed to them has been referenced;
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Signature: 

Date:

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ABSTRACT

Water is one of the necessities needed for survival but due to the changing climate it has become scarce in many parts of the world, including South Africa. An investigation into the role of the state and non-state actors within the Department of Water and Sanitation in the eThekweni municipality serves as a departure point from which to critically examine the inclusion of the Millennium Development Goals within strategies and policies put in place by the eThekweni Municipality to promote water conservation and to ascertain how the state and non-state actors contribute in mitigating water shortages within the eThekweni Municipality. The collective problems of water scarcity are evident and will grow over time. This study used an environmental lens into understanding and examining the phenomenon of water scarcity and considered the link between governance as applied to water and how water is an important resource in reducing poverty and playing a part towards economic development of the country. This was highlighted in order to reveal the missing mechanisms of governance that would help public organizations and other stakeholders to take on joint responsibility for the water scarcity issue, because it is a long-term problem.

This study employed a qualitative research design. Eleven semi-structured interviews with Department of Water and Sanitation representatives and the water management forum representative from the eThekweni Municipality were conducted. These were face-to-face interviews which were subsequently transcribed, and key themes were then developed, analysed and interpreted. Secondary data that were employed in this study was extracted from relevant journal articles, academic database websites and books. The transcribed interviews were thematically analysed. The findings revealed the ways in which the current water crisis can be used to find new solutions or practical ways such as the shift towards more water-efficient waste-management technologies. Furthermore, an evaluation of the role of the state in water mitigation measures is provided, based on the results of the qualitative data analysis. South Africa is a water stressed country with rising pressure on its water resources. The study recommends urgent solutions to protect water resources within this rapidly-developing country.

Key Words: Water Scarcity, Water Governance, Poverty Alleviation, Partnerships, conservation

TABLE OF CONTENTS

Declaration	i
Acknowledgements	ii
Abstract	iii
Acronyms and abbreviations	vii
Tables and Boxes	viii
Chapter One: Introduction	1
1.1 Introduction.....	1
1.2 Research Problem.....	3
1.3 Research Questions.....	3
1.4 Research Objectives.....	3
1.5 Literature Review.....	4
1.6 Conceptual Framework.....	10
1.7 Research Methodology.....	11
1.8 Significance of the study.....	15
1.9 Rational of the Study.....	15
1.10 Structure of the Dissertation.....	16
1.11 Conclusion.....	17
Chapter Two: Water challenges in South Africa	18
2.1 Introduction.....	18
2.2 Water Scarcity Issues in South Africa	18
2.3 Water Conservation.....	21
2.4 Water Policy in South Africa	23

2.5	National Water Resources Strategy of 2013.....	24
2.6	Integrated Water Resources Management.....	26
2.7	Department of Water and Sanitation: eThekweni Municipality.....	29
2.8	Conclusion.....	30
Chapter Three: Conceptual Framework.....		31
3.1	Introduction.....	31
3.2	Refining Governance.....	32
3.3	The importance of Water Governance.....	33
3.4	Water Service Provision.....	37
3.5	Conclusion.....	41
Chapter Four: Research Methodology.....		43
4.1	Introduction.....	43
4.2	Research Design.....	43
4.3	Data Sources.....	45
4.3.1	Secondary Data Sources.....	45
4.3.2	Primary Data Sources.....	45
4.4	Primary Data Collection Tools.....	46
4.4.1	Sampling.....	47
4.5	Document and Textual Analysis.....	49
4.6	Data Analysis and Interpretation.....	50
4.7	Subjectivity issues/concerns/limitations.....	53
4.8	Ethical Considerations.....	53
4.9	Conclusion.....	53
Chapter Five: Findings and Discussions.....		55
5.1	Introduction.....	55

5.2	The Nature the eThekweni Municipality’s Water and Sanitation Department ...	56
5.2.1	The Purpose of the eThekweni Municipality’s Water and Sanitation unit	56
5.3	The Importance of Water Governance.....	57
5.3.1	Evaluation of the Water Governance System.....	58
5.4	Water Conservation.....	61
5.5	Poverty Alleviation.....	63
5.6	Public Participation	65
5.7	Partnerships	67
5.8	Conclusion.....	70
Chapter Six: Conclusions and Recommendations.....		73
6.1	Introduction.....	73
6.2	Objectives of the Study.....	73
6.3	Research Questions.....	73
6.4	Summary of the Study.....	74
6.5	Recommendations.....	77
6.6	Final Remarks.....	79
References.....		81
Table of Participants.....		94
Appendix A : Interview Schedule.....		95
Appendix B: Ethical Clearance		101
Appendix C: Informed Consent.....		102
Appendix D: Participant Consent.....		103
Appendix E: Turnitin Report.....		104

ACRONYMS AND ABBREVIATIONS

CBO	: Congressional Budget Office
CSIR	: Council for Scientific and Industrial Research
DWA	: Department of Water Affairs
DWAF	: Department of Water Affairs and Forestry
DWS	: Department of Water and Sanitation
GIS	: Geographical Information System
HRC	: Human Rights Commission
IPCC	: Intergovernmental Panel on Climate Change
IUCN	: International Union for Conservation of Nature
IWA	: International Water Association
IWMI	: International Water Management Institute
MDGs	: Millennium Development Goals
NDP	: National Development Plan
NGO	: Non-governmental organisations
NGP	: New Growth Path
NWA	: National Water Act
NWRS	: National Water Resource Strategy
NWS	: National Water Strategy
PPPs	: Public–private partnership

RDP : Reconstruction and Development Programme

RSA : Republic of South Africa

SAICE : South African Institution of Civil Engineering

SDG : Sustainable Development Goals

UNDP : United Nation Environment Programme

UNICEF : United Nations International Children's Emergency Fund

WC/WDM: Water Conservation/Water Demand Management

WESSA : Wildlife and Environment Society of South Africa

WHO : World Health Organization

WSDPs : Water Services Development Plan

LIST OF TABLES

Table 4.1: Water and Sanitation Projects: eThekweni Municipality	48
Table 4.2: Interviewees details	49
Table 4.3: Data Documents	50
Table 6.1: Central themes emerging from the results	76

CHAPTER ONE

INTRODUCTION AND OVERVIEW OF THE STUDY

1.1 INTRODUCTION

The global water scarcity phenomenon has become a major issue of concern to governments, organizations, policy-makers, water-users and water managers. According to Mekonnen and Hoekstra (2016), significant proportion (two-thirds) of the world's population faces difficulties in accessing freshwater. The pressure on freshwater resources arises as a result of population growth, climate change, pollution of existing water resources and urbanization, among other things (Jefferies et al., 2012). South Africa is a water stressed country with the pressure rising on its water resources.

This study will be assessing the role of the state and non-state actors in mitigating water shortages in the eThekweni Municipality region. In many parts of the world, quantities of water supply do not meet the quantity demanded by the various sectors of the economies. Food production has been identified as the major user of the available scarce water resources; accounting for about 86 % of all global water use (International Water Management Institute, 2007). However, given the fact that food production is vital for human survival and essential role that water plays in food production, there is a need to design strategies and methods to make efficient use of water in all sectors, particularly in agriculture which uses most of the world's water. Based on this, two internationally accepted concepts of water footprint have been developed: the water footprint concept as described by Hoekstra (2011). Disasters and climate change impact, as well as increased water demand, have severe risks to the delivery of sustainable urban water services, such as water, safe drainage and sanitation especially in large cities. A transition towards improved water management is needed based on these challenges (Howard and Bartram 2010).

The global water shortage is an extreme issue of concern to sustainable development and requires thorough evaluations of water footprints and water productivity in all major sectors of the economy. It is of concern to governments, organisations, policy-makers, water-users and water managers. A significant proportion (two-thirds) of the world's population faces difficulties

in accessing freshwater (Mekonnen and Hoekstra, 2016). The pressure on freshwater resources arises as a result of population growth, climate change, pollution of existing water resources and urbanisation, among other things (Jefferies et al., 2012).

South Africa is experiencing severe water challenges which is a huge hindrance to economic growth and causes an inconvenience to all individuals in the country. Water shortages are currently a South African reality. South Africa has an annual rainfall that is under the world average of 500 mm than the world average of 860 mm. In addition, rainfall experienced in South Africa is periodic and unevenly distributed throughout the country. The South African government plans to provide safe potable water and sanitation to the people (Friedrich et al., 2009). Surface water is heavily dedicated for use, and Scholes and Noble (2001) contend that water is imported from neighbouring countries, and the limited groundwater resources do not offer much reprieve. Thus, water availability is said to be the one of the greatest and most important development challenge facing South Africa. The necessity for water is highlighted by the fact that water shortage in developing countries is strictly linked to the predominance of hunger, poverty and disease (Falkenmark, 1994; Ashton and Haasbroek, 2002).

In the past, Smakhtin (2001) argued that water resource managers met rising water demands through a complex system of engineering supply measure side solutions which included major inter-basin transfer and water pumping schemes, even over mountain ranges and across vast distances. And because of the rising charges linked with supply measures and the water resource potential left over of which is exploitable. The solutions are becoming less practical. This is highlighted by the fact that twelve of our country's nineteen catchment areas are insufficient and they obtain water through the inter-basin transfer schemes from the left over excess areas (De Wit, 2004). Ashton and Seetal (2002) expand on this by stating that it has become essential to discover other alternative solutions to supplement and preserve water supplies.

1.2 RESEARCH PROBLEM

The global water shortage challenge is a critical issue of concern to sustainable development and needs a full assessment of water footprints and water productivities in all sectors of the economy as stated above. The global water scarcity phenomenon has become a major issue of concern to governments, organizations, policy-makers, water-users and water managers. A significant proportion (two-thirds) of the world's population faces difficulties in accessing freshwater (Mekonnen and Hoekstra, 2016).

1.3 RESEARCH QUESTIONS

The study attempted to answer the following research questions:

- What the role of water in poverty alleviation and human development is as represented through the millennium Development Goals?
- To what extent has the eThekwini Municipality included the millennium development goals within its strategies and policies in place to promote water conservation?
- What are non-state actors doing towards mitigating water shortages in eThekwini Municipality?
- What are the governance arrangements that use models for inclusive participation?

1.4 RESEARCH OBJECTIVES

This study aimed to critically examine the role of the state, private sector and communities in mitigating water shortages within the eThekwini Municipality boundaries. The objectives of the study were as follows:

- To analyse the role of water in poverty alleviation and human development as represented through the millennium Development Goals;
- To critically examine the inclusion of the millennium development goals within strategies and policies put in place by the eThekwini Municipality to promote water conservation;
- To assess how the non-state actors contribute in mitigating water shortages in eThekwini Municipality; and
- To assess governance arrangements that use models for inclusive participation.

1.5 LITERATURE REVIEW

A water service actually refers to water supply and sanitation services. Thabethe (2011) also explains that it also includes regional water schemes, local water schemes, rudimentary water schemes, on-site sanitation and the collection and treatment of wastewater. The pressure on freshwater resources arises as a result of population growth, climate change, pollution of existing water resources, urbanization, among other phenomena (Jefferies et al., 2012). Our country is predominantly water-stressed and the burden placed on the water resources of the country. As mentioned above in the introduction section above immediate interventions are needed to guard water security within this fast developing country. The growing scarcity of water has made it an extremely tradable product. According to Jefferies (2012) the ecosystem services that affect water supply will also become prized, and, eventually, tradable. Water supply affects the catchment health, and there is a shortage of water however there is a potential niche market for conservation activities in the catchment. In South Africa, the delivery of water is extremely dependent on the preservation of catchment areas. The collective problems of water shortages and flooding are now clearly evident and will rise in the long term.

Pollitt (2011) argues that the government capacity to solve water scarcity issues is not adequate enough due to the fact that there is existing confusion surrounding responsibilities in this area and the appeal of a short term and selfish strategy “pass on the problem to another region, organization or sector”. As argued by Pollitt (2011:7), the one main thing that is absent is a governance system that assists public organisations and interested stakeholders to take on joint responsibility for the issue of water shortages, supply and flooding, as mentioned above. An interconnected approach to water issues is desired; one major concern is the governance mechanism approach that has to be implemented is highly disjointed and is likely to be uneven in the upcoming years (Pollitt, 2011).

The issue of scarcity and flooding as a subject for discussion in Water Services Development Plans (WSDPs) and also very intricate because they are interconnected with other systems, like climate and land-use thus putting great pressure on the national government dealing with the water systems. The national government has taken up the responsibility of solving current

problems and the future problems of the prospect future. The institutional complexity and disintegration around water matters, as argued by Pollitt (2011:9), poses a huge challenge to governments. In numerous cases there have been different institutions with diverse and differing interests concerning water, such as water safety, water quality, water shortage (Pollitt, 2011:8-9) as well as water services providers.

As stated and sworn oath by South Africa's first democratic, elected government in 1994 and as indicated in the South African Constitution (1996), equitable access to basic services and interrelated infrastructure, including sanitation, water, electricity and roads, has been paramount to this vision (Tissington, 2010). Currently, South Africa continues to experience considerable economic, social, and political transformation from land reform and housing development to improving and extending services infrastructure (Rodina and Harris, 2016). The conversion from apartheid to democracy based; local governments steered to the establishment of district municipalities, who then took over the accountability and responsibility for water and sanitation services, the management of water services authority status. The National Unity government circulated and established statutory frameworks to warrant effective service delivery and bring about change in the local government sphere (Rodina and Harris, 2016).

The acceptance of the new Constitution of the South African Republic of 1996 hurried up the transformation of sectors of the public service and was led by different policies and legislative instruments. Section one of the Constitution of 1996 requires that, "all public services be changed and democratized in accordance with the values of human dignity, the achievement of equality and the advancement of human rights and freedom". The sphere of government that is still faced with the challenge of poor service delivery is the local sphere because there is a lack of infrastructure and the identification of the appropriate vehicles that will bring about effective and efficient service delivery. Meyer (2006) agrees with the formation of creating an enabling environment for the development of water sources for sustainable development.

Local government is known as the sphere that is much closer to the people and it is unswervingly responsible to the needs of different communities. Section 152 of the South African Constitution

states that one of the main objectives of local government is “to ensure the provision of services in a sustainable manner,” interestingly section twenty seven (1) (b) further states that the citizenry must have the “right of access to sufficient water”. Local government faces the task of guaranteeing that water is accessible to communities irrespective of whether it is ground water a spring or portable water.

A constitutional obligation is the right to clean and adequate water for all. In acknowledgement of this right the South African national government is dedicated to the provision of adequate water and sanitation services. This was long-established when the concept of “Partnership for Community Investment” was introduced by means of which available funds are to be used to the development of community services, including water and sanitation in rural areas (Thabethe, 2011). The international community has put supplying water and sanitation in rural areas at bay where else it should be at the top of the list of urgencies in the battle against poverty (Thabethe, 2011).

The main functions of the local municipality is basically to manage some of the water resource infrastructure such as dams, boreholes, bulk water supply schemes; supply water and sanitation to consumers. It is also to operate wastewater collection and treatment systems (Water Service Authority, 2007: 4). However, water systems are multifaceted and compounded and often go past the boundaries of municipalities, provinces and countries (Pollitt 2011:8). This therefore needs collaborative water governance by all involved in the managing of this resource. As stated by Rowston (2006: 13), other national government departments have the overall responsibility to support the Department of Water Affairs (DWA), as the leader in the water services sector, it deals with the fulfilment of its policy, regulating, supporting and the management of information (Department of Water Affairs and Forestry, 2003:23). Furthermore to this overall responsibility, different national government departments have specific responsibilities with regards to water services.

The key to community by-in is through the form of public participation, which is a municipal process. And without public participation, alienated communities are bound to reject even some

of the best projects that have dynamic plans. One of the most important underlying principles of public participation comes from the acknowledgement that the community or the people are at the centre in other words the heart of development (Thabethe, 2007: 15). The most positive benefit that public-private partnerships (PPPs) can offer government is the opportunity to gain access to private capital, skills to upgrade or build and manage public water infrastructure services up until it is run by the public sector. Having access to private finance makes it much faster to provide water services in developing countries, most of these countries are up against budget constraints. Noteworthy, the sector that attracts the least investment is the water sector especially in developing countries; investment is well below the other sectors.

