Exploring the QwaQwa Water Crisis for Effective Planning in Post-apartheid South Africa

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Declaration

I, **Kgosi Mocwagae,** declare that the thesis that I herewith submit for the degree *Doctor of Philosophy* at the University of the Free State, is my independent work, and that I have not previously submitted it for a qualification at another institution of higher education.

Kgosi Mocwagae

Date: 19 March 2020

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Abstract

Water scarcity in the twenty-first century is an issue that affects both the developed and developing world. This study focused on exploring the water crisis in QwaQwa, Free State. On 1 January 2016, the community of QwaQwa experienced water access challenges with no water accessible from taps. The Fika Patso Dam, which supplies 85% of water in QwaQwa, had water levels below 10%. This sparked interest to explore the QwaQwa water crisis because the study area is a water source of the Tugela, Caledon and Elands rivers that provide water to major parts of South Africa. Two other dams, the Metsi Matsho and Sterkfontein dams, supply the remaining 15% of QwaQwa with water. The Metsi Matsho Dam is situated in QwaQwa, while the Sterkfontein Dam lies 20 km outside of QwaQwa.

The study employed an exploratory sequential mixed methods approach by using exploratory qualitative and survey quantitative components to collect data. Primary qualitative data were collected through 26 interview schedules, 10 informal encounters and observations, while primary quantitative data was collected using a validated questionnaire from 571 households. Literature and archival data review, GIS, Google Maps and census were secondary data sources. Qualitative data were analysed using discourse and thematic data analysis, and descriptive and inferential statistics were used to describe and make inferences from the quantitative data.

The study found that when QwaQwa was established as a homeland in 1974, there was a water crisis that was caused by predatory form of planning that led to the forceful removal of Basotho from farms and towns around the Free State and beyond. The Basotho were settled in the Phuthaditjhaba Township and villages with the aim of creating class segregation between these two groups. Upon being settled in QwaQwa, water was provided through water tankers, rivers and streams that signified a water crisis. In 1968 the Sterkfontein was planned and developed as a water reservoir for the Vaal River system to address urbanisation and drought in Johannesburg, using water drawn from QwaQwa. In 1976 the Metsi Matsho dam became operational in QwaQwa but did not sufficiently cater for population increase from 24 000 people in 1970 to 248 000 people in 1980. In 1986, the Fika Patso Dam became operational in

QwaQwa but was reported with inconsistent river perennial flow of the Namahadi River.

After 1994, the democratic dispensation aimed to address the injustices of water access for previously disadvantaged communities such as QwaQwa that were marginalised. The Maluti-a-Phofung Local Municipality was established in 2000, and the Maluti-a-Phofung Water in 2005 as the primary supplier of water in QwaQwa. In 2008, one out of four phases of a water pipeline from QwaQwa was constructed to supply two out of 103 areas.

On 1 January 2016, QwaQwa experienced severe water shortages and Maluti-a-Phofung cited drought as the cause. Water tankers were appointed to deliver water to the community. Participants however indicated that they accessed less water, incurred unbudgeted costs and time and travelled longer distances to access low quality water. Participants believed that climate change, corruption, dam crises, negligence of infrastructure and ecological factors caused the QwaQwa water crisis. The community of QwaQwa accessed water from water tankers, rivers and streams, purchasing water, rainwater harvesting, greywater, from the taps occasionally and boreholes.

The study made seven recommendations. Firstly, Maluti-a-Phofung should perform its primary functions according to the Constitution; the Water Services Act and Municipal Systems Act and the United Nations Sustainable Development Goals. Second, ensuring that infrastructure is resilient to climate change conditions. Third, maintain, upgrade and construct new water infrastructure to sufficiently provide water in QwaQwa. Fourth, employ water use education for the community to use water as a limited natural resource. Fifth, effective planning for water to meet the demand in QwaQwa. Sixth, exploration of alternative water sources such as boreholes, rainwater harvesting and waterless infrastructure sanitation systems. Lastly, the reinstatement of the services tax for the villages in QwaQwa and efficient collection of rates and services in Phuthaditjhaba.