The World Bank (2003) stated that the community can only do so much in terms of organising itself with dealing with shocks. The community largely needs assistance from higher level authorities and other external stakeholders to keep the service going. “Accountability triangles” between service providers, users and service authorities are noted to improve accountability. For instance, raised awareness about their water powers can enable impoverished communities to discipline providers and influence policy-makers to raise public services. In fact the policy-makers can make the service providers serve impoverished people better (World Bank 2003). Lastly, the use of regulatory accounting for urban water infrastructure assists and reflects its true costs over the life span of the service, with implications for decision making.

The availability of safe drinking water is considered as a basic human right. Water is a source of life and livelihoods, (Hardberger, 2005 and references therein). Hence why the phrase “water security” has been described and included in current times in so many civil society, governmental and academic discourses on socio-economic development. Despite of its occurrence and use, the word does not have and requires a clear definition. In contrast according to Grey and Sadoff (2007), the terms ‘food security’ and ‘energy security’ are now largely known to mean, “reliable access to sufficient supplies of food or energy, respectively, to meet basic needs of individuals, societies, nations or groups of nations, thus supporting lives, livelihoods and production”.

The term ‘water security’ has thus been accepted and acknowledged by many scholars to be an equivalent meaning, but the shocking difference is that water, unlike food or energy, can represent a danger in both its absence and presence. The study explains “water security” by the definition provided by Grey and Sadoff (2007). The Millennium Development Goals (MDGs), currently superseded by the Sustainable Development Goals (SDGs) include goal number 7 which carries the importance to guarantee environmental sustainability. This same goal challenges the whole world to halve in the near future, the number of people that do not have access to water that is clean and safe as well as decent sanitation (Weitz et al., 2014).

Vörösmarty et al. (2010) revealed, in spite of this appeal for raised access to safe drinking water, in 2010 almost eighty percent of the world’s population were exposed to high levels of water shortages, regarded as the antipodal to water security. There has been massive investment in water technologies that has enabled wealthy nations to offset high stressor levels over the past two decades without remedying their underlying causes. Poorer nations remain vulnerable (United Nations International Children's Emergency Fund [UNICEF] and World Health Organisation [WHO], 2015). This is evidently true in Africa, where many regions (especially rural areas) still show the lowest and worst water supply coverage globally (Heijnen et al., 2014; UNICEF and WHO, 2015).

In the year 2015, 663 million estimate of individuals all over the world that still use unsafe drinking water sources, majority of them live in sub-Saharan Africa (WHO, 2015). However the bigger concern is that often diseases are linked with dirty water and poor sanitation of which still places a huge risk to the public health in most developing countries (WHO, 2015). In many places in Africa, the key solution seems to be as simple as rising the amount at which the availability of improved water and sanitation is prolonged however this seems to be far more difficult than simple (UNICEF, 2015).

A vast amount of scholars have questioned Africa’s issues of water and sanitation for over the past twenty years. Scholars from various disciplines as far as reaching geopolitics and microbiology attempted to pin point the issues and potential alternative solutions. However, a

small number of these studies (Siebrits et al., 2014) have tried to bring together the different water sector role players to identify similar and unique challenges, gaps in knowledge, and recommendations with regards to water security. Noteworthy, South Africa is mainly a semi-arid, water-scarce country, with an estimated average annual rainfall of approximately 464 mm when compared with the rest of the world average of 860 mm (WESSA, 2012).

The presence of alien plants has a huge impact on water resources within these dams and rivers (Coetzee et al., 2010). Also, the rural urban migration adds onto the deteriorating water resources especially in African countries. The shocking rise in urban dwellers primarily those in poorly managed slums and poorly maintained has had worse implications on the water resources (Nyenje et al., 2010 and WHO, 2015). The South African Census (Statistics South Africa, 2012) revealed that 46.3% of households in South Africa do not have access to piped water and a little over 85% have access through the Reconstruction and Development Programme (RDP). Interestingly across all nine provinces these levels of access are not showing. In Limpopo and the Eastern Cape for example 31% and 27.2% of households have absolutely no access to water of RDP acceptable level.

According to Coetzee (2010) in the northern regions of South Africa, the lower-lying rivers are polluted by acid mine run-off caused by the mining activities that take place in the area. The Department of Water and Sanitation (DWS, previously the Department of Water Affairs and Forestry), composed with the associated water stakeholders and providers, are accountable for the maintenance of fresh and drinking water standards across South Africa (DWA, 2013a, 2013b).

The main obstacle of the South African government has always been to improve and put in place policies that will protect the country's water resources. The international and South African water laws should also be checked or re-evaluated using two tools "the Green Drop Programme" which reports on the integrity of treated effluent released from wastewater treatment works into rivers and the sea (DWA, 2013a), and the "Blue Drop Programme" which assesses the quality of potable water (DWA, 2013b).

1.6 CONCEPTUAL FRAMEWORK

This study aims to review literature, providing the reader with a picture of the state of knowledge about this topic being investigated and bringing together empirical evidence about this study. By exploring the above areas of literature, a significant contribution will be made to this study. The conceptual framework chapter will have two sections; the first being governance, the second being water service provision. At the core of this discussion, much emphasis will be placed on the governance and how one describes what governance is and its mandate, particularly beyond the management of interventions and the enforcement of law. Included in the first section in the literature review under the governance section, it will discuss how governance takes place at various levels in civil society and through multiple processes Meissner and Jacobs (2014). It also takes place in multi-level passageways of governance which are predisposed by both institutionalised governance mechanisms such as regulations, and non-institutionalised mechanisms such as norms and principles (Batchelor, 2007).

Water is a main factor that is important to all life on earth. Water is an important resource for the welfare of all humankind socially, as well as economically. For the healthy functioning of the world's ecosystems water is needed (Dukhovny, 2009). The importance of water and its connectedness to intrinsic value of sanitation in poverty eradication are recognised under target ten of the Millennium Development Goals (MDGs), namely, to "Halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation"(Folifac, 2006).

A number of studies reveal that water challenges mainly reflect a crisis in governance (Plummer and Slaymaker, 2007). However, extreme scarcity rarely results from natural limitations or insufficient funds and not having technical support, but relatively from intense water governance failures (Plummer and Slaymaker, 2007). This simply implies that issues arise from how different people and societies have given value to and managed the water resources available to them (Solanes, 2006). Plummer and Slaymaker (2007) states that issues regarding failure to properly use policy instruments interactively in the water sector are water governance challenges. It has become of vital importance to this study that the review of literature begins with the wider topic of what is water governance and its mandate on an international as well as

on a local scale. It is also important to understand the difference between governance and water governance specifically. It must be noted that each of these terms are in fact disciplines in their own right, therefore it is necessary to define and describe them independently in order to emphasize and understand their relationship.

1.7 RESEARCH METHODOLOGY

The purpose of research is to discover answers to questions by applying scientific methods or certain procedures. Each research has its own methodology and procedures in order to complete the objectives and answer the questions set at the beginning. There are two common types of research designs namely quantitative and qualitative (Creswell, 2013). Quantitative research is based on the quantitative measurements of some characteristics. It is applicable to phenomena that can be expressed in terms of quantities (Creswell, 2013). On the other hand, qualitative research refers to the meaning, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things (Gray, 2014). There is also a mixed-method research design which resides in the middle of this continuum because it incorporates elements of both qualitative and quantitative approaches (Creswell, 2013). This study has used a qualitative research design. Qualitative research means to explore and understand the meaning of social or human problems, and this type of research involves the emerging of questions and procedures and data is typically collected in the respondents setting. This study takes on the constructivism perspective and will use a case study as a strategy of enquiry. One of the features of case study research is its flexibility; hence adjustments might be made during the data collection method process by deciding to make use of additional data sources (Gray, 2014). The unit of analysis for this study is the Department of Water and Sanitation in eThekweni Municipality.

Secondary Data sources

Secondary data will include books, journal articles that will be used to discuss the study conceptual and theoretical framework. Substantial work will be done in developing theoretical framework of which will be drawn from an extensive review of literature relating to political ecology, environmental justice and water management. Other sources of information will be national, provincial and municipal government legislation and policy documents on service

delivery, national, provincial and municipal governments' workshops and public gatherings on critical issues relating to the provision of water services.

Primary Data Sources

There are many different types of primary data such as observations, interviews, documents and audio-visual material; this study will use interviews; face to face semi structured interviews of which is useful when participants cannot be observed directly and that participants can provide historical information as well as means of providing sufficiently detailed and rich textual material and lastly allows researcher control over the line of questioning (Creswell, 2013).

Semi-structured interviews are commonly defined by their conversational nature. Such a conversational approach means that each interview varies according to the interests, experiences and views of interviewees (Creswell, 2013). Respondents are able to discuss issues from their perspective in their own words, and are able to explain and elaborate further when necessary (Gray, 2014). The study will use documents of the Department of Water and Sanitation in eThekweni municipality such as the financial planning and budget documents, policy and strategic plan. These can be accessed at a time convenient to the researcher. Documents represent data that is thoughtful, in that participants have given attention to compiling and written evidence; it saves the researcher the time and expense of transcribing (Creswell, 2013).

Study site

The study will be conducted in eThekweni Municipality, in the Department of Water and Sanitation.

Target population

Qualitative research usually works with purposive non-probability samples because it seeks to obtain insights into particular practices that exist in a specific location, context and time (Gray, 2014). The study will target five provincial official, 3 project consultants and 2 community members from the water management forum because of the role these people in the issue of water conservation.

Sampling strategies

Since the study does not target any particular race to collect its data, it will use non-probability sampling which is purposive because sometimes it's appropriate to select your own knowledge of the population, its elements, and the nature of the research aims (Babbie & Mouton, 2001).

Sample size

The interviews will include 5 provincial officials; 3 project consultants and 2 community members from the water management forum of eThekweni municipality.

Data collection methods

The researcher will develop and use an interview protocol for asking questions and recording answers during a quantitative interview. The interview protocol will include the following components, a heading, and instructions that the interviewer will follow so that standard procedures are used from one interview to another. It will also include spaces between the questions to record responses and lastly a final thank you statement to acknowledge the time the interviewee spent during the interview (Creswell, 2013). The researcher will record information from interviews by making handwritten notes; a log will be developed to keep a record of documents collected for analysis in qualitative study. This log will contain information that represents primary material (i.e. information directly from the people).

Data Quality Control

When checking for validity and reliability, the researcher will use validity strategies such as using a peer debriefing to enhance the accuracy of the account. This process involves locating a person who reviews and asks questions about the qualitative study so that the account will resonate with people other than the researcher. This strategy involving an interpretation beyond the researcher and invested in another person adds validity to an account and to also present negative or discrepant information that runs counter to the themes. Most evidence will build a case for the theme; researchers can also present information that contradicts the general perspective of the theme. By presenting this contradictory evidence, the account becomes more realistic and more valid (Creswell, 2013).

Data analysis

In the data and interpretation, in general the intent is to make sense out of text data. It involves segmenting and taking apart the data as well as putting it back together in the light of the research questions (Creswell, 2013). The data analysis in qualitative research will proceed hand in hand with other parts of developing the qualitative study namely, the data collection and the write up findings. While interviews are going on, for example researchers may be analyzing an interview collected earlier. This process is unlike quantitative research in which the investigator collects data, then analyses the information, and finally writes the report (Creswell, 2013). Data analysis stage the researcher will transcribe the data, field notes from observation or reflective diaries will be written up into a format that can be easily read. The recorded interviews will be transcribed. While typing up the transcript it may be time consuming and laborious, it does develop familiarization with the data at an early stage (Gray, 2014).

Because the text data is so dense and rich, not all information can be used in qualitative study. Thus, in the analysis of the data, the researcher needs to “winnow” the data (Guest, MacQueen & Namey, 2012) a process of focusing in on some of the data and disregarding other parts of it. This process, to, is different from quantitative research in which researchers go to great lengths to preserve all of the data and reconstruct or replace missing data (Creswell, 2013).

A helpful conceptualization to advance in the methods section is that qualitative data analysis will proceed on two levels, the first is the more general procedure in analyzing the data and the second would be the analysis steps embedded within specific qualitative designs. This study is using a case study which involves a detailed description of the setting or individuals, followed by analysis of the data for themes or issues (Stake, 1995 & Wolcott, 1994). The researcher will then start coding the data organizing the data and writing a word representing a category in the margins (Rossman & Rallis, 2012).

Coding will comprise of seeking codes on topics that readers would expect to find, based on the past literature and common sense, codes that are surprising and that were not anticipated at the beginning of the study, codes that are unusual. It will then use the coding process to generate a

description of the setting or people as well as categories or themes for analysis. This analysis is useful in designing detailed description and themes will be represented in the qualitative narrative. The most popular approach is to use a narrative passage to convey the findings of the analysis. The final step in data analysis involves making an interpretation in qualitative research of the findings or results (Creswell, 2013).

1.8 SIGNIFICANCE OF THE STUDY

The water issues and problems in developing countries present special problems. These problems include the natural scarcity of drinking-water in certain areas, floods, as well as the contamination of rivers and large dams. These problems are more severe and widespread in the developing countries. Some 1.1 billion people in developing countries have inadequate access to clean water (Shah, 2010). This study seeks to present a thorough understanding of the factors which give rise to water conservation that will enable the community to successfully implement and practice water conservation as they will understand the importance of the phenomena and to give attention to the sustainability of the free basic water policy given the scarcity of the water resource.

1.9 RATIONALE OF THE STUDY

The reasons for the study is that South Africa is experiencing severe drought with demand exceeding supply, given South Africa's increasing demand for water, the need for water is clear. This study seeks to create awareness about water conservation as a means to addressing this crisis. There is scope for further examination on the topic of water conservation.

As mentioned previously water has become an extremely tradable commodity. In South Africa, the service delivery of water is highly dependent on the conservation of catchment areas, riparian zones, and wetlands. The collective problems, water scarcity are apparent and will grow long term. Pollitt (2011:6-7) argues that the governance capacity to solve water scarcity issues is not enough due to the existing disintegration of responsibilities and accountability in this field and its appeal of a short-sighted and selfish strategy of pass on the problem to another region, organization or sector.

1.10 STRUCTURE OF THE DISSERTATION

This dissertation consists of six chapters.

The **first chapter** is an introductory chapter and provides the introduction and an overview of the main issues to be discussed in the thesis. The statement of the problem, motivation for the research, objectives of the study, conceptualization, study area, research design and methodology, organization of thesis and lastly problems experienced in the research forms the basis of this chapter.

Chapter Two consists of the background of the study. It outlines the relevance of this study and discussing the water scarcity crisis that we are currently facing as a country and then further elaborating on how South Africa is tackling these issues.

Chapter three comprises the literature section and will highlight the main literature that will be reviewed, focusing on governance system, service delivery and water management. Much emphasis is being placed on the adoption of the new South African constitution of 1996. As well as look at the local government sphere and focus on the South African Constitution section 152, the objectives of the local government states that “to ensure the provision of services in a sustainable manner,” while section 27(1) (b) goes on to state that the citizenry must have the “right of access to sufficient water”.

Chapter four covers the methodology, provides a concise overview of how this research was conducted; when employing a qualitative research design approach, using a case study design. This research used primary data in the forms of semi structured interviews and proxy documents. The researcher developed and used an interview protocol for asking questions and recording answers. Secondary data in the form of books and journals were used to compile the information. This chapter describes the various steps that the researcher used to transcribe and analyse the data.

Chapter five discusses the key findings and analysis including themes that emerged from the analysis of the interviews. Themes reflect mitigation measures taken up in the eThekweni region.

Chapter six, the researcher assesses the discussion to deliver final remark to the research objectives and the aim of the study. The researcher moreover makes recommendations regarding gaps that future research could fill.

1.11 CONCLUSION

This chapter provided a broad insight into the nature of the study conducted. It discussed the relevant background information of the study and described the aims and objectives of the study. Thereafter the chapter provided a rationale that motivated the researcher to undertake a study of this nature. The following chapter presents the background of the study looking at the water scarcity crisis that we are currently facing and the drought issue that is faced by the country.

CHAPTER TWO

WATER CHALLENGES IN SOUTH AFRICA

2.1 INTRODUCTION

The purpose of this chapter is to contextualise and discuss the relevance of this study. This is necessary in order to meet the objectives of the study and to thereby assess mitigation measures. In this regard, this research begins by discussing the drought crisis South Africans are currently facing as a country and then elaborates on how South Africa is tackling these issues. Lastly, the discussion will outline the case context which is the eThekweni water and sanitation department, its history and detailed in which it is involved. The following section looks at the water scarcity issues in the Republic of South Africa.

2.2 WATER SCARCITY ISSUES IN SOUTH AFRICA

South African water system is currently faced by difficult times, with serious water constraints throughout the country taking a toll to the country's economic growth, hence inconveniencing everyone in the country. With the country's annual rainfall being below that of world average (500 mm as opposed to the world average of 860 mm), it seems that water scarcity is South Africa's reality. Seasonal and unevenly distributed rainfall patterns throughout the country have seen to be putting great pressure national government dealing with water systems. Hence South African government plans to provide safe potable water and sanitation to the people (Friedrich et al, 2009). Water scarcity along with flooding cannot be tackled without considering factors such as climate and land-use systems as they are all heavily interrelated; and being subjects for discussion in WSDPs. In relation to climate, high variability, high levels of evaporation caused by hot climate, and increasing challenges from water pollution has resulted to South Africa is the 30th driest country in the world and has less water per person than countries widely considered being much drier, such as Namibia and Botswana (National Water Strategy, 2013).

Water safety, water quality, water shortages have proven to be of focus in different institutions which are carrying conflicting interest studies concerning water (Pollitt, 2011:8-9) as well as water services providers. In the literature it is of shock that both water absence and presence can represent threat, which is never the case with food and energy security regardless the meaning equivalency between the term ‘water security’ and that of food and energy. Vörösmarty et al. (2010) stated, “despite this call for increased access to safe drinking water, in 2010 nearly 80% of the world’s population were exposed to high levels of water insecurity, regarded as the antipodal to water security While massive investment in water technology has enabled wealthy nations to offset high stressor levels over the past two decades without remedying their underlying causes, poorer nations remain vulnerable”. Africa displays the lowest global coverage of water supply, in particularly rural areas regions within the African continent (Heijnen et al., 2014; UNICEF and WHO, 2015).

The presence of alien plants, sand mining activities, industrial effluent discharge, high evaporative rates are among factors that highly caused threat to the water resources in many of the country’s rivers and built dams (Coetzee et al., 2010). On the other hand, due to rural-urban migration on other parts of Africa there has been dramatic increase in urban dwellers mainly living in poorly or un-serviced slums resulting in negative implications (compromised quantity and quality) on natural resources such as rivers. These natural resources are under a severe strain of having to carter for continuous population increase (DWAF, 2005; Nyenje et al., 2010; UNICEF and WHO, 2015).

In and around South Africa, water availability varies from region to region and from province to province. With 31% in the Eastern Cape and 27% in Limpopo of households with no access to RDP acceptable level, whereas according to 46.3% of households in South Africa have access to piped water and slightly over 85% have access to water that is of a Reconstruction and Development Programme (RDP)-acceptable level (South Africa’s 2011 Census 2011, Statistics South Africa, 2012) This proves that in South Africa the levels of access to water are not homogeneously reflected across all provinces.

South Africa, in recent years has seen the worst hydrological drought conditions which has affected different parts of the nine provinces. According to the Deputy Minister of Water and Sanitation, Mrs P Tshwete (2016), the arranged structures and continued engagement with the stakeholders has made it possible for the department to mitigate the drought impacts under the guidance of the National Water Resources Strategy, which supports the transformation of the sector through protecting and conserving this limited resource. Developing countries are going to bear the brunt of climate change and suffer most from its negative impacts. Reality is the mitigation measures does not come as the solution to the effects of climate change, but rather as partial softening on the situation. There will continue to be change in Local climates and terrestrial ecosystem which act as a threat to human livelihood and biota (Louis, 2007). Louis also asserts that water problems vary from time to time (being seasonally or annually) Even within a country, regions experience significantly different water problems. According to Louis (2007), Water availability is not the solely solution to water problem. Below is the list of other participating factors in ensuring water security and doing away with water problems:

- Water management processes;
- Capacities and competences of institutions;
- Dictatorship of water planning in socio-political conditions;
- Processes and practices of development management;
- Existing legal framework appropriateness implementation statuses;
- The countries' appropriateness, regarding social- environmental conditions;
- Availability of investment funds;
- Standards or degrees of available and usable technology; and
- Modes of governance in national, regional and international perceptions.

There is a widespread interest on water across the entire world population. Such interest has been shown by developmental organisations at central and state levels, municipalities, non-governmental organisations (NGOs), and private sectors. The interest on water is due to water problems that are currently in and around the world, commanding high levels of attention in modern societies. Experts have claimed that the widespread interest on water has also been

applicable to other problems like food, energy, environment, health, communication, and transport.

Louis et al. (2007), exerts that many of water have already became far too complex, as they are unified with other development-related problems as well as social, economic ,environmental legal, and political factors at local and national levels, and sometimes at regional and even international levels. This entails that water problems in a country can no longer be resolved by the water experts or water authorities alone. Hence it is agreed upon that water is of universal interest for reassuring peoples' good quality of life.

Louis et al. (2007), also argue that the foreseeable future trends indicates that water issues will gradually be linked with other development sectors such as energy, industry, agriculture, transportation, and communication, and with social factors such as education, , health, environmental and rural or regional development. It is high time whereby water must not be seen as isolated by one institution or any other stakeholder or water expert without having a clear and concurrent consideration of other connected sectors. It can be argued that South African country has reached a point whereby it needs to revisit its water policies and water related-issues for assessment, analysis, and review, so they can be resolved, so to reassure the main objectives of water management, which aims at accomplishing good standard and quality of life for people, poverty alleviation, as well as regional and equitable income distribution. Water professionals are in a quest of overcoming water challenges in a manner which will be socially acceptable and economically efficient.

2.3 WATER CONSERVATION

International Water Association (IWA) endorsed a notation of water conservation. This looks at minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water, Butler Memon (2006). IWA notation promotes water conservation 'doing less with less' (e.g. taking shorter showers, using bucket system instead of using hosepipes when washing cars),water efficiency, 'doing the same (or more) with less' (such as fix leaks; hydraulically efficient toilet pan and cistern design), water sufficiency , 'reduction of some water

uses or the proportion of water available to each user or sector' (e.g. dual flush toilets, automatic shut-off of taps etc.), water substitution,' replace water with something else'. In addition, another Department of Water Affairs water management tool is Water Demand Management (WDM), which looks at adaptation and implementation of a strategy by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, and environmental protection, sustainability of water supply and services and political acceptability.

At times there are conflicts between conservation goals and economic development. Turpie exerts that there is pressure to use land and water resources as opportunities of economic growth driven by social issues on political agenda. Exploitation of land use and water resources can result to negative effects for the future health of terrestrial and aquatic ecosystem and their capacity to perform their duties such as delivering 'adequate' goods and services that also contribute to social and economic welfare. With almost all Conservation efforts focusing on the protected areas, which tend to be geographic, economic, and socio-political enclaves; it has monopolised it to the wealthy. Hence, more practical solutions will need to be found to ensure adequate conservation of biodiversity, and to sustain the values taken from ecosystems in South Africa (Turpie, 2003 and Turpie et al., 2003).

It is stated in the Water Services Act, No 108 of 1997 (RSA, 1997a) that it is a duty of all municipalities that have been tasked with water services provider status to give measures to promote water conservation and demand management, which will be included in their Water Conservation and Water Demand Management (WC/WDM) strategy and business plan and Water Services Development Plan (WSDP). This follows the requirement from all spheres of government to provide water supply services efficiently, equitably and sustainably. The target for reducing water has been set however activities at municipal level to reach this goal have been limited (McKenzie et al., 2012). This could be pinned to a lack of proper planning, and not realising the implications and potential benefits of WC/WDM. Also the fact that

The Department of Water and Environmental Affairs (DWA) report that many of the existing strategies are ambiguous and of little value (DWA, 2011). A number of municipalities have limited financial, technical and institutional capacity to prepare a WC/WDM strategy. Hence municipalities often unsuccessful at realising that the most WC/WDM activities will pay for themselves and those financial institutions will fund these projects if a proper business case could be compiled. Paradoxically, municipalities complain that they are unable to obtain funding while most financial institutions complain that they cannot find bankable projects because of the poor quality of the applications and strategies. It is crucial for a country to look at its governability as it is vital in assessing the efficacy of a country's' water governance. The country's governance capacity is defined as the capability of a country to implement water policies; hence, the next section will discuss more closely the water policy implementation situation in South Africa.

2.4 WATER POLICY IN SOUTH AFRICA

With South Africa having semi-arid climatic conditions, with an average annual rainfall of 500 mm and is branded by high annual variability and unpredictability (Nomqophu, 2005; McKay, 2004; Stein, 2005; Ashton *et al.*, 2006; and Naster, 2009). During apartheid era (prior 1994) , water service provisions were extremely centralised, as water resource management was only the responsibility of the national government sphere and no other bodies were involved (Tewari, 2009; Movik and de Jong, 2011). As a result there was uneven distribution of water resources and water services between various ethnic groups (Anderson *et al.*, 2008; Naster and Hansen, 2009). On the other hand, lack or absence of comprehensive national water legislation and effective administrative support structures intensified the issue further (Muller and Lane, 2002).

According to Abraham, South African water sector and the environment in general were severely impacted, by the fact that during the apartheid era Department of Water Affairs and Forestry (DWAF) were mainly focused on irrigation and forestry. It was only post-apartheid government that a new legal framework and policy was developed, with initiation of extensive reform process in the water sector (RSA, 1999; Thompson *et al.*, 2001 and Ashton *et al.*, 2006). And it

was argued that reforming the entire governance process will still continue for years to come, as it is extensive, dynamic and costly (Medema et al., 2008; Tewari, 2009; Movik and de Jong, 2011).

According to the NWA (1998), the Minister of Water and Sanitation is obligated to update the National Water Strategy (NWS) every five years. It is argued that National Water Act (No 31 of 1998) is the two core pillars of the new water legislation. These are linked through the sanitation business cycle. Moreover, it is the responsibility of the NWRS to make sure that there are enough water resources available to satisfy basic human needs and to cater for socio-economic development, both now and in the future. This can be achieved by engaging in stakeholder consultation and participation as it is very critical (DWAF, 2005; du Toit et al., 2011; NWRS, 2013). The next section will be discussing the National water resources strategy (2013).

2.5 NATIONAL WATER RESOURCES STRATEGY OF 2013

The main emphasis of the National Water Strategy (NWRS) of 2013 main emphasis is equitable and sustainable water accessibility by all South Africans while sustaining water resource. In addition there is South African national economic and development (NDP) which priorities coupled with the complex environment within which requires a “new” era of advanced and smarter water management to operate. This Strategy gives and opportunity for robust and sustainable water sector institutions (it includes nine both catchment management agencies and regional water utilities) that have adequate capacity to manage our water resource sustainably and equitably as well as ensure sustainable and effective service provision.

The main NDP shortcoming is to increase the skills and capacity within the sector for both water resource management and water services. Lack of skills development, staff motivation and capacity building might result in poor regulatory capacity needed to improve compliance and ensure that standards and license conditions are met in an integral of strengthening the institutional framework and capacity. Such skills development can be achieved through

Institutions being well capacitated with qualified, appropriately staffed and resourced at all levels. Below are benefits of effective NDP strategy:

- Equitable and improved access to water and sanitation for all South Africans;
- Water availability to support economic-development and job creation;
- Protection of existing assets, stimulation of the construction sector;
- Stimulation of enterprises sector (both small and medium); and
- Water resource sustainability.

Water plays a great role in bringing justice, development and growth for all, and this is only achieved through application of NWRS strategy with joint effort of all sectors and stakeholders, led to operationalise and raise-up investments by Department of Water Affairs. This is in responds to the National Development Plan (NDP) and outlines the strategy for protecting, using, developing, conserving, managing and controlling South Africa's scarce water resources towards achieving the 2030 Vision. The NDP 2030 vision makes it clear that the national development goal is poverty alleviation and sharply reducing inequality by 2030. To attain this, the government has defined a New Growth Path (NGP), one of inclusive growth and development, with a focus on diversification and wide participation by South African citizens within a vibrant and growing economy. As mentioned that water is an important and central role in all sectors, including energy, agriculture, mining, tourism, urban growth, rural development, the allocation, development and protection of water of which is an important prerequisite for inclusive economic growth, poverty alleviation and inequality in South Africa. The NWRS hopes to achieve and ensure that water serves as an enabler for inclusive economic and social development and not a barrier.

Most sectors and national strategies now recognise the importance of water and that development cannot happen without proper water planning and development or corresponding budget allocations. However, for water to play an optimal role in poverty eradication, the reduction of inequality, inclusive growth and development, and building a just and equitable society, water resources planning must be integrated into national, provincial and local planning, and must be addressed in all growth and development strategies.

2.6 INTEGRATED WATER RESOURCES MANAGEMENT

A number of members of the water profession started to notice that during the 1980s that the situation is not as good as they appeared. This feeling intensified during the 1990s, when many in the profession began to appreciate that the water problems have become multi-dimensional, multi-sectoral, and multi-regional and filled with multi-interests, multi-agendas, and multi-causes, and which can be resolved only through a proper multi-institutional and multi-stakeholder coordination. The current issue at present, however, is not whether such a process is desirable, but rather how can this be achieved in the real world in a timely and a cost effective manner (Department of Water Affairs and Forestry, 2004).

Faced with such unmatched complexities, many in the sector started to look for a new paradigm for management, which will solve the existing and the foreseeable water issues all over the world (Water Re-use Association, 2009). There has not been any new solution, there was a rediscovery of a 60 year old concept which was not successfully applied, integrated water resources management. Many who discovered

The solution that was selected was, however, not new. It was the rediscovery of a basically more than 60-year old concept, which could not be successfully applied earlier: integrated water resources management. Many who “discovered” this concept were not aware that the “new” concept was in fact not really new, but has been around for several decades, but with a dubious record in terms of its implementation, which has never been objectively, comprehensively, and critically assessed (Water Research Commission, 2010). Before the status of application of integrated water resources management can be discussed to make water management more efficient, an important and fundamental issue that should first be considered is what precisely is meant by this concept. A comprehensive and objective assessment of the recent writings of the individuals and the institutions that are vigorously promoting integrated water resources management indicates that not only no one has a clear idea as to what exactly this concept means in operational terms, but also their views of it in terms of what it actually means and involves vary very widely (Water Research Commission, 2006).

The definition that is most often quoted at present is the one that was formulated by the Global Water Partnership (2000), which defined it as a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. This definition, on a first reading, appears broad, all encompassing, and impressive. However, such lofty phrases have little practical resonance on the present, or on the future water management practices.

The question then arises is whether this well-intentional and good-sounding definition has any real meaning in terms of its application and implementation to improve existing water management, or is it just an aggregation of trendy words which collectively provides an amorphous definition which does not help water planners and managers very much in terms of actual application of the concept to solve the real life problems (Water Re-use Association, 2009).

Let us consider some of the fundamental questions that the above definition raises in terms of its possible implementation in the real world, which have not been addressed thus far for example “promotes”, who promotes this concept, why should it be promoted, and through what processes? Can the promotion of an amorphous concept be enough to improve water management? What about its implementation?

The phrase “land and related resources”, what is meant by “related resources”? Does it include energy, minerals, fish, other aquatic resources, forests, environment, etc.? In terms of land and agricultural resources, the water ministry mostly has no say or jurisdiction over them (Jimenez and Takashi, 2008).

Considering the intense inter-ministerial and intra-ministerial rivalries that have always been present in all countries, how can use, development, and management of such resources be integrated, even if this was technically possible? Is this realistically feasible? If the

environmental and ecosystem resources are to be considered, how can the water professionals and ministries handle such integration, which is often beyond their knowledge, expertise, and/or control? It should also be noted that water has linkages to all development sectors and social issues like poverty alleviation and regional income redistribution. It is simply unthinkable and totally impractical to bring them under one roof in the guise of integration, irrespective of how it is defined. Such integrations are most likely to compound the complexities of the problems, instead of solving them. Some have argued that integrated water resources management is a journey, and not a destination, and the concept provides only a road map for the journey (National Water Resources Strategy, 2013).