Keywords: Urban planning, effective planning, water access, accumulation by dispossession, social engineering, post-apartheid planning, commons, marginalisation, powerlessness, water governance

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List of Abbreviations and Acronyms

ANC	African National Congress
CoGTA	Department of Cooperative Governance and Traditional Affairs
DAFF	Department of Water Affairs and Forestry
DBSA	Development Bank of Southern Africa
GAA	Group Areas Act
GIS	Geographic Information Systems
HP	Household participants
IDP	Integrated Development Plan
IEs	Informal encounters
IP	Institutional participant
IRR	South African Institute for Race Relations
LTAB	Land Tenure Advisory Board
MAP LM	Maluti-a-Phofung Local Municipality
MAP Water	Maluti-a-Phofung Water
MFMA	Municipal Finance Management Act
MSS	Multistage sampling
NDP	National Development Plan
NRDC	Natural Resource Development Council
NUA	New Urban Agenda
OECD	Organisation for Economic Cooperation and Development
PBSGA	Promotion of Bantu Self-Government Act
PRA	Population Registration Act
PSP	Private sector participant
RDP	Reconstruction and Development Programme

SABC	South African Broadcasting Corporation
SDGs	Sustainable Development Goals
SPISYS	Spatial Information Systems
SPLUMA	Spatial Planning and Land Use Management Act
Stats SA	Statistics South Africa
TL	Traditional leaders
TVTS	Thukela (Tugela)–Vaal Transfer Scheme
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
VOC	Dutch East India Company (**Dutch**: Vereenigde Oostindische Compagnie)
WSA	Water Services Act
WSP	Water Services Provider

Units and Symbols

ha	hectare
km	kilometre
ℓ	litre
ℓ/s	litre per second
mℓ	millilitre
ML	megalitre

Part 1
Framing the Context of the Study

The thesis is divided into two parts, namely: Part 1 and Part 2. Part 1 frames the context of the study in four chapters. The introduction of the study in the first chapter and discusses the background of the study; problem statement; objectives of the study; research questions; significance of the study; background of QwaQwa; research methods; scope, limitations, and definitions and outline of thesis chapters. The second chapter is a review of current knowledge on water governance in former homelands by discussing theories and concepts of urban and regional planning; state and power; and water. The third chapter is about the legislative and policy framework related to water and planning in South Africa that discuss the historical legislation and policies promulgated during apartheid; international policies on water; and post-apartheid legislation and policies that influence planning and access to water in South Africa. The fourth chapter is about the methodological considerations that were employed by the study and discusses the research methodological approach; data collection procedures and methods; and ethical conduct.

Chapter 1
Introduction

1.1 Background of the study

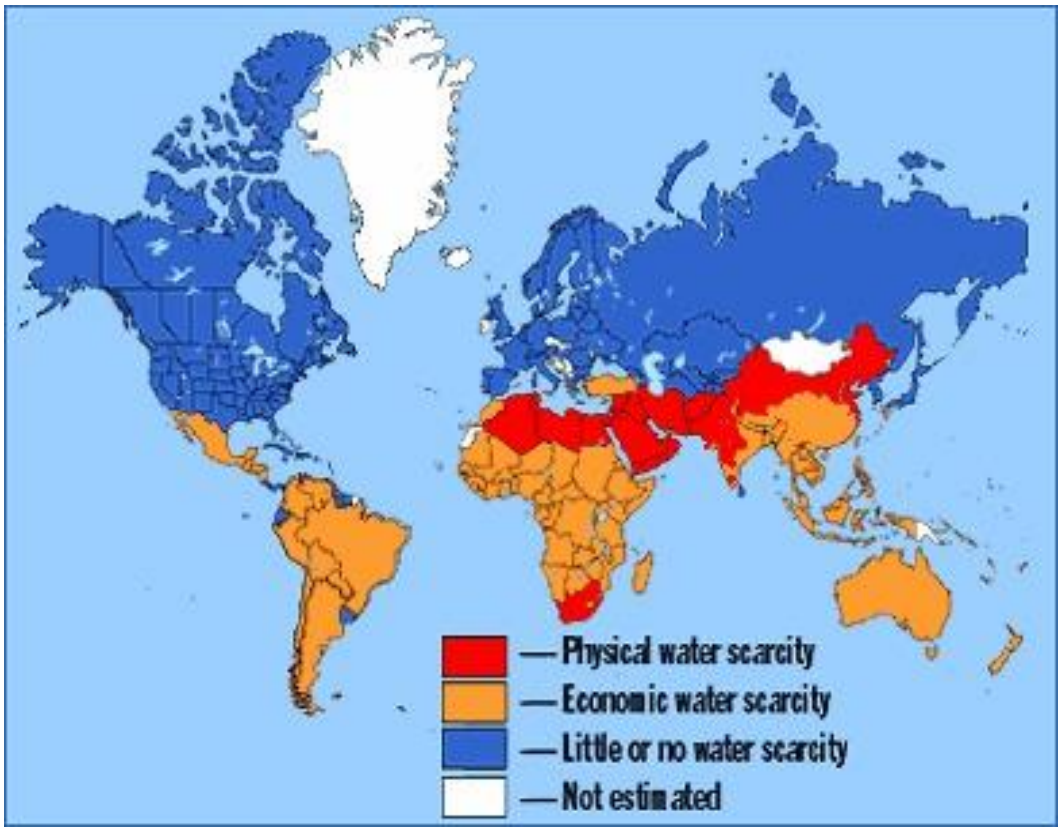
If wars of this century are fought over oil,
the wars of the next century will be fought over water.

~ Ismail Serageldin
Former Vice President of the World Bank

This quotation above is one of the most important warnings for the new millennium – the twenty-first century. Events happening in many countries of the world, South Africa included, have proven Serageldin correct. Water crises capable of triggering intra-state wars have become endemic in many geographies, such as Cochabamba in Bolivia, Bangalore in India, San Raphael in Brazil, the Niger Delta in Nigeria, QwaQwa and Cape Town in South Africa (Okorie 2018:116; Okorie, Mphambukeli and Amusan 2019:22). Similarly, Wolf (1998:251), towards the end of the twentieth century, published research on possible wars over water in the Middle-East. And by 2008, a report on Millennium Development Goals indicated that nearly 50% of the world's population was in the throes of water scarcity. The report further showed that approximately 5 000 children are dying daily from preventable water-related diseases across the globe (Loftus 2009:953). The world is, perhaps, heading towards a global water emergency. Water scarcity has become endemic, as depicted in the map of water scarcity across the globe (Figure 1.1).

Figure 1.1 shows that South Africa, although deeply dipped in two mighty oceans of the world, is not isolated from the water crises rocking the globe. South Africa is a severely water-scarce country. Many socio-ecological, economical, and socio-politico-cultural dynamics have been implicated in the country's water scarcity (Okorie et al. 2019:28). Some scholars have identified inconsistent rainfall, excess water-runoff, invasion by alien plant species and climate change (Van Heerden & Blignaut 2009:415) as factors underpinning the water scarcity in South Africa. While these factors may be important determinants of water availability, it is worth noting that what is considered as water scarcity in the physical sense could be valid, or possibly a

product of improper use of water, which solution requires finding better ways to use water. According to Rijsberman (2004:1), some claims about water scarcity could be fictional and not factual. Water scarcity is structured by social and material infrastructures (Cousins & Newell 2015:42). Additionally, water scarcity in South Africa is unevenly distributed between gender, geography, race, and class (Kemerink, Ahlers & Van der Zaag 2011:585). The intersection of two or more of these dynamics may constitute vectors of oppression or clusters of advantages for some individuals, households, communities and even municipalities in the country's waterscapes.



Source: NEWater (2019: online)

Figure 1.1: Global water scarcity map

Expert knowledge, political and police power have been influential in promoting the intersections of these clusters of (dis)advantages in South African waterscapes. While disciplines such as social and cultural anthropology provided expert knowledge for the balkanisation of South Africans into natives, white, coloured and black, expert knowledge from urban and regional planning made this segregation concrete through the planning and erection of cemeteries, roads, and railways and other infrastructure, as barriers (Moodley 2018:1).