It is argued that integrated water resources management has become a popular concept in recent years, but its application to more efficiently manage macro- and meso-scale water policies, programs, and projects has been dismal. Conceptual attraction by itself is not enough: concepts, if they are to have any validity, must be implementable to find better and more efficient solutions. This is not only happening at present, but also there are no signs that the situation is likely to change in the foreseeable future (National Water Resources Strategy, 2013). It is also necessary to ask a very fundamental question: why it has not been possible to properly implement a concept that has been around for some two generations in the real world for macro- and meso-level water projects and programmes?

The question then arises is whether the concept of integrated water resources management is a universal solution as its many proponents currently claim, or it is a concept that has limited implementation potential, irrespective of its conceptual attractiveness and current popularity? Unless the concept on integrated water resources management can actually be applied in the real world to demonstrably improve the existing water management practices, its current popularity and extensive endorsements by international institutions become irrelevant (Jimenez & Takashi, 2008) . The systems of governance, legal frameworks, decision-making processes, and types and effectiveness of institutions often differs from one country to another in very significant ways. Accordingly, and under such diverse conditions, one fundamental question that needs to be asked is that if it is possible for single paradigm of integrated water resources management to

encompass all countries, or even regions, with diverse physical, economic, social, cultural, and legal conditions?

Can a single paradigm of integrated water resources management be equally valid for an economic giant like the United States, technological powerhouse like Japan, and for countries with diverse conditions as Brazil, Bhutan, or Burkino Fasso? Can a single concept be equally applicable for Asian values, African traditions, Japanese culture, Western civilization, Islamic customs, and emerging economies of Eastern Europe? Can any general paradigm be equally valid for monsoon and non-monsoon countries, deserts and very wet regions, and countries in tropical, sub-tropical, and temperate regions, with very different climate, institutional, legal, and environmental regimes? The answer most probably is likely to be no (National Water Strategy, 2013).

2.7 DEPARTMENT OF WATER AND SANITATION: ETHEKWINI MUNICIPALITY

EThekwini Water and Sanitation is a unit of the eThekwini municipality and is responsible for the provision of water and sanitation services to all customers in the municipality. The Unit is continually looking for new and innovative ways to provide services to their customers and has been recognised through many awards and acknowledgements.

Initiatives such as free basic water, flow limiters, the use of plastic bodied water meters, polypropylene water piping, ground tanks and semi-pressure water service levels, urine diversion toilets, anaerobic baffled reactors, the use of grey water for urban agriculture, customer services agents, condominium sewerage and a customer water debt repayment policy were first introduced to South Africa here. The Unit has been able to use Geographical Information System (GIS) based tools, specifically developed call centre, electronic workflow and document management software to further improve service delivery.

Their key priorities at present include, eradicating the backlog in the provision of water and sanitation services:

- The water backlog has been reduced to 15% of what it was in 1996; the sewerage backlog stands at approximately 50% of the 1996 figure;
- Reducing non-revenue water from the present level of 30% to 25%, over the next 5 years.
- Improving our asset management systems;
- Training young graduates in engineering and retaining our skilled staff to respond to the shortage of engineers and professional skills in SA;
- Improving our performance management systems; and
- Improving customer services and services payment levels, which are currently just over 90%.

2.8 CONCLUSION

This chapter provided the reader with a background and an idea of the context in which the water scarcity issues are situated in South Africa and the policy context. It presented an analysis of the National Water Resources Strategy (2013). It is important when dealing with water scarcity research to understand its context and state in the country. This chapter provided an understanding of what the Department of Water and Sanitation in eThekweni Municipality was currently doing. The next chapter presents a review of literature and the conceptual framework of the study.

CHAPTER THREE

CONCEPTUAL FRAMEWORK

3.1 INTRODUCTION

This study will be reviewing the literature, thus providing the reader with a picture of the state of knowledge of this topic being investigated and bringing together empirical evidence relating to this study. By exploring the above areas of literature, a significant contribution will be made to this study. This chapter will have two sections: the first being governance, the second being water service provision. At the core of this discussion, much emphasis will be placed on the governance and how one defines what governance and its purpose is, especially beyond management interventions and enforcement of law. Included in the first section in the literature review under the governance section, will be a discussion on how governance takes place at multiple levels in society and through multiple processes. The multilevel pathways of governance, which are influenced by both institutionalised governance mechanisms, such as regulations, and non-institutionalised mechanisms such as norms and principles (Meissner and Jacobs 2014).

The central role of water to all life on earth is important. This natural resource is important for the welfare of all humankind socially, as well as economically, and is needed for the healthy functioning of the world's ecosystems (UNDP, 2004; Batchelor, 2007; Dukhovny, 2009). However, water is seen as a catalytic entry point to help developing countries deal with poverty and hunger, maintain human health, reduce child mortality and both manage and protect their

natural resources (UNDP, 2012). The role of water and its associated intrinsic value of sanitation in poverty eradication are recognised under Target 10 of the Millennium Development Goals (MDGs), namely, to “Halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation” (UNDP 2003; Folifac, 2006).

A number of studies indicate that water challenges that mainly reflect a crisis in governance (Al-Eryani, 2002; GWP, 2003; Solanes and Jouravlev, 2003; Plummer and Slaymaker, 2007; Miranda et al., 2011), hence, severe scarcity seldom results from natural limitations or insufficient funds or technical support, but rather from intense water governance failures (UNDP, 2004; Plummer and Slaymaker, 2007; Miranda *et al.*, 2011). This implies that problems arise from how individuals and societies have assigned value to and managed the water resources available to them (Solanes and Jouravlev, 2006). Plummer and Slaymaker (2007) concur by saying that challenges concerning failure to properly use policy instruments interactively in the water sector are water governance challenges. It is therefore of vital importance to this study that the review of literature begins with the wider topic of water governance, and its purpose, on a global as well as a local scale. It is also important to understand governance and water governance specifically and that each of these concepts is a discipline in its own right, therefore it is necessary to describe and define them individually in order to emphasise and establish their relationship.

3.2 DEFINING GOVERNANCE

Governance is defined as (often non-harmonious) interactive socio-economic and political forms of governing (Rhodes 1996; Meissner et al. 2013) between various non-state and state actors, including individuals, to create opportunities and solve problems in society (Kooiman et al. 2008). To reiterate: during this governance process, both institutionalised and non-institutionalised mechanisms are at play. Paproski (1993) defines governance as the management process which involves interaction between the public sector and the various actors in civil society (see also Harpham and Boateng, 1997). On the other hand, the United Nations (2006) assert that a more inclusive and more precise definition of governance is that of Hirst (2000)

mentioned it as a means of creating an effective political framework conducive to private economic action. Hirst (2000), furthermore, states that good governance includes stable governments, clear laws, well-organized State administration modified to the roles that governments can perform, and a strong civil society, which is free from the state's influence (UN, 2006).

According to the United Nations Development Programme (UNDP, 2013), good governance incorporates four poverty-centred dimensions, namely, political, economic, social and environmental. Governance, as applied to water however is defined differently by various users but the most widely accepted definition of water governance was one given by the Global Water Partnership (2003), stating that water governance comprises of a range of political, social, economic and administrative systems that are in place to develop and manage water resources, and manage the delivery of water services at different levels of society.

Numerous other authors have incorporated a similar definition (Rogers and Hall, 2003; JCWRE, 2006; Plummer and Slaymaker, 2007). Expanding from the GWP's definition, Castro (2007 p.107) states that water governance involves interactions between governments, businesses, political parties, civil and other organizations representing sector interests, international agencies, NGOs and other relevant power holders. According to the UNDP (2013), it is important to note that the water sector is part of the wider social, political and economic development of a country and therefore such developmental decisions impact on the water sector as a whole. According to Castro (2007), a high level of advancement has been reached in water-related fields of science and technology however it is still going to take some time for anyone to understand the historical, cultural, socio-economic and political processes underpinning water governance and hence, the water crisis. Castro (2007 p.99) thus concludes that achieving water governance that is grounded on the principles of equity and sustainability is by far the most cause for concern in the water sector today.

3.3 THE IMPORTANCE OF WATER GOVERNANCE

Water governance recognizes that water plays an important role in poverty reduction and the economic development of a country and hence emphasizes the importance of the responsible use of water resources in order to ensure efficiency (UNDP, 2013). The country's water governance system shows significant elements of fragmentation (Tewari, 2009; DWA, 2011; Movik and de Jong, 2011). In many areas there is a high level of disintegration between water stakeholders and various sectors that impact on water resources (Ashton et al., 2006; Naster and Hansen, 2009; Movik and de Jong, 2011). A handful of studies have revealed that this is partially due to the legacy of the previous water legislation, in which water resource management was highly centralised and did not allow civil society to influence decision-making (Naster and Hansen, 2009; Tewari, 2009; du Toit et al., 2011; Movik and de Jong, 2011; Quinn, 2013). In addition, recent studies show that there are two main factors underpinning the problems of policy implementation, these being the incomplete sector/institutional reforms that were imagined in the new National Water Policy and the performance of the Department of Water Affairs (DWA) itself (Woodwill, 2010; du Toit et al., 2011; DWA, 2011; Schreiner, 2013). Various factors have been found to contribute to the delay in implementation, but most significantly it is the lack of public involvement and insufficient representation of local stakeholders and their vested interests, in particular, the poor and disadvantaged groups (DWA, 1999; Naster and Hansen, 2009; Pollard and du Toit, 2010; Carden and Armitage, 2013). This highlights a need for more research to be undertaken on integrative instruments that will allow for greater coordination and enhanced stakeholder participation and which will also fast track the establishment of the current sector reforms, thereby facilitating the implementation of the NWA (du Toit et al., 2011).

The above section has shown the importance of water governance and has especially emphasized the important link for the South African case between good governance and poverty reduction. According to Pollard and du Toit (2008), coordination between various water institutions and other sectors related to water management is crucial in achieving effective water governance.

As promised by the country's first democratically elected government (1994) and new Constitution (1996), equitable access to basic services and related infrastructures, including water, sanitation, electricity and roads, has been paramount to this vision (Tissington, 2010).

Today, South Africa continues to undergo considerable social, economic and political transformation – from land reform and housing development to improving and extending services infrastructure (Rodina and Harris, 2016). The transformation from apartheid to democracy-based local governments subsequently led to the establishment of district municipalities, who then took over the responsibility for water and sanitation services and attained the water services authority status. The government of national then unity promulgated and established a few statutory frameworks to ensure proper service delivery and transformation in the local government sphere (Rodina and Harris, 2016).

The uptake of the new Constitution of the Republic of South Africa of 1996 hurried up the transformation of sectors of the public service and was guided by the different policies and legislative instruments. Section One of the Constitution of 1996 requires that, all public services be transformed and democratised in accordance with the values of human dignity, the achievement of equality and the advancement of human rights and freedom. However, local government is still faced with the challenge of poor service delivery, lack of infrastructure and identification of appropriate vehicles for effective and efficient service delivery. Meyer (2006: 6) supports the establishment of an enabling environment for the development of water resources for sustainable development.

It has been established that local government is the sphere of government closest to the people and it is directly responsible to the needs of different communities. Section 152 of the Constitution of the Republic of South Africa states that, one of the objectives of local government is to ensure the provision of services in a sustainable manner, while Section 27(1)(b) goes on to state that the citizenry must have the “right of access to sufficient water”. Local government faces the challenge of making sure that water is available to communities regardless of whether it is ground water, from springs or portable water. The right of access to clean and sufficient water is a constitutional requirement.

In acknowledgment of this right, the South African government is committed to provide adequate water and sanitation services. This was confirmed when it introduced the concept of

“Partnership for Community Investment” by means of which available funds are to be used to improve community services, including water and sanitation in rural areas (Thabethe, 2011). Although it has been put on hold for a long time by the international community, supplying water and sanitation in rural areas should be at the top of the list of priorities in the fight against poverty (Thabethe, 2011). The role of any municipality is to control some water resource infrastructure such as dams, boreholes and bulk water supply schemes; supply water and sanitation to consumers and operate wastewater collection and treatment systems (WSA, 2007: 4). However, water systems are complex and compounded and often go beyond the boundaries of municipalities, provinces and countries (Pollitt 2011:8). This therefore requires joint water governance by all involved in the management of this resource. According to Rowston (2006: 13), other national government departments have the general responsibility to support the DWA, as the water services sector leader, in fulfilling its policy, regulatory, support and information management roles (DWAF, 2003: 23). In addition to this general responsibility, certain national government departments have specific responsibilities with respect to water services.

The difference between water management and water governance is in the control function (Grigg, 2011; UNDP, 2013). In order to ensure that the needs of society and the environment are met water management need to manage and check the usage of water resources (Grigg, 2011), and while on the other hand water governance controls water management to ensure that it fulfils its function (Grigg, 2011). Grigg (2011) and Hoekstra (2011) state that enough water can be provided to meet the needs of the environment and humans through perfectly coordinated manner, which will ensure equitable access, efficient use and sustainability of water resources. Knowing the distinction between water governance and water management, it is clear that an improved coordination of effective water governance is important and carries the need of a coordinated water management, whereby the contribution of all stakeholders, including the impoverished communities is wanted.

As mentioned in the previous chapter it’s important to note that one important factor for effective water governance is water governance capacity. According to IUCN (2009), a precondition for good water governance is its capacity to implement effective water arrangements and reforms.

Water governance capacity (also known as governability) is defined as the society's ability to implement effective water arrangements through policies, laws, institutions, regulations and compliance mechanisms (Kauzya, 2002; MacKay et al., 2004; Plummer and Slaymaker, 2007; IUCN, 2009).

IUCN (2009) further adds that in order to achieve a system of effective water governance, it is necessary for a country to develop all of the components of water governance capacity (policies, laws and institutions and the four dimensions of effective water governance, namely, the social, political, economic and environmental dimensions) and to implement them effectively.

Clear policies are needed when dealing with water governance. A well-established legal structure, appropriated and enough financial and human resources for water provision activities, efficient institutions, and dedicated water professionals doing their allocated roles. There is a need for improved access to information and most of all, interconnected policy instruments in order to allow for effective water governance (Plummer and Slaymaker, 2007).

3.4 WATER SERVICE PROVISION

The current water challenges facing the country can only be described through the lens of history. The apartheid years (1948-1994), fuelled by the rationale of racial segregation, has built the country's access to and development of its water resources (Naidoo and Constantinides, 2009). According to Naidoo and Constantinides (2009) they confirm that policies within the apartheid era were distorted towards the privatisation of water for commercial agriculture, a sector which has been dominated by white South Africans. The white South Africans owned eighty three percent of South Africa's arable land and who used more than 54% of the country's available water. Stein (2005) also supports this view by stating that during the apartheid years water was allocated on racial grounds and distribution was linked to access to land.

Furthermore Naidoo and Constantinides (2009) state that social engineering during the apartheid era resulted in expensive inter-basin transfer schemes as major industries were located away

from the major rivers (Naidoo and Constantinides, 2009). In addition, a clear consequence of apartheid was the differential domestic services based on a race system, resulting in reasonable water infrastructure being implemented in former white suburbs and a complete lack of water infrastructure in black townships (Naidoo and Constantinides, 2009).

The inception of democracy within South Africa resulted in the implementation of the Water Services Act (Act 107 of 1998) which was to inform all decision making around treated water and the National Water Act (Act 36 of 1998) (Naidoo and Constantinides, 2009). These Acts have made a platform for the managing of water within the country as they state that the Minister of Water Affairs is the custodian of all waters and water resources on behalf of the country (Stein, 2005). The National Water Act (Act 36 of 1998) has had a huge impact on the way in which water is managed in the country through the implementation of a public rights system to water provision rather than the former private rights system and this has resulted in the disassembling of water ownership and water rights (Stein, 2005; Naidoo and Constantinides, 2009).

With respect to water provision, South Africa has to ensure equality to all citizens in terms of their demand for water and according to Stein (2005) the country has to consider social, economic and environmental factors. The National Water Act (Act 36 of 1998) shifts the view of water management from the former supply side management to demand management (Stein, 2005). The post-apartheid government has now found itself in the undesirable position of the country becoming increasingly water scarce, with increasing water demands greater than the existing supply levels (Pott et al., 2009).

Water services are managed by the local government, the water supply is the fastest growing sector of national water demand. It reflects population growth and the increasing living standards (van Rooyen 2008). The success of municipal water services management has crucial consequences for national water security now and increasingly in the future. Handling water services also has different dimensions: managing water demand through effective metering and tariff systems, promoting efficient use and minimizing losses, and safeguarding the quality of

return flows of treated wastewater so that surface and groundwater systems remain fit for use. A strong commitment to infrastructure development and spending on servicing subsidies has achieved impressive results in South Africa. Government figures show that in 2009 water services infrastructure had been extended to 96 percent of the population, up from 59 percent in 1994 (DWAF 2009a). The new water services infrastructure reached far more people since 1994 in the country than the total population of other African countries such as Angola and international such as the Netherlands. Many more people are benefiting from improved sanitation facilities in South Africa than the total population of Zambia. Even more outstanding, is that the majority of new toilets in South Africa are flush toilets provided in new housing developments.

Most municipalities have opted for a technocratic, top-down approach to delivery, with decisions taken and implemented with little public involvement. However, many municipalities lack the skills to succeed with a technocratic approach. In too many times, this has actually led to services not being delivered or poor quality infrastructure without the resources to keep it functioning. Government places a high regard on meeting service delivery targets for distributive justice has, however, not been achieved at a high cost. As Seddon (2008) points out, target driven approaches to service delivery inherently divert resources from areas not targeted, compromising overall performance.

In South Africa, widespread evidence shows that high importance has been placed on new service connections, which has therefore led to neglected maintenance of existing infrastructure and lack of capacity in bulk infrastructure, causing service failures and bottlenecks. Perhaps more importantly, pressure to meet delivery deadlines have limited local engagement on service options, preferences, and approaches and marginalised the intended beneficiaries. Service delivery has been prioritized and largely removing people from any role in holding local government accountable for service delivery (Friedman 2006). Furthermore, the roles and responsibilities of individuals in supporting sustainable service provision are not always agreed on or understood. Many community members complain that services are not affordable; they costly and causing them to accrue debt. Public accountability relationships among different

spheres of government are emphasized over relationships between municipalities and service providers: few agreements stipulating performance parameters are in place between municipal seniors and their own technical services departments or external service providers. Vast water services achievements in the first 10 years of democracy in South Africa can be compromised in the second decade if swift measures are not taken to mitigate the consequences of the current supply-driven approach to service provision. South Africa's state-centric approach to service delivery is top-down, target driven, supply-led, and generously grant funded.

Local government is responsible for service delivery, but debate is growing over service provider arrangements. Sector skills are dispersed across several hundred municipal water services providers the majority being municipal technical services departments with considerable disintegration and high overheads. Debates are held that are centred on how best to consolidate capacity to maximize scale economies and promote effective governance without introducing new risks and discontinuities. Lasting improvement in performance outcomes requires institutional reform at a range of levels such as recruiting necessary skills and competencies, emphasizing performance contracts and service delivery outcomes, ring-fencing water finances and administration, respecting the roles of officials and councillors, arranging partnerships with public, private and establishing separate utilities, among others.

Municipalities need to appoint managers, supervisors, and work operators with the appropriate professional and technical expertise which is a clear requirement. The Department of Water Affairs is now seeing the need of regulating the competencies of critical water services personnel such as the option to introduce mandatory minimum qualifications for senior water services staff, possibly linked to accreditation through a relevant body (Muller 2009). Muller asserts that most municipalities take on service provision without certainty and without considering what arrangements might best serve the needs of their constituents. The norms and conditions of the process for deciding on municipal services mechanisms are plainly detailed in Section seventy eight of the Local Government: Municipal Systems Act of 2000. Framed amid strong organized labour opposition to the privatization of municipal services, Section seventy eight is intended to

discourage outsourcing by requiring careful consideration of how to enable in-house service provision. Section seventy eight, however, does not always serve the public interest.

Countless municipalities need to recognise that they lack the capacity to deliver effective and affordable services. Most municipalities have a non-municipal service provider a small enterprise in the local area, service partners and a professional utility that might offer a better service. According to the Municipal Systems Act of 2000, it favours the appointment of internal water services providers through requiring the municipality to assess, for example, whether it could reorganize its administration to develop the necessary human resource capacity to provide the service.

3.5 CONCLUSION

In conclusion, this chapter served to establish a foundation for understanding South Africa's water governance and water service provision. In addition, it reiterates the central role of water to all life on earth. The chapter also emphasized responsibility, relationships in the water sector, frameworks in the water sector, and relations among the spheres of government such as national, provincial, local and between municipalities and their service providers.

This chapter also expanded on the topic by discussing the accountability mechanisms between citizens and service provider's and their political representative's long-route responsibility which are poorly developed and perhaps atrophying. South Africa is a young democracy and citizens' awareness of their own rights and power is still growing; building awareness of rights and responsibilities will take time. A sobering reminder of the task ahead lies in the findings of a consumer survey (Sigodi, Marah and Martin, 2007): "roughly, half of the citizens surveyed had never heard of the Constitution, the majority were not aware of Free Basic Water, and there was significant confusion about the meaning of rights".

For the purpose of this study, the researcher discussed governance as an interactive socio-economic and political form of governing between various non-state and state actors. This includes individuals who create opportunities and solve problems in a society (Rhodes 1996;

Meissner et al. 2013). The study also looked at Paproski (1993) who defines governance as the management process which involves interaction between the public sector and the various actors, in civil in a society.

Overall, the chapter looked at the importance of water governance which has to recognize that water plays an important role in poverty reduction and the economic development of a country; hence the researcher emphasized the importance of the responsible use of water resources, in order to ensure efficiency. The researcher also discussed how local government was the sphere of government closest to the people and should be directly responsive to the needs of different communities. The next section presents the research methodology.

CHAPTER FOUR

RESEARCH METHODOLOGY AND DESIGN

4.1 INTRODUCTION

Research methodology is one of the most significant sections of any research study. The researcher has to choose which method is best suited to the study in order to answer questions posed to meet the study's objectives. The purpose of this chapter is to introduce the empirical techniques applied in the study and to describe the qualitative research approach that was followed to address the research objectives already presented. An ultimate plan for collecting and utilizing data is also significant in any study in order that the desired and relevant information is obtained with sufficient precision, in relation to methods utilized, in order to provide a precisely completed research paper (Bell, 2010). In this chapter the research design is discussed and the researcher outlines the methodology that was pursued in this study to evaluate the role of the state and non-state actors in mitigating water shortages. The sources of data and participants, the data collection methods and analysis process are also discussed. Lastly, the ethical issues pertinent to the study are considered.

4.2 RESEARCH DESIGN

The purpose of research is to discover answers to questions by applying scientific methods or certain procedures. Each research has its own methodology and procedures in order to complete the objectives and answer the questions set at the beginning. There are two common types of research design, namely quantitative and qualitative (Creswell, 2013). Quantitative research is based on the quantitative measurements of some characteristics. It is applicable to phenomena

that can be expressed in terms of quantities (Creswell, 2013). On the other hand, qualitative research refers to the meanings, concepts, definitions, characteristics, metaphors, symbols and descriptions of things (Gray, 2014). There is also a mixed-method research design which resides in the middle of this continuum because it incorporates elements of both qualitative and quantitative approaches (Creswell, 2013).

This study used a qualitative research design. Qualitative research means to explore and understand the meaning of social or human problems, and this process of research involves emerging questions and procedures. Data is typically collected in the respondents' settings. This study has taken on the constructivist perspective taking which views knowledge as socially constructed and may change depending on the circumstances. Crotty (1998) defined constructivism from the social perspectives as the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context. In any qualitative research, the aim is to engage in research that probes for deeper understanding rather than examining surface features (Johnson, 1995).

The constructivist notion is that reality is changing, whether the observer wishes it or not (Hippis, 1993), and is an indication of multiple or possibly diverse constructions of reality. Constructivism values multiple realities that people have in their minds, therefore, to acquire valid and reliable multiple and diverse realities, multiple methods of searching or gathering data are in order. This study used a case study as a strategy of enquiry; one of the features of a case study research is its flexibility. The term case study is strongly associated with qualitative research, partly because a case allows for the generation of multiple perspectives either through multiple data collection methods, or through the creation of multiple accounts from a single method (Lewis, 2003). The integration and contrasting of different perspectives can build up a rich and detailed understanding of a context.

As Punch (2005) asserts, a case is not easy to define since almost anything can serve as a case, hence, adjustments can be made during the data collection method process by deciding to make use of additional data sources (Gray, 2014). A case study approach is also commonly useful for

understudied concepts (Yin, 2009). The unit of analysis for this study will be the eThekweni Energy Office dealing with renewable energy resources.

4.3 DATA SOURCES

The following sections discuss two types of data sources, namely primary data sources and secondary data sources. The significance of the use of secondary data sources is to firstly justify the need for the study. The purpose of secondary data is also to draw on the relevant literature to provide an understanding of the nature of the study and the primary data which forms the core of the study (Saunders et al., 2009). In order for the study to be comprehensive and cohesive, secondary data sources and primary data sources must be interlinked. These two types of data sources are further discussed below. The main data collection techniques used in this study were the literature review, interviews and documentary evidence. Using various data sources facilitates the reliability of the study's findings (Creswell, 2009). All the data collected were informed by the aim and objectives outlined in Chapter one.

4.3.1 Secondary data sources

Secondary data used for this study included books and journal articles that underpinned the study's conceptual and theoretical framework. Secondary data is the data that has already been collected by researchers and is readily available from other sources (Saunders et al., 2009). Secondary data is not only used in order to address the specific issues that the study strives to address, but it can also be used to highlight general issues in that particular field of study by discussing a broad theoretical framework attached to the study (Bless et al., 2000). This study used secondary data to construct the introduction and the background of the study. The following paragraph discusses the primary data sources used in the study.

4.3.2 Primary data sources

There are many different types of primary data such as observations, interviews, documents and audio-visual material. This study used interviews (face-to-face, semi-structured interviews) these

are useful when participants cannot be observed directly and that participants can provide historical information as well as sufficiently detailed and rich textual material. Lastly it allows the researcher control over the line of questioning (Creswell, 2013).

Semi-structured interviews are commonly defined by their conversational nature. Such a conversational approach means that each interview varies according to the interests, experiences and views of interviewees (Creswell, 2013). Respondents are able to discuss issues from their perspective in their own words, and are able to explain and elaborate further when necessary (Gary, 2014).

To increase the reliability of research results, further data were extracted from policy documents. An important source of data used in this study was found in documents such as the Integrated Development Plan (eThekweni Municipality, 2014/2015), the Durban Climate Change Strategy (2014). Documents can be accessed at a time convenient to the researcher. Documents represent data that is rich, especially where participants have given attention to compiling them as written evidence; it saves a researcher the time and expense of transcribing (Creswell, 2013).

4.4 PRIMARY DATA COLLECTION TOOLS

The researcher developed and used an interview protocol for asking questions and recording answers during a qualitative interview. The interview protocol included the following components: a heading, instructions that the interviewer would follow so that standard procedures were used for each interview. It also included spaces between the questions to record responses and, lastly, a final thank-you statement to acknowledge the time the interviewee spent during the interview (Creswell, 2013). The researcher recorded the information from interviews by making handwritten notes; a log was developed to keep a record of documents collected for analysis for the qualitative study. A log contains information that represents primary material (i.e., information directly from the people).

As already stated the researcher in this study used a semi-structured interviewing technique in order to obtain primary data. King and Horrocks (2010), state that interviews are effective when a researcher wants to collect in depth information about the subject at hand. In this study seven semi-structured interviews were conducted in the form of face-to-face interviews. According to Sekaran and Bougie (2010) face-to-face interviews are important in qualitative research as they allow the researcher to capture feelings and facial expressions of the participants. The open-ended nature of the question defines the topic under investigation but provides opportunities for both interviewer and interviewee to discuss some topics in greater detail than in structured interviews. If the interview schedule is too tightly structured this may not enable the phenomena under investigation to be explored in terms of either breadth or depth. All interviews were recorded in order to allow the researcher to pay full attention to the respondents by not having to take notes during the interviews. A further advantage of recording the interviews was to ensure that all information was captured in detail, and also to simplify the process of transcribing the interviews. Steward and Shamdasani (1990) believe that voice recorders are valuable as data collection tool; however they tend to pick up background sounds. A voice recorder was set up before the interview began and it was visible to the participant.

The interview schedule compiled for the semi-structured interviews included 30 questions (see appendix A). All interviews were recorded; completing an interview took approximately 45 minutes at the Water and Sanitation offices at the eThekweni Municipality during the 25th and 29th of September 2017. The interviewees were informed that the interview may take up to an hour. The researcher initially planned to conduct only twelve interviews, however, during the interview process the interviewer identified only ten potential interviewees. See appendix A for interview questions and the structure of the schedule.

4.4.1. Sampling

A population can be defined as including all people or items with the characteristic that the researcher wishes to understand (Richards, 2009), and a sample is a subset of a population (Creswell, 2009). A population in other words, can be an entire set of elements that have certain common attributes, all well-defined by the sampling criteria and well selected by the researcher

(Sekaran and Bougie, 2010). The population in this study consisted of the eThekwini Water and Sanitation Department staff and a community representative of the water catchment forum. The population included the eThekwini Water and Sanitation Department staff because they play an important role in renewable energy projects. The table below shows the projects and services in which the eThekwini water and Sanitation Department is involved.

Table 4.1: eThekwini Water and Sanitation Department Services

Services
1. Acceptance of Wastewater for Disposal
2. Clearance of Sewer Blockages
3. Emptying of Septic tanks and Conservancy tanks
4. Emptying of VIPS
5. Provision of Potable Water
6. Provision of Ventilated Improved Pit Latrines (VIP)
7. Provision of Water Borne Sewerage
8. Provision Sanitation Informal Settlements
9. Septic Tanks Information
10. The Durban Water Recycling Project

Source: eThekwini Water and Sanitation Department

Qualitative research usually works with purposive, non-probability samples because it seeks to obtain insights into particular practices that exist in a specific location, context and time (Gary, 2014). The study used non-probability sampling which is purposive because sometimes it is appropriate to select your own knowledge of the population, its elements and the nature of the research aims (Babbie & Mouton, 2001). Purposive sampling was used to select the sample because the researcher could use her own judgment in selecting cases that best enabled her to answer the research question and meet the objectives (Richards, 2009). According to Saunders et al. (2009), purposive sampling is often used when working with a small sample and when a researcher wants to use cases that are particularly informative. The sample used for this study is shown in Table 4.2 below.

Table 4.2: Interviewees' Details

Interviewee Number	Date	Position	Entity
Interviewee One	19 September 2017	Director	eThekwini Water and Sanitation
Interviewee Two	19 September 2017	Assistant Director	eThekwini Water and Sanitation
Interviewee Three	19 September 2017	Control Environmental Officer	eThekwini Water and Sanitation
Interviewee Four	19 September 2017	Environmental Officer	eThekwini Water and Sanitation
Interviewee Five	19 September 2017	Liaison officer	eThekwini Water and Sanitation
Interviewee Six	19 September 2017	Community development Officer	eThekwini Water and Sanitation
Interviewee Seven	19 September 2017	Infrastructure Programme Manager	eThekwini Water and Sanitation
Interviewee Eight	19 September 2017	Engineer Technician	eThekwini Water and Sanitation
Interviewee Nine	19 September 2017	Engineer Production	eThekwini Water and Sanitation
Interviewee Ten	19 September 2017	Water Catchment Management Forum	eThekwini Water and Sanitation

Source: Authors own

4.5 DOCUMENTS AND TEXTUAL ANALYSIS

Studies conducted by researchers and academics were reviewed as part of the study (see Chapter Three). Furthermore, published documents were used to support interview data. According to

Berg (2009), documentary evidence comes in the form of recorded documents such as written documents, recordings, or other form of media information. Documents used in this study are shown in the data Table 4.3 below.