The importance of this argument is that holistic social engineering, which was the structural control exercised to create former homelands in South Africa, resulted in negative planning that has led to the water crisis in QwaQwa that manifested post-apartheid. Noyoo (2018:25) articulated holistic social engineering as a process of remodeling a whole society with a blueprint or plan, by controlling key positions and extending the power of the state until the goal is reached, which is what apartheid government achieved. The South African political landscape hinders effective post-apartheid planning to resolve the water crisis in QwaQwa and has rendered planners as spectators through piecemeal social engineering. Noyoo (2018:25) further described piecemeal social engineering as having had ideals of applying for the general welfare and social justice to society but having rejected any impractical attempt to rectify the problem. Piecemeal social engineering was evident in initiatives by the post-apartheid government. Piecemeal social engineering was provided through general welfare and social justice that has left previously disadvantaged communities in a deplorable state. This is the case in QwaQwa, where the third largest dam in South Africa is just 20 km outside of QwaQwa, and continuing to serve the apartheid function of providing water to the Vaal Dam 320km away.

1.2 Problem statement

QwaQwa experienced a potable water supply shortage in January 2016 when the community started experiencing water shutdowns at different phases and times. As an intervention, Maluti-a-Phofung Water (MAP Water) entered into partnership with the former minister of Water and Sanitation, Nomvula Mokonyane, and former Free State premier, Ace Magashule, to appoint water tankers to supply water in QwaQwa. This led to water being delivered to different settlements in QwaQwa. Khumalo (2016) created a short documentary video titled *FreeWaterinQwaqwa* that shows the heightened water crisis regarding times and distance communities spent in accessing water. The documentary highlighted that during the water supply shortage it was unclear to the residents of QwaQwa as to what caused the crisis.

In a social media statement issued by former executive mayor, Vusi Tshabalala, the potable water supply shortage presented a water crisis to QwaQwa Maluti-a-Phofung Local Municipality (MAP LM 2016b: online). Before this, the former minister of Water

and Sanitation, Nomvula Mokonyane, declared the Free State and KwaZulu-Natal as drought-stricken regions in November 2015 (Chabalala 2015).

Before 1994, water provision by the apartheid government served a few and mostly the white population. According to Earle, Goldin and Kgomotso (2005:5), the Department of Water Affairs during the apartheid era focused on enriching the wealthy sectors such as mining and agriculture, instead of alleviating poverty in rural areas. The Department of Water Affairs and Forestry (South Africa, DAFF 1994:4) indicated that after the Second World War subsidies for municipal water schemes were introduced to improve the standard of water supply. These subsidies were marginal and only contributed to a portion of the cost of water services. Regional water supply schemes were constructed by the apartheid government to exploit new gold discoveries in the Orange Free State Goldfields (Welkom) scheme. The large inter-basin schemes constructed were the Tugela–Vaal River (Sterkfontein Dam), Orange–Fish River, Usutu–Vaal River and Riviersonderend–Berg River that involved sophisticated engineering work like that of the Lesotho Highland Project. Grand apartheid and the balkanisation of South Africa into homeland territories made it clear that all investments in large-scale water provision were meant for the white sector. Financial mechanisms such as that of the Development Bank of Southern Africa were used to fund homelands but did so unevenly and inadequately (Earle et al. 2005:5; Funke, Nortje, Rascher & Turton 2008:311; South Africa, DAFF 1994:4).

Potable water provision became part of basic service delivery by the African National Congress (ANC), as the first South African democratically ruling party, to address the injustices of the past. The ANC's (1994) Reconstruction and Development Programme (RDP), prioritised the provision of water as a basic human need. The RDP was a blueprint for their first term (1994–1999) of office. During this period, the Constitution of the Republic of South Africa in 1996, and the National Water Act in 1998 became key legislation to emphasise the right to water access as a basic human right. Statistics South Africa (Stats SA 2011: online) indicated that access to water increased from 80.3% in 1996 to 91.2% in 2011, indicating positive results for government. Contrary to government's national progression, the MAP LM and QwaQwa, in particular, did not enjoy the same results because only 16.9% in 1996 and 31.9% in 2011 of households having access to water in their dwellings.