Table 4.3: Data Documents

Name	Author	Year	Content
National water strategy	Department of Water Affairs	2013	Chapter 7: Water conservation and water demand management (WCWDM)
Water services development plan	EThekwini Municipality	2012	Part 3 : Policies and Practices for the delivery and management of water services provision and Priority Pillars and
Policies and practices of the eThekwini Municipality water and sanitation unit	EThekwini Municipality	2012	Policy Review
Durban Climate Change Strategy	Professor Roland Schulze, Nicci Diederichs Mander, Catherine Hughes, Dr. Andrew Mather	September 2014	Title: Durban Climate Change Strategy Water Theme Report

Source: Author's own

4.6 DATA ANALYSIS AND INTERPRETATION

In the data analysis and interpretation in general, the intention was to make sense out of text data. The main purpose of the data analysis was to integrate the information and data collected

through the various research methods to explore what had been done to mitigate the water shortages within the eThekweni Municipality. It involved segmenting and taking apart the data as well as putting it back together in the light of the research questions (Creswell, 2013). The data analysis in qualitative research proceeded together with, the data collection and the write up of findings (while interviews are going on, for example, the researcher may be analysing an interview done earlier). This process is unlike quantitative research in which the investigator collects the data, then analyses the information, and, finally, writes the report (Creswell, 2013).

The process of qualitative data analysis generally involves the development of data categories, allocating units of the original data to appropriate categories, and recognizing relationships within and between categories of data to produce well-grounded conclusions (Berg, 2009). This section presents the data analysis process undertaken in this study. The analysis relied on a combination of literature, interviews and documentary evidence and was conducted with the aim of producing results from the study and to show that the research results could be relied on and were valid.

The data analysis method adopted by this study was a qualitative content analysis, which is a method to analyse raw data. The thematic content analysis is a descriptive presentation of qualitative data (Anderson, 2007). According to Anderson, this method works effectively with Microsoft word, which is used as a substitute for the traditional style of cutting out transcription paper and pasting according to categories of analysis and then transcribing into text and converting to Microsoft word all of which make developing themes and analysis much easier (Leedy and Ormrod, 2014). This method enabled the researcher to develop codes which were utilized in order to develop themes to discuss in the analysis section.

In the data analysis stage the researcher transcribed the data, field notes from observation and reflective diaries, all of which were written up using a format that could be easily read. The recorded interviews were transcribed. While typing up the transcript although time consuming and laborious, it did help to develop familiarization with the data at an early stage (Gray, 2014). Because the text data is so dense and rich, not all the information could be used in this qualitative

study. Thus, in the analysis of the data, the researcher had to “winnow” the data (Guest, MacQueen, and Namey, 2012), a process of focusing in on some of the data and disregarding other parts of it. This process, too, is different from quantitative research in which researchers go to great lengths to preserve all of the data and reconstruct or replace missing data (Creswell, 2013).

A helpful conceptualization to advance in the methods section is that qualitative data analysis has proceeded at two levels: the first is the more general procedure in analysing the data and the second is the analysis steps embedded within specific qualitative designs. This study used a case study which involved a detailed description of the setting or individuals, followed by analysis of the data for themes or issues (Stake, 1995 and Wolcott, 1994). The researcher coded the data by organizing the data and writing a word representing a category in the margins (Rossman and Rallis, 2012).

Coding involves of seeking codes on topics that readers would expect to find, based on the past literature and common sense, codes that are surprising and that were not anticipated at the beginning of the study and codes that are unusual. The coding process generates a description of the setting or people as well as categories or themes for analysis. This analysis is useful in designing detailed descriptions for case studies. After this stage the researcher decides how the description and themes will be represented in the qualitative narrative. The most popular approach is to use a narrative passage to convey the findings of the analysis. Using the Microsoft search function, keyword frequencies and codes were created for this study. These codes were then used to create subtopics/themes to discuss in the analysis chapter. The discussions were supported by documents the researcher used. Through these discussions, key findings were identified and summarised. The final step in the data analysis involved interpreting the qualitative research findings or results (Creswell, 2013).

When checking for validity and reliability, the research used validity strategies such as peer debriefing to enhance the accuracy of the account. This process involves locating a person who could review and ask questions about the qualitative study so that the account would resonate with people other than the researcher. This strategy, involving an interpretation beyond the

researcher and invested in another person, adds validity to an account as the other person can highlight negative or discrepant information that runs counter to the themes. Most evidence will build a case for the theme; researchers can also present information that contradicts the general perspective of the theme. By presenting this contradictory evidence, the account becomes more realistic and more valid (Creswell, 2013).

4.7 SUBJECTIVITY ISSUES AND LIMITATIONS

The limitation of this type of study, when using interviews, is that they provided indirect information filtered through the views of interviewees. When using documents it required the researcher to seek out the information in hard-to-find places and materials may be incomplete or the documents may not be authentic or accurate. The limitations of this study were not being able to interview other stakeholders and project developers because the unit of analysis was the eThekweni Water and Sanitation Department, it was restricted to this one organization. The following paragraphs present a consideration of the ethics procedure that was followed when undertaking this study. Appendices for informed consent must be referred to.

4.8 ETHICAL CONSIDERATIONS

Ethical clearance was sought from the ethical clearance committee of the College of Law and Management Studies, University of KwaZulu-Natal, to ensure that the research complied with the University's code of conduct and ethical expectations of its research community. Before the interviews were conducted, a request to be interviewed had to be presented to each participant, both in written and oral form (See Appendix C). During the interview, the researcher explained the aims and objectives of the study. Consent was voluntary.

4.9 CONCLUSION

This chapter presented and discussed the methods and techniques that were utilized in conducting this qualitative study. It provided a concise overview of how this research had been conducted by employing a qualitative research approach, using a case study design which

enabled the researcher to obtain relevant information from the purposively sampled participants. This research used primary data involving semi-structured interviews and the use of proxy documents and secondary data in the form of books and journals to compile the literature chapter. This chapter presented the various steps that the researcher used to analyse the data; a discussion of the thematic analysis method which allows for rigorous interpretation of the collected data was also put forward. This chapter also discussed checking the validity of the study and, despite the limitations mentioned above; the study checked the validity and reliability of the data collected. The following chapter presents the results of the data collected.

CHAPTER FIVE

DISCUSSION OF FINDINGS AND ANALYSIS

5.1 INTRODUCTION

The role of the state and non-state actors in mitigating water shortages and the part that water plays in poverty alleviation and human development as represented through the millennium Development has been explored in previous chapters. This chapter continues from the previous chapters by providing an analysis of the primary data which was collected to address the objectives of this study. It has been established from the literature chapters that water is a crucial product for survival and the improvement of quality of life and that all societies require water both for basic survival and for economic development. The review of the literature, specifically in Chapter Two, considered the importance of water governance and has especially emphasized the important link for the South African case between, good governance and poverty reduction. This study focuses more particularly on the mitigation measures being taken. There are number of different units that focus on water conservation and mitigation measures in KwaZulu-Natal, The department of water and sanitation and the water catchment forum. These departments and forums support and provide services in different communities in eThekweni Municipality.

This chapter provides an insightful analysis of the responses gathered from the participants regarding the role of that the state and non-state actors play in mitigating water shortages. The data was analysed by considering the themes that emerged from the interviews. Five main themes emerged from the data, namely water governance, public participation, water conservation, partnerships and poverty eradication. The data is therefore presented according to these themes and sub themes. The first section of this chapter focuses on an analysis of the

Department of Water and Sanitation. This is aimed at providing an overview of what the Department of Water and Sanitation in eThekweni Municipality does to support and mitigate the water shortages. In this study there are key terms from the primary data collected that appear throughout the discussions, these terms include poverty reduction, service delivery and creating water conservation awareness. The chapter begins with an overview of the nature of the eThekweni water and Sanitation Department below.

5.2 THE NATURE OF ETHEKWINI MUNICIPALITY'S WATER AND SANITATION DEPARTMENT

It was mentioned in Chapter One that the eThekweni Water and Sanitation Department is a unit of the eThekweni municipality and is responsible for the provision of water and sanitation services to all customers in the municipality. The Unit is consistently searching for original and innovative ways to provide services to their clients. Their key priority currently is eliminating the backlog in providing water. The backlog of water has been reduced to 15% of what it was in the previous years. It was indicated in the literature chapter that South Africa is facing critical water constraints which play a major role in economic growth and shortages are currently an inconvenience for everyone in the country and are a serious South African reality. The country is the 30th driest country in the planet and has less water per person than countries widely considered being much drier, such as neighbouring Namibia and Botswana. This means that the government does not only have to solve the current water issues, but also the issues of the future. Pollit (2011) argues that the institutional complexity and fragmentation around water issues pose a huge challenge to government.

In order to understand the nature of the Water and Sanitation issues of the eThekweni Municipality, this study examine different facets of the unit. These facets included the purpose of the unit and how the unit operates. The following section presents insightful information in order to understand the eThekweni municipality's water and sanitation situation as a government office. The section also illustrates how the unit acts as a substitute to the conventional service providers in the community.

5.2.1 The Purpose of the Water and Sanitation Unit

The law of South Africa gives the obligation for the provision of water services, and the setting of tariffs to the local government sphere. The Water Services Act sets out a governing framework for various institutions tasked with supplying water services and providing diverse water services to institutions. The Director (September 2017) indicated that the water services provider had the role of physically providing the water supply and sanitation services to consumers, and that the eThekweni Municipality was the Water Services Authority (WSA) and the Water and Sanitation Unit was the Water Services Provider (WSP) for the Municipal area. The Director of the eThekweni Municipality Water and Sanitation (September 2017) expanded on the purpose of the Unit: “...*The Department of Water and Sanitation is the upholder of South Africa's water resources. It's actually responsible for the creation and application of policy governing the sector. And to make sure that all South Africans have access to clean drinkable water and dignified sanitation, the department also aims to promote effective and efficient water resource management to make sure we reach sustainable economic and social development.*”

The above discussion aimed to provide an overview of the nature of the eThekweni Municipality's Water and Sanitation Department, more particularly for this study. It is evident, as will be shown in the rest of the chapter that the Water and Sanitation unit plays a vital role in the provision of water and that their main purpose is based entirely on ensuring that they play their role in eradicating the backlog of water provision and in finding new and innovative ways of tackling the issue of the water shortages with which the country is faced. The discussions in the chapter will further unpack how the department plays a role in the current water constraints that the country is facing and what it will take to reach the goal.

5.3 THE IMPORTANCE OF WATER GOVERNANCE

This section aims to provide a precise discussion about the importance of water governance. As mentioned in the literature section, water governance acknowledges that water plays a crucial part in poverty alleviation and the economic development of a country and also stresses the

importance of the responsible use of water resources. According to the Department of Water Affairs (DWA, 2011), the country's water governance system shows significant elements of fragmentation. Regarding the importance of water governance in mitigating water shortages, this section draws on the South African constitution and water-related legislation as well as some of the issues related to water governance and the challenges to good water governance. As mentioned and discussed in Chapter Three, Section 3.3, there are numerous studies that show how the legacy of the previous water laws and WRM had been highly centralised and did not allow communities to influence decision-making (Naster and Hansen, 2009).

These challenges and issues are discussed in relation to the primary data collected from participants at the eThekweni municipality's Department of Water and Sanitation. In the opinion of the Director of the eThekweni Department of Water and Sanitation (September 2017), *"...challenges to good water governance are definitely the fragmentation and the change in the governance systems put in place and how they have matured over time."*

5.3.1 Evaluation of the governance system

The South African water governance system is motivated mainly by the Constitution, and water-related legislation; for example, the National Water Act and Water Services Act, administered by DWAF (Department of Water Affairs and Forestry) are core consideration. The Department of Water and Sanitation in eThekweni Municipality focuses specifically on the regulatory environment and practice, specifically from the perspective of water governance. According to the Water Research Commission (2017), "governance that is based on well-defined principles, tools and effective institutions are critical for the sustainable development and management of natural resources. Creating adequate and effective governance provisions form the basis for good management and custodianship of natural resources and, in particular, water. Vertical and horizontal linkages of institutions, policies, regulations and laws ensure improved management, service delivery and the meeting of broader economic, environmental and societal goals."

The Infrastructure Programme Manager (September 2017) explained: *"...The complete system of governance for water is a three-dimensional system of different elements that include the*

principles and obligation; it also includes the policies and legislation, regulatory framework, institutional arrangements and practice. It also includes levels from international, national, regional, local to community levels; and one must mention the responsibilities of government, non-government organizations and community.”

According to Rogers and Hall (2005), governance matters a great deal for economic, social and environmental outcomes. Some necessary conditions for good governance are inclusiveness, accountability, participation, transparency, predictability and responsiveness. The Director of the Water and Sanitation (September, 2017) believes that “...*the Department understands that for good governance and inclusion of all stakeholders in the various spheres it needs to achieve the objectives that have been set out; for example, participation and democratisation.*”

The above statement tells us that governance is about effectively implementing socially-acceptable allocations and regulations. This suggests that it is thus intensely political. According to Rogers and Hall (2005), governance is a more inclusive concept than government because it embraces the relationship between a society and its government. The authors mention that governance, generally, involves mediating behaviour via values, norms, and, where possible, through laws and that the concept of governance definitely encompasses laws, regulations and institutions but it also relates to government policies and networks of influence, including the private sector and civil society. However most respondents in this study mentioned that there were delays in the development of regulatory instruments and that practical implementation of these frameworks was not well developed. The technical engineer (2017) explained: “...*specific governance issues related to the water environment include governance of catchment management agencies at all levels, within a paradigm of cooperative, integrated, developmental and participatory management, and also governance considerations for the development of catchment management strategies through a consultative process and their alignment with local development planning (IDPs, WSDPs, and provincial planning processes.*”

The assistant Director, regarding the challenges to good water governance said: “...*some of the challenges include institutional change and decentralisation, changing management paradigm, transformation, communication and uncertainty, lastly technical and management capacity.*”

From the above responses and the discussion with the respondents, it was clear that the specific government issues (related to water governance) was the weakness of the consultative process with which this study will deal in the public participation section below. However, it is noteworthy to mention that different factors have been found to add to the delay, and as mentioned in the literature chapter under water governance, most importantly, is the lack of public involvement and inadequate representation of local stakeholders and their vested interests, especially, the impoverished and poor groups.

Hoekstra (2006) states that, “...achieving effective water governance demands a much broader approach that allows enhanced cooperation with other forms of governance. It is therefore important to note that, coordination can be internal and external in the context of water governance”. He expands and says that discussing good water governance does not only rest on the question of which tools are accessible or which arrangements water professionals can make to solve the water issues of today and of the future. Interviewee seven (September, 2017), stated that “...*one should address how various water stakeholders, and civil society as a whole, can manage their water resources in a coordinated manner.*”

According to Plummer and Slaymaker (2007), effective water governance has a much broader perspective than that of the water manager. In the literature chapter it is notably that water governance controls water management to ensure that it fulfils its function (Grigg, 2011). If the two work in a perfectly coordinated manner, enough water can be provided to meet human and environmental needs. This means ensuring the equitable access, efficient use and sustainability of water resources (Grigg, 2011; Hoekstra, 2011)?

The Director of the eThekweni municipality’s (September, 2017), expanded by saying, “...*one important factor for effective water governance is water governance capacity.*” According to

IUCN (2009), “a precondition for good water governance is its capacity to implement effective water arrangements and reforms. Water governance capacity is also known as governability and defined as a society’s ability to implement effective water arrangements through policies, laws, institutions, regulations and compliance mechanisms” (Plummer and Slaymaker, 2007; IUCN, 2009). Interviewee two (September, 2017), put forward the view that “...*to achieve good water governance we need to overcome these fragmentations and implement policies and strategies that can be practically used and touch on socio-economic issues.*”

IUCN (2009) confirms the above, and, as its mentioned in the literature chapter, in order to achieve a system of effective water governance, it is necessary for a country to develop all of the components of water governance. These are “*capacity policies, laws and institutions and the four dimensions of effective water governance, namely, the social, political, economic and environmental dimensions and to implement them effectively.*”

5.4 WATER CONSERVATION

Water conservation is highlighted in this chapter because it is regarded as a theme that emerged from the primary data collected from the eThekweni Department of Water and Sanitation for this study. The context concerning water conservation is therefore discussed below. This discussion aims to ascertain the Departments focus and extent of the inclusion of the millennium development goals within strategies and policies put in place to promote water conservation. According to Cody (2008), the result of climate change creates more uncertainty about future water availability; it is also evident that groundwater is being depleted and that the environment is placing demands on the freshwater supply. There is a strong need to minimise the loss or waste of water and to protect water resources. The following paragraphs discuss the primary data collected regarding the theme of water conservation.