The startling paradox has received scholarly attention in the ongoing debate about the water crisis by many researchers that had focused on water crisis in major cities of South Africa, such as Day Zero in Cape Town (Winter 2018: online). Less is known about the situation in QwaQwa, which has water sources that supply fresh water to other parts of South Africa. Therefore, this study interrogates the water crisis in QwaQwa. The water crisis then presented the researcher with the opportunity to explore the events that took place leading to the water crisis in QwaQwa post-apartheid.

1.3 Aim and objectives of the study

The study aimed to explore the factors that were at play that led to the QwaQwa water crisis. By exploring the factors that led to the QwaQwa water crisis, the study sought to offer insights for effective planning in post-apartheid South Africa. To achieve the aim of the study, four objectives were included, namely:

1. To explore the history of water policies in South Africa and the water crisis in QwaQwa.
2. To document the lived experiences of the affected QwaQwa communities.
3. To assess interventions by various actors during the QwaQwa water crisis.
4. To explore the implications of the QwaQwa water crisis for effective planning in post-apartheid South Africa.

1.4 Research questions

1. What are the ways in which planning has shaped the trend and trajectory of water crises in QwaQwa, and how are the effects of the crisis felt at household, business and institutional levels?
2. What other factors underlie the water crisis and in what ways can effective planning contribute to addressing the crisis in the context of post-apartheid South Africa?

1.5 Significance of the study

The significance of the study was therefore to explore factors that led to the QwaQwa water crisis and challenges faced by former homeland towns in South Africa in the post-apartheid era. After 25 years of democracy in South African communities, the former homeland of QwaQwa continues to be faced with the legacy of apartheid. Apartheid utilised urban and regional planning as a tool of forcefully removing and re-locating black people to areas proclaimed as homelands for self-determination based on the native language. The democratic dispensation sought to address the injustices of the past but have continued to perpetuate the apartheid legacy. QwaQwa is a water-rich region in South Africa, but the community has not been prioritised with the provision of potable water post-apartheid. The study, therefore, offers a perspective and understanding of how ineffective planning post-apartheid has led to the QwaQwa water crisis and a situation that is similar in former homelands.

1.6 Background of QwaQwa

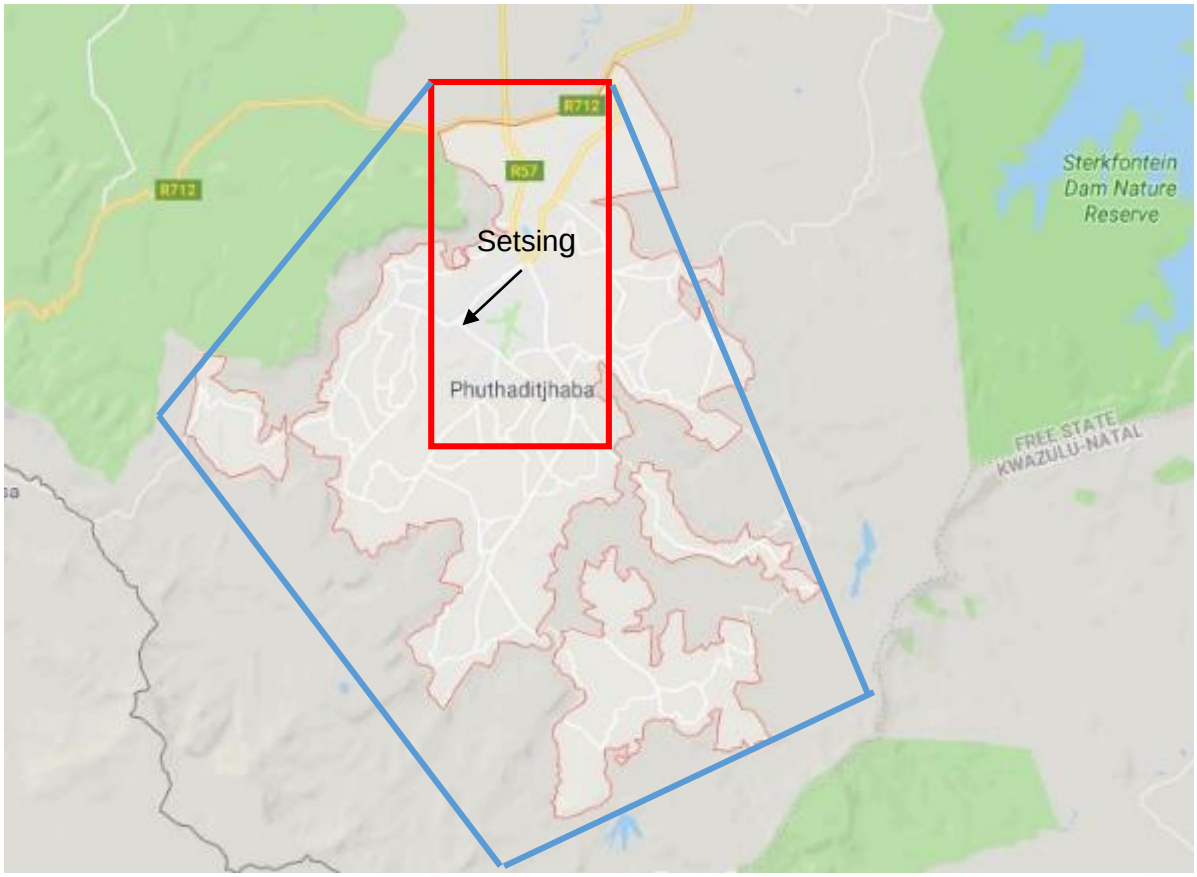
QwaQwa is situated in the Eastern Free State under the MAP LM. The MAP LM covers a land area of 4 421 km^2 and consists of four urban settlements as depicted in Figure 1.2, namely: QwaQwa (urban core), Harrismith (53 km north-east of QwaQwa), Kestell (36 km north-west of QwaQwa), and Tshiame (41 km north-east of QwaQwa). QwaQwa is the administrative head of both the MAP LM and Thabo Mofutsanyana District Municipality. Phuthaditjhaba is the township area with surrounding villages. The main economic activities are commercial farming, with cattle farming contributing the most, and nature reserves such as Sterkfontein Dam, Maluti mountain range, and Golden Gate National Park (Stats SA 2011: online).

Source: Google Maps (2019: online)

Figure 1.2: Locality map of QwaQwa in the Maluti-a-Phofung Local Municipality

QwaQwa mainly consists of two jurisdictions, being the local government and traditional leadership (MAP LM 2016a:48). The Phuthaditjhaba township and the Setsing central business district (Figure 1.3) are in the local government jurisdictions and 90 surrounding villages that are governed by the Bakoena and Thlokoa Tribal Councils (MAP LM 2016a).

According to Stats SA (2011: online), in 2011 QwaQwa had a population of 284 729 people, with 54 661 in Phuthaditjhaba (19%) and 230 068 (81%) in the villages. The 2011 population statistics were used because they offered detailed statistics for QwaQwa such as population per area, number of households per area and access to water per area. The 2011 statistics were also used for calculating sample size with the attrition of 25.6%, above the growth rate of 1.17 annual growth from 2011 to 2016 (Municipalities of South Africa 2019), to increase the validity of the data.