The Director of the eThekweni Department of Water and Sanitation (September 2017) indicated that the departments priorities were also focused around awareness. The Director of eThekweni department of Water and Sanitation (September 2017) further explained by saying:

“...eThekweni Water and Sanitation Unit has developed various intervention strategies to mitigate the drought effects including awareness campaigns regarding the importance of conserving water.”

To emphasize the above ideal, the liaising officer of the eThekweni Department of Water and Sanitation (September 2017) said: *“...The campaigns have also raised awareness on the side of residents about the role water plays in social and economic development with the view of changing attitudes and behaviours of citizens. Community meetings have been held with ward councillors and print and electronic campaigns have been undertaken to ensure audibility of the water scarcity message.”*

Interviewee six (September 2017) reiterated the water-wise message, *“...to further spread the message of being water-wise, the eThekweni Water and Sanitation Unit will be erecting billboards, street pole posters and T-shirts with message of water conservation.”*

The above discussion shows that the state is interested and is taking part of finding solutions to the water crisis the KwaZulu-Natal region is facing and in the formulation phase of projects that will impact the community in a positive way. However, as mentioned in Chapter two Section 2.3, conservation in South Africa has historically been seen as a luxury and the problem of the wealthy, especially since almost all conservation efforts have been focused on the protected areas, which tend to be geographic, economic, and socio-political enclaves. Conservation therefore is a low priority in relation to other more pressing social issues on the political agenda.

Interviewee four (September 2017) emphasized awareness when saying: *“...it has become crucial for the Unit to extend and expand its awareness raising drive as part of its multi-pronged information dissemination approach. A report has been drafted that states our unit intends putting the drought messages on billboards, posters and T-shirts. The billboards and street poles will be placed strategically to attract the attention of drivers and pedestrians.”*

Interviewee six expanded on this and said “...*The T-shirts will serve the purpose of visible walking advertising and marketing. All these mediums will contain powerful and punchy messages about saving water. They will also add to the other efforts currently in place and will further increase the level of awareness of citizens of the continued quest to conserve water and be water-wise.*” By having posters and billboards emphasising the need to save water and use it wisely, will motivate people to act when they see a water leak or other wastage.

5.5 POVERTY ALLEVIATION

The National Water Resource Strategy explains out how it will achieve the core objectives, which are firstly water support and development pertaining to the elimination of poverty and inequality. Secondly, water has to contribute to the economy and also job creation, and, lastly, water has to be protected, used, developed, conserved, managed and controlled sustainably and equitably (National Water Strategy, 2013). One of the main objectives of the Department is to eradicate poverty in the eThekweni Municipality through water. It is indicated from the information gathered from the respondents in the study that South Africa has well developed water resources infrastructure, with more than 4 395 registered dams. However, these are fast approaching the full utilisation of accessible surface water yields, and are running out of suitable sites for new dams. This section aims to examine how the Department sees the problem and plays a role in the national goal of poverty alleviation.

The Infrastructure Programme Manager (2017) referred to job creation by saying: “...*there is actually an opportunity to create more green jobs in the country by focusing on areas of natural resource management.*” From the above discussion it is noteworthy to understand that with our increasing population, and focus on economic growth and development there is a need to ensure water security and healthy water ecosystems that support South Africa’s national imperatives (National Water Strategy, 2013). One of our national imperatives is to create more jobs as stipulated in the National Water Strategy (2013). This Strategy also responds to priorities set out by the government within the National Development Plan (NDP) and National Water Act imperatives that support sustainable development. The NWRS2 acknowledges that South Africa

is a water-stressed country and is facing a number of water challenges and concerns, which include security of supply, environmental degradation, resource pollution and the inefficient use of water.

According to the Director of the Water and Sanitation Department of eThekweni Municipality: *“Dealing with and providing basic services is a huge task, not only because of the backlog we have as a department but also the growing population. It’s a struggle to deliver, and privatising natural resources (such as water) is a disadvantage to the poor. I mean we can see that even around the world, privatisation has pushed up costs of services but one must mention that providing services to the millions of disadvantaged South Africans can present government and service providers with a good opportunity. We could become a world leader in sustainable development if we built new infrastructure, supported grey-water recycling, had waterless sewage, low-energy housing, just to name a few. Such innovations also create new job opportunities.”*

From the above discussion one can see that there is a need for the development of strategies that will use the water scarcity crisis together with the wish for sustainable natural resources use as a driver of job creation and economic development. According to Naidoo and Constantinides (2009), the current water dilemma facing South Africa can only be discussed through the lens of history, which is through the apartheid years (1948-1994), driven by the motive of racial segregation, water policies shaped the country’s access to and development of the water resources. The policies within this era were skewed towards the privatisation of water for commercial agriculture, a sector dominated by white South Africans, who owned eighty three percent of the country’s arable land, requiring more than fifty four percent of the country’s available water. Stein (2005) confirms this view when stating that during the apartheid era water was allocated on racial grounds and that the distribution was linked to access to land. In the same vein the Representative from the Water Catchment Management Forum (05 September 2017) indicated that the Department’s main focus was, *“...eradicating the backlog in the provision of water, the water backlog which was caused and impacted by the apartheid era.”*

The above discussions revealed the role of the Department of Water and Sanitation in the eradication of poverty through providing basic services within the eThekweni municipality. The primary data collected from the Department demonstrates the crucial role they play especially at local level; being the ones drafting and implementing policies. The discussion on public participation also attempts to illustrate that the Department does act as a ‘correcting device’ or second service provider in order to address issues such as the inclusion of the public in decision-making that affects the region. The following discussion is based on the theme that emerged while discussing the challenges and solutions that the department faces in the water governance sphere.

5.6 PUBLIC PARTICIPATION

According to Mwangi (2007) participation and partnerships between different actors such as your municipal authorities, central government agencies, NGOs, CBOs and the private sector is not a new phenomenon. Local participation can be defined as an organized opportunity where stakeholders voluntarily take part and where their voices can be heard in urban environmental management and the decision-making process. The Director of the Water and Sanitation Department, talking of these voices said: *“...we are guided by the IWRM of which places its emphasis on the role of the role of local actors, and implies how local governments should be in touch with the community’s needs, be more empowering, more effective in cooperative practices, and more cost-efficient than “higher” scales of governance.”*

According to Swai (2016), public participation in governance is an important pillar. In any democratic country worldwide, it is regarded as an integral part of social, economic and political activities. The involvement of the local community is important in bringing about local development. When people in the community participate in the decisions that affect their lives, they feel “attached” to the decisions and actively participate in the implementation process which increases a sense of ownership of the projects. According to Pateman (1970), participation is taken as a collective, sustained activity for the purpose of achieving common objectives, especially regarding a more equitable distribution of the benefits of development. Individuals

and groups are able to pursue conflicting interests and compete for scarce resources when they participate in the implementation process.

Interviewee six (September, 2017) mentioned catchment when saying: “...*we have a water catchment management forum that includes community members, private sector members and local government members, it’s actually a broad stakeholder participation in planning, implementing or improving catchment management plans and aims to effectively and efficiently manage naturally occurring water within catchment areas by managing or accounting for all aspects of the hydrological cycle. (For example, a catchment is the area or region which ‘catches’ the rainfall runoff flows with reference to a point on a river or drainage system.) Catchment management also aims to achieve a balance between resource protection and resource utilization.*”

Teorell (2006) mentions that participation in some form or the other has been included as an important element in development strategies of countries in sub-Saharan Africa. Indeed, participation has become an essential ingredient and a prerequisite of good governance. Development as a process of increasing people’s capacity to determine their future means that people need to be included in the process – the need to participate. Participation or empowerment is part of the process and definition of development. There is, therefore, growing consensus that people everywhere have a basic human right to take part in decisions that affect their lives, therefore participation is defined as a form of action performed by private citizens or a group of people which has the intention of influencing activities of the government or the decisions (Verba et al., 1995:38; Teorell, 2006). According to Pateman (1970), participation is taken as collective, sustained activity for the purpose of achieving common objectives, especially regarding a more equitable distribution of the benefits of development.

The majority of the interviewees and a community member of the water catchment management forum who confirmed to participate in the discussion to find solutions to the water crisis we are currently facing, said “...*there are few participants who said that they did not participate in the decision making process*”. The respondent said, “... *I participated in various meetings where*

several projects were initiated and further participated in the decision to prioritise water project.”

Public participation is the process by which parliament and provincial legislatures consult with the people and interested or affected individuals, organisations and government entities before making a decision. Public participation is a two-way communication and collaborative problem-solving mechanism with the goal of achieving representative and more acceptable decisions. Other terms sometimes used are ‘public involvement’, ‘community involvement’ or ‘stakeholder involvement’. According to the Water Resource Commission (2017), representative community and stakeholder participation, amongst other principles of integrated water resources management, across sectors needs to be strengthened.

Typical areas related to water management reforms and the related governance aspects will be covered thereafter these include cooperative governance at all levels, water sector legal frameworks and broader institutional arrangements, financing and pricing, civil society participation and the equitable provision of access and services. The sustainability of water systems ultimately depends on how we operate and manage these schemes or interventions.

5.7 PARTNERSHIPS

This section aims to examine the relationship status between the Department of Water and Sanitation and the local stakeholders regarding the partnerships that they have formed. The above sections focused on the importance of involving different stakeholders in their decision making processes or partnerships. This section explores these linkages and their importance in fuller detail. This section therefore starts by outlining partnerships or relationships between other stakeholders. Furthermore, the section focuses on examining relationships and partnerships between the department and the community in mitigating water shortages. This is one of the main focuses of this study, as outlined in the research objectives. This analysis assists the researcher in examining the relevance and role of the department in this regard. The following

paragraphs explore partnerships between the Department of Water and Sanitation and other stakeholders.

Partnerships among complementary organizations are very important because these organizations can learn from each other. With regard to this study, outlining partnerships between the Department of Water and Sanitation and other stakeholders is aimed at examining the uniqueness and effectiveness of the Department in the water sector.

Regarding partnerships with complementary organizations, the liaison officer (September 2017) said: *“...a Memorandum of Agreement has been signed between the eThekweni Municipality’s Water and Sanitation Department and the University of KwaZulu-Nata; the University’s Pollution Research Group (PRG) has stretched its activities into municipal water and wastewater management. These activities form the focus of a multi-disciplinary team that includes engineers, biologists, political scientists and community medical professionals, and have included participation in two European Union research projects related to membrane bioreactors and the identification and dissemination of best practice of water and sanitation supply to unserved communities.”*

Interviewee Five (September 2017) contended that partnership between the department and the research institutions could enhance the level of service delivery in the water sector in the eThekweni Municipality. Furthermore, Interviewee six stated that this partnership would stimulate the department’s ability to operate because of the research support the university would bring to the table. Interviewee ten from the Water Catchment Management Forum(September 2017) said: *“...but as I said before if there can be a partnership between the department and other key stakeholders in order to provide some of needs that the local municipality needs in terms of research”*. This shows that even the community member understood that partnerships were a relevant mechanism to achieve collective successful implementation of solutions towards the water shortages.

Interviewee seven (September, 2017), speaking of foreign investment said: *“...we have partnered up with the Bill and Melinda Gates Foundation and coming up with ground-breaking technologies seek to contribute positively to the climate-change-induced water crisis on a global scale. The technologies are designed to work off the sewer grid and will use minimal or no water or recycled waste water while at the same time providing the comfort of a normal flush toilet to residents. A report published by the Executive Committee said the Bill and Melinda Gates Foundation wish to play a significant role in solving world water challenges for the more than 2.5 billion people affected by poor or non-existent sanitation services. The Foundation has for the past five years funded an international grand challenge which seeks to reinvent toilet technologies.”*

From the above discussion the researcher gathered that the Foundation had selected eThekweni Municipality to test these new and original innovations, recognizing the Durban as a world leader in the sanitation field with the technical capacity and a proven track-record in innovation. According to the report, “the memorandum of agreement will be beneficial to eThekweni as the innovative toilets, that would meet the aspirational needs of the poor, will be tested in communities in eThekweni for the first time. The toilets will significantly reduce water consumption and pressure on the environment. All technology testing funding will be provided by the Bill and Melinda Gate Foundation. The Department will provide local liaison expertise and access to community sites.”

Interviewee six, when expressing views about ecosystems said: *“...they have formed a partnership with the South African National Biodiversity Institute to catalyse a new partnership initiative aimed at unlocking the potential of natural ecosystems in the water security equation. And we also attended a workshop that provided evidence of the critical role that ecological infrastructure can play in improving the overall state of the water resource in the catchment, while simultaneously providing job creation opportunities through the restoration and maintenance of the ecological infrastructure.”*

Five years ago, 75 participants from 35 organisations representing the three spheres of government, namely communities, universities and the private sector gathered at a workshop that was highly important for social and economic resilience in the areas of jurisdiction of the eThekweni Municipality, the uMgungundlovu Municipality and adjacent areas. *“Our current strategies aimed at securing water of sufficient quantity and quality to address the vulnerability of our people and the economy need to be reviewed”*, said the director of the Department of Water and Sanitation of the eThekweni municipality. Furthermore he added that *“...Durban’s defence against poor water quality is rapidly eroding due to the state of the catchment. Information presented at the workshop highlighted the many challenges in the catchment resulting from inappropriate agricultural practices, industrial pollutants, faulty sewerage works and other practices that are leading to excessive mud/sediments and pollution in rivers as well as significant water losses to thirsty invasive plant/tree species.”*

Interviewee nine (September, 2017) said, *“...Key stakeholders will be invited to join the partnership which is due to be launched mid-year.”* Interviewee six (September, 2017) also stressed that, *“... I pictured that an uMngeni Ecological Infrastructure Partnership would not replace or duplicate existing institutions such as the catchment management forums, but rather focus on the contribution that ecological infrastructure could make to the overall catchment management strategy.”*

While engineering solutions have provided a great deal of improvements in development and human well-being, they alone are unlikely to help deal with the water security challenges as well as the uncertainty posed by climate change. Healthy intact ecosystems that are dependent on the rich biodiversity also play an important role. They provide society with food, water, grazing and biomass an important source of energy and building material. Ecosystems such as wetlands, grassy mountain catchments and forests prevent siltation and flooding downstream and help reduce the impacts of extreme weather events.

5.8 CONCLUSION

This chapter presented a discussion of the results that were relevant to the aim and objectives of the study. This study aimed to intensively evaluate the role of the state and non-state actors in mitigating water shortages within the eThekweni Municipality. The study critically examines this role by evaluating the linkages between the local governments since the local government acts as the main driving force behind service delivery. The chapter further explored the inclusion of the millennium development goals within strategies and policies put in place by the eThekweni Municipality to promote water conservation. This was examined through primary data collected during semi-structured interviews with respondents from the Water and Sanitation Department in eThekweni. Each section in the results presented above addressed the aim and objectives of the study.

The first section of the chapter examined the nature of the department of Water and Sanitation in eThekweni municipality. This section aimed to offer an understanding of the nature of the Department in terms of playing a role in mitigation measures. In order to examine the nature of the Department, the purpose was been outlined. The intention was to determine whether the nature of the organization was aligned with the strategies and polices put in place by the national government and the SDGs. The discussion presented in this section indicated that the Departments by their very nature were aligned as the unit regarded itself as a driving force which sought to come up with solutions and drive water conservation awareness. The first section also included the importance of water governance and managing the natural resources.

The second section of this chapter examined the role of water in poverty alleviation and human development as represented through the millennium Development Goals, as well to assess how the non-state actors contributed in mitigating water shortages within the eThekweni Municipality.

In this section it was noted that there was a need for the development of strategies that will use the water scarcity crisis together with the wish for sustainable natural resources use as a driver of job creation and economic development. This discussion also aimed to clarify the role of the Department of Water and Sanitation in acting as a driving force in mitigating climate change.