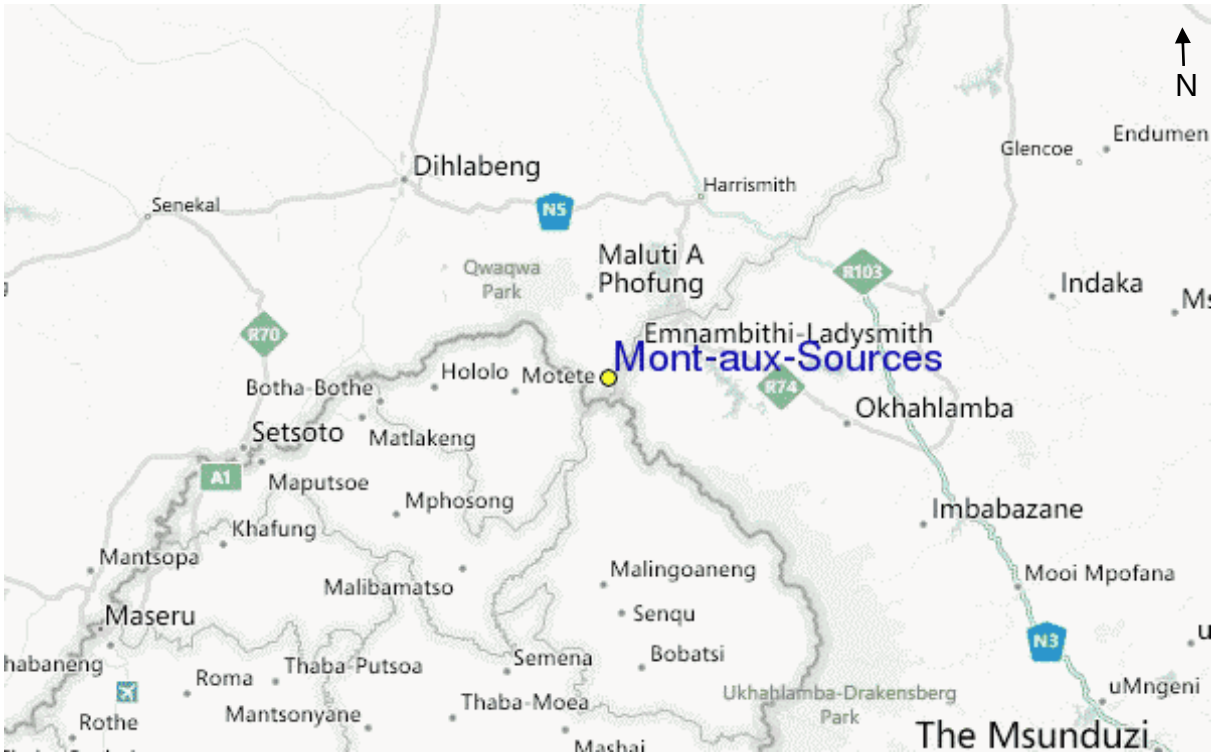
Key: Red = Phuthaditjhaba and Setsing; Blue = Villages sourced Google Maps (2019: online)

Figure 1.3: Map of QwaQwa

QwaQwa was serviced by two water schemes, namely the MAP Water and the Sterkfontein Water Scheme in 2016, when the water crisis started according to MAP LM (2016b). The water catchment areas of MAP LM are the Metsi-Matsho and Fika Patso Dams that supply approximately 85% of QwaQwa's potable water (MAP LM 2016b; Public Eye News 2016). The Sterkfontein Water Scheme's catchment area is the Sterkfontein Dam and it supplies the remaining 15% of water for QwaQwa. However, it is noteworthy that the Mont-Aux-Sources peak in the Drakensberg mountain ranges of QwaQwa is a water source for areas beyond QwaQwa and the Free State.

The name Maluti-a-Phofung was derived from two attributes in QwaQwa. According to Stats SA (2011: online), Maluti is the native Southern Sotho name of the Drakensberg mountain ranges and Phofung is the native Southern Sotho name of the Sentinel peak. Mont-Aux-Sources is accessible from QwaQwa in the Maluti-a-Phofung and its locality is as depicted in Figure 1.4. Encyclopaedia Britannica (2019a: online)