The final section of this chapter examined partnerships among stakeholders. This section focused more on partnerships between the Department and the other stakeholders in the water catchment management forum. It is indicated from the discussions in this section that there is a current service agreement between other stakeholders such as the University of KwaZulu-Natal and the water and sanitation Department. However, noteworthy from the discussion with the representative from the water catchment management forum is that local government is under pressure to produce high-level outcomes which cause a delay in solving some of the issues. Lastly, in this section the study assessed governance arrangements that used models for inclusive participation as the researcher explored the value and impact that the Department of Water and Sanitation had created in the community. Conclusions can be established that the partnerships and relationships between the community and the local government are still in a developing phase. The following chapter provides the overall conclusions to the study and suggests recommendations based on the discussions from this chapter.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This study was conducted to critically examine the role of the state and non-state actors in mitigating water shortages within the eThekweni Municipality. This chapter aims to merge different sections of the study in order to show how the aim and objects of the study were realized. This chapter also aims to provide conclusions and recommendations based on the different aspects that were examined in the study. These sections include the summary, contribution of the research, recommendations and final remarks on the study.

6.2 OBJECTIVES OF THE STUDY

This section provides an overview of the study, based on the aim of the study and culminating in the findings. The first chapter of the study provided a background regarding the purpose of the study. In order to satisfy the aim of this study, the following objectives were identified:

- To analyse the role of water in poverty alleviation and human development as represented through the Millennium Development Goals;
- To critically examine the extent of the inclusion of the Millennium Development Goals within strategies and policies put in place by the eThekweni Municipality to promote water conservation;
- To assess how the non-state actors contribute in mitigating water shortages within the eThekweni Municipality; and

- To assess governance arrangements that use models for inclusive participation.

6.3 RESEARCH QUESTIONS

The study attempted to answer the following research questions:

- What is the role of water in poverty alleviation and human development as represented through the millennium Development Goals?
- To what extent is the inclusion of the Millennium Development Goals within strategies and policies put in place by the eThekweni Municipality to promote water conservation?
- What are non-state actors doing towards mitigating water shortages in eThekweni Municipality?
- What are the governance arrangements that use models for inclusive participation?

6.4 SUMMARY OF THE STUDY

Chapter one of this study outlined the research design and methodology of the study. After this key concepts were defined and an outline of the chapters was given.

Chapter two presented a background of the policy framework that exists in South Africa with regards to the water crisis with which the country has been hit. This chapter also outlined the relevance of this study and discussed the water scarcity crisis that South Africa currently facing as a country. It then elaborated on how South Africa is tackling these issues. It also outlined the case context that being the eThekweni Water and Sanitation Department, its history and detailed functions in which it is involved.

Chapter Three constituted the literature review, which focused on theoretical literature in order to understand the concept of water governance; this section described the significance of water governance and pointed the important connection between South Africa, effective governance and poverty reduction. Pollard and du Toit (2008) stated coordination between various water

institutions and other sectors related to water management is crucial in achieving effective water governance.

The literature review presented views on how water services are managed by local government and how the municipal water supply is the fastest growing sector of national water demand, reflecting population growth and rising living standards (van Rooyen 2008). This section also highlighted the effectiveness of municipal water services management and how it has critical implications for national water security now and, increasingly, in the future.

Chapter Four presented the research methodology of this study. This research was conducted by employing a qualitative research design approach, using a case study design. Semi-structured face-to-face interviews were conducted with each participant and recorded with a voice-recording device. A thematic analysis was then carried out and key themes were identified from the data collected. These fed into the results of the study. Documentary data were also collected relating to South African legislation. This data provided a basis on which participants' views were tested.

Chapter Five presented a detailed analysis of the data findings. This chapter was divided into five sections with the first examining the role that the Department of Water and Sanitation at the eThekweni Municipality plays in mitigating water shortages. The discussion presented in this section indicated that the Department of Water and Sanitation at the eThekweni municipality is mandated to promote sustainability and water conservation. The second section of this chapter examined the importance of water governance. The third section explored the inclusion of economic development goals within strategies looking at the policy landscape of water management. Through the documentary analysis the chapter focused on the Water Strategy (2013) which placed importance on how South Africa has to move away from unsustainable use of natural resources; thus one of the major focuses of the water strategy is equitable and sustainable availability and use of water by all South Africans while sustaining our water resource. The last section of this chapter focused on the importance of partnerships in finding solutions. There were key terms that appeared throughout the discussion; these key terms fall

under the above mentioned themes. Table 6.1 below outlines central themes that appeared throughout discussions.

Table 6.1: Central themes emerging from the results

Central Themes	Explanation	Source of Data
Economy and employment	The creation and maintenance of new innovative technological advances that may help in conserving water in the region can also create jobs through installation and maintenance and acquiring skills, the development of infrastructure programmes, water conservation and water demand management such as fixing leaks, retrofitting, plumbing, waste-water treatment turnaround programmes, infrastructure asset management, integrated catchment management and resource protection, ensuring water availability for economic sectors in order to create jobs	All Participants
Climate Change	The Department of Water and Sanitation sees the need for creating awareness of conservation as the means to address the challenges of climate change and water scarcity.	All Participants
Partnerships	The stakeholders that participate in water projects are needed in the water-saving process and it is important for a partnership to be built for the success of these projects.	All Participants
Participation/community development	Creating an enabling environment for locals and community members to be able to voice their solutions and cooperate with the Department to develop water provision programme,	All Participants

	development of community infrastructure programme, water allocation reform and regional bulk infrastructure grant	
Education and innovation	A formalised graduate placement scheme for the public service, skills for managers, technical skills for local government staff.	All Participants

With our country being water-stressed, it is important for South Africa to look into and understand its current and future water challenge. To frame the water security question better, “there is a ‘need for more information on variables that control and impact water security, and a need for an integrated, multi-disciplinary, multi-scale, multi-agency approach to research”.

Areas of research in this programme include:

- Developing new knowledge on the understanding of natural water security through new data;
- Developing models to support water risk analysis and water (in)security frameworks;
- Developing scientific and technology tools to manage water security, such as water use/reuse efficiency tools;
- The role of the ecological infrastructure in ensuring water security;
- Alternative water sources such as fog water and rainwater harvesting;
- Investigation into the impact of alien and invasive plants on water security; and
- The impact of the growing population and the effects of climate extremes (droughts and floods) on water resources. .

The following section presents the recommendations for future researchers who wish to conduct research in this field.

6.5 RECOMMENDATIONS

This section aims to provide recommendations for future researchers who may wish to conduct research in the same field of study and also recommendations for the water governance

institutions. This section also includes recommendations for improved practice. Recommendations based on the evidence are provided here. From this evaluation it is apparent that:

- A creation of an effective governing framework and implementation plan for water resources management connected to other sources is needed.
- Water professionals must make a concerted effort to achieve a virtuous cycle where water data contribute significantly to policy, leading to a higher priority in terms of funding, which will enable better quality data to be collected.
- Institutional mandates are often distinct yet related to ensure a functional system geared towards improved, efficient and well-coordinated service delivery.
- Creating platforms for collaborations and knowledge sharing amongst government and other related institutions responsible for water, land, environment, health, energy, mining and agriculture will increase their impact on addressing water and other related challenges facing the country.
- There is a need for programmes that will also include the role and functions of local authorities and communities in water resources management.
- Transboundary water research that will enable neighbouring countries, institutions across administrative boundaries or catchments to manage their shared natural capital in an integrated manner ought to be funded under this programme.
- The use of innovative and modern technologies such as remote sensing, radar shuttle and isotop technologies could help in transforming water data in developing countries,
- Efforts to improve the availability of data must be nationally led and must meet the specific needs of each country while also contributing to the global system.

However, the UN and other agencies can and must play critical roles. A strong effort must be initiated to harmonize various water data initiatives and focus on assisting countries to improve their capacities to collect reliable, consistent raw data and convert it into useful information.

New technologies are important in ensuring water and environmental security. Real-time data and information is becoming important for decision-making and influencing policy. In-situ

treatment of water resources can be effectively used to improve water quality and reduce water treatment costs. This thrust aims to establish, stimulate and pilot innovations and appropriate novel technologies that could be taken up by the sector and beyond.

Development and implementation of a cohesive program to build national capacities to collect and process water data is recommended. It has to be linked to broader efforts aimed at strengthening the evidence base for implementation and monitoring of the proposed SDGs. An example is support for peer-to-peer programs in which developing countries with more experience assist other countries to strengthen their capacities. Enhancing access to water for productive use should be strongly emphasized in addition to access for domestic use and ensuring ecological sustainability.

It is recommended that future research be investigated, mainly because there is a need to undertake research to find out how technological advancements can be incorporated in South Africa in terms of addressing the water crisis. Research can be conducted in the following areas mentioned below:

- South African industry response to the water crisis;
- Research into ecological modernisation principles, which may be adopted by policy makers in order to provide a more democratic, open process in terms of environmental decision-making;
- Multiple pressure effects on ecosystems and ecosystem services as well as effective mitigation – adaptation tools and assessments for implementing the water related targets of the UN SDGs;
- Developing accessible solutions for clean water management to address UN SDG6 targets and associated SDGs; and
- Financing for water projects.

6.6 FINAL REMARKS

It was established from the literature chapter that South Africa is a water-stressed country and is facing a number of water challenges and concerns, including security of supply, environmental degradation and resource pollution. The limited water resources require careful management to enable the provision of basic water services to every citizen, while meeting the needs of economic growth without threatening the environmental integrity of water resources. The sustainability of the country's fresh water resources has reached a critical point and its associated management is now at a crossroads.

The study has indicated that the success of water conservation is, to a large extent, dependent on education levels and water conservation awareness. Recommendations for future research were discussed. It is hoped that the recommendations will assist in ensuring that the water demand management targets are met. It is noteworthy to mention that despite good infrastructure, floods and droughts are part of the normal water cycle, and water restrictions and flood management are a critical part of the water business.

It was also established in previous discussions that for water to play an optimal role in poverty eradication, the reduction in inequality, inclusive growth and development, and building a just and equitable society, water resources planning must be integrated into national, provincial and local planning, and must be addressed in all growth and development strategies. Finally in overcoming the water crisis, an obligation rests on everyone; the government, public and private entities, individuals and communities forming partnerships is important in achieving the main goal and all the latter players should cooperate.

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Table of Participants

Interviewee Number	Date	Position	Entity
Interviewee One	19 September 2017	Director	eThekwini Water and Sanitation
Interviewee Two	19 September 2017	Assistant Director	eThekwini Water and Sanitation
Interviewee Three	19 September 2017	Control Environmental Officer	eThekwini Water and Sanitation
Interviewee Four	19 September 2017	Environmental Officer	eThekwini Water and Sanitation
Interviewee Five	19 September 2017	Liaison officer	eThekwini Water and Sanitation
Interviewee Six	19 September 2017	Community development	eThekwini Water

		Officer	and Sanitation
Interviewee Seven	19 September 2017	Infrastructure Programme Manager	eThekwini Water and Sanitation
Interviewee Eight	19 September 2017	Engineer Technician	eThekwini Water and Sanitation
Interviewee Nine	19 September 2017	Engineer Production	eThekwini Water and Sanitation
Interviewee Ten	19 September 2017	Water Catchment Management Forum	eThekwini Water and Sanitation

Appendix A: Interview Schedule

➤ Introduce myself- I am currently undertaking a master's degree in public administration at the University of Kwa Zulu-Natal and I'm interested in understanding how the municipality deals with the water crisis that the region is facing.

➤ Introduce Thesis topic- In broad terms my thesis looks at the role that the state is playing as well as the private sector and communities in mitigating water shortages.

➤ The interview is intended to be an informal discussion; the following outline gives you a sense of the issues I would like to discuss with you.

- A brief description of your department and responsibilities and functions, as well as your area of responsibility.
- The inclusion of the millennium development goals within strategies and policies to promote water conservation.
- Governance arrangements that use models for inclusive participation.

General Questions

1. Please could you give me an overview of your professional experience, the type of work you are involved in, and your interest and expertise?
2. Provide background on how the department is set up and how it works.
3. Are there any projects put in place to mitigate or address the water issue in the region and who were the most dominant role players in the projects?
4. Where there any conflictual issues, disagreements negotiations, compromise as part of the project? How did these get resolved?
5. Are there any forums or groups that come together to address the water issue?

Objectives and questions

➤ To analyse the role of water in poverty alleviation and human development as represented through the millennium development goals.

What is the role of water in poverty alleviation?

What is the department doing in trying to combat or overcome this problem?

How do you promote effective and efficient water resources management to ensure sustainable economic and social development?

➤ To critically examine the inclusion of the millennium development goals within strategies and policies put in place by the eThekweni Municipality to promote water conservation.

In your opinion which particular policy guides the implementation of water conservation?

According to your opinion can this strategy be improved to address challenges imposed by informal settlements?

Do you think more can be done to implement water conservation in the region or the country at large?

What could be done to improve the conservation of water in the community level?

Do you think people are informed about water conservation management strategies or programmes?

Was there any introductory programme/procedure implemented to educate the people of any water saving methods or devices in the region?

Are you aware of any awareness programmes with regard to water conservation, water demand management strategies?

➤ To assess how the non-state actors contribute in mitigating water shortages in eThekweni Municipality.

How do you address the problems associated with water in the region?

Do you encounter any problems when approaching the community with water queries?

Are there any obstacles that prevent you from implementing effective water saving methods?

Briefly elaborate as to what are problems associated with water delivery in the region?

➤ To assess governance arrangements that use models for inclusive participation.

How do you make sure that you are involved in inclusive participation?

What are the emerging trends which require policy responses and innovation in governance?

How do you Enhance Good Governance and Accountability?

Appendix B: Ethical Clearance Certificate



21 August 2017

Ms Nokukhanya Thobeka Radebe (210503823)
School of Management, IT & Governance
Westville Campus

Dear Ms Radebe,

Protocol reference number: HSS/1330/017M

Project title: Evaluating the role of the state and non-state actors in mitigating water shortages in eThekweni Municipality

Approval Notification – Expedited Application

In response to your application received on 11 August 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

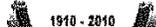
Yours faithfully


.....
Dr Shamila Naidoo (Deputy Chair)

/ms

Cc Supervisor: Professor TI Nzimakwe
Cc Academic Leader Research: Professor Brian McArthur
Cc School Administrator: Ms Angela Pearce

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X64001, Durban 4000
Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: ximbao@ukzn.ac.za / svrmanm@ukzn.ac.za / mohunp@ukzn.ac.za
Website: www.ukzn.ac.za



Appendix C: Informed Consent Letter

UNIVERSITY OF KWAZULU-NATAL
School of Management, IT and Governance

M Admin Research Project
Researcher: ThobekaRadebe (031 242 5604)
Supervisor: Dr T Nzimakwe (031 260 7429)
Research Office: Ms P Ximba (031 260 3587)

Dear Participant,

I, ThobekaRadebe, a master of commerce student, at the School of Management, IT and Governance, of the University of KwaZulu-Natal. You are invited to participate in a research project entitled **The Evaluation of the State and Non-State Actors in Mitigating Water Shortages: A Case study of EThekwini Municipality**. The aim of the study is to critically examine the role of the state and non-state actors in mitigating water shortages in eThekwini municipality.

Through your participation I hope to find out the understanding of the Department of Water and Sanitation in regard to the role of water in poverty alleviation and human development as represented through the millennium Development Goals.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this survey/focus group. Confidentiality and anonymity of records identifying you as a participant will be maintained by the School of Management, IT and Governance, UKZN.

If you have any questions or concerns about participating in this study, you may contact me or my supervisor at the numbers listed above.

The interview should take you about 30-45 minutes to complete. I hope you will take the time to help in making this study feasible and add to the knowledge of eThekwini Municipality.

Yours Sincerely

Investigator's signature _____ Date _____

This page is to be retained by participant

Appendix D: Participant Consent
UNIVERSITY OF KWAZULU-NATAL
School of Management, IT and Governance

MCOM Research Project
Researcher: Thobeka Radebe (031 242 5604)
Supervisor: Dr T Nzimakwe (031 260 2606)
Research Office: Ms P Ximba (031260 3587)

CONSENT

I.....(Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

I hereby consent/do not consent to record the interview.

SIGNATURE OF PARTICIPANT

DATE

.....

.....

This page is to be retained by researcher

Appendix E: Turnitin Report

The Evaluation of the role of the State and non state actors in mitigating water shortages in Ethekekwini Municipality

ORIGINALITY REPORT

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