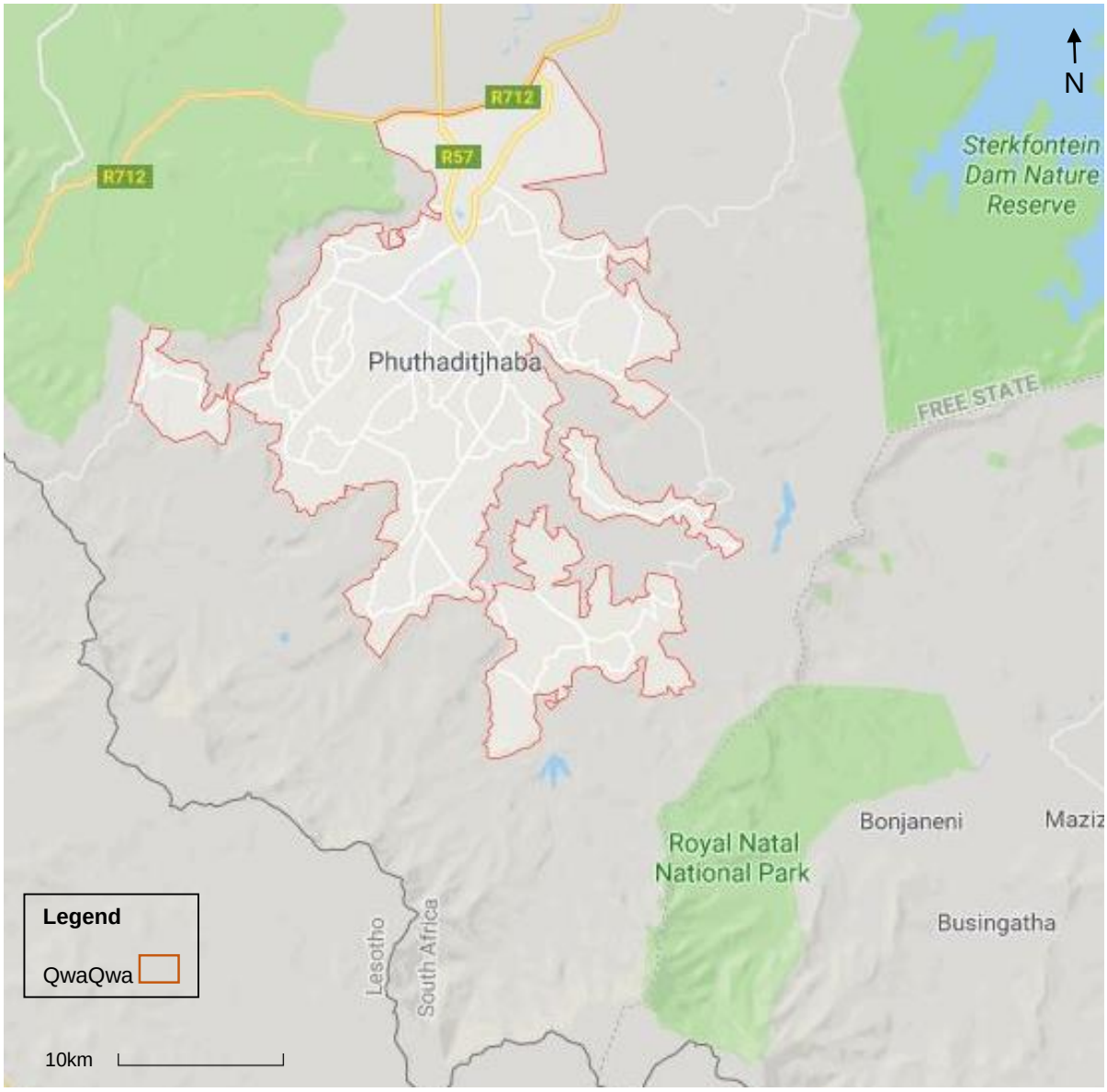
indicated that it became Mont-Aux-Sources after being "*[e]xplored in 1836 by two French Protestant missionaries, the summit was named Mont-aux-Sources ('Mountain of Sources') because it was a watershed of the Orange (south), Vaal (north), Tugela (east), and other rivers*".



Source: Snow-Forecast.com (2019: online)

Figure 1.4: Mont-Aux-Sources, QwaQwa

QwaQwa (Figure 1.5) forms a boundary of the Free State Province to KwaZulu-Natal and Lesotho, at an average altitude of 2 134 m above sea level (Encyclopaedia Britannica 2019b: online). To the northern boundaries of QwaQwa, there are farms. To the southeast, there are mountainous boundaries of the Drakensberg mountain where the Mont-Aux-Source peak is situated at an altitude of 3 282 m above sea level between QwaQwa, Lesotho, and KwaZulu-Natal. To the west, are the Maluti mountain ranges that form a boundary between QwaQwa and the Golden Gate Nature Reserve (Semela 2005:110).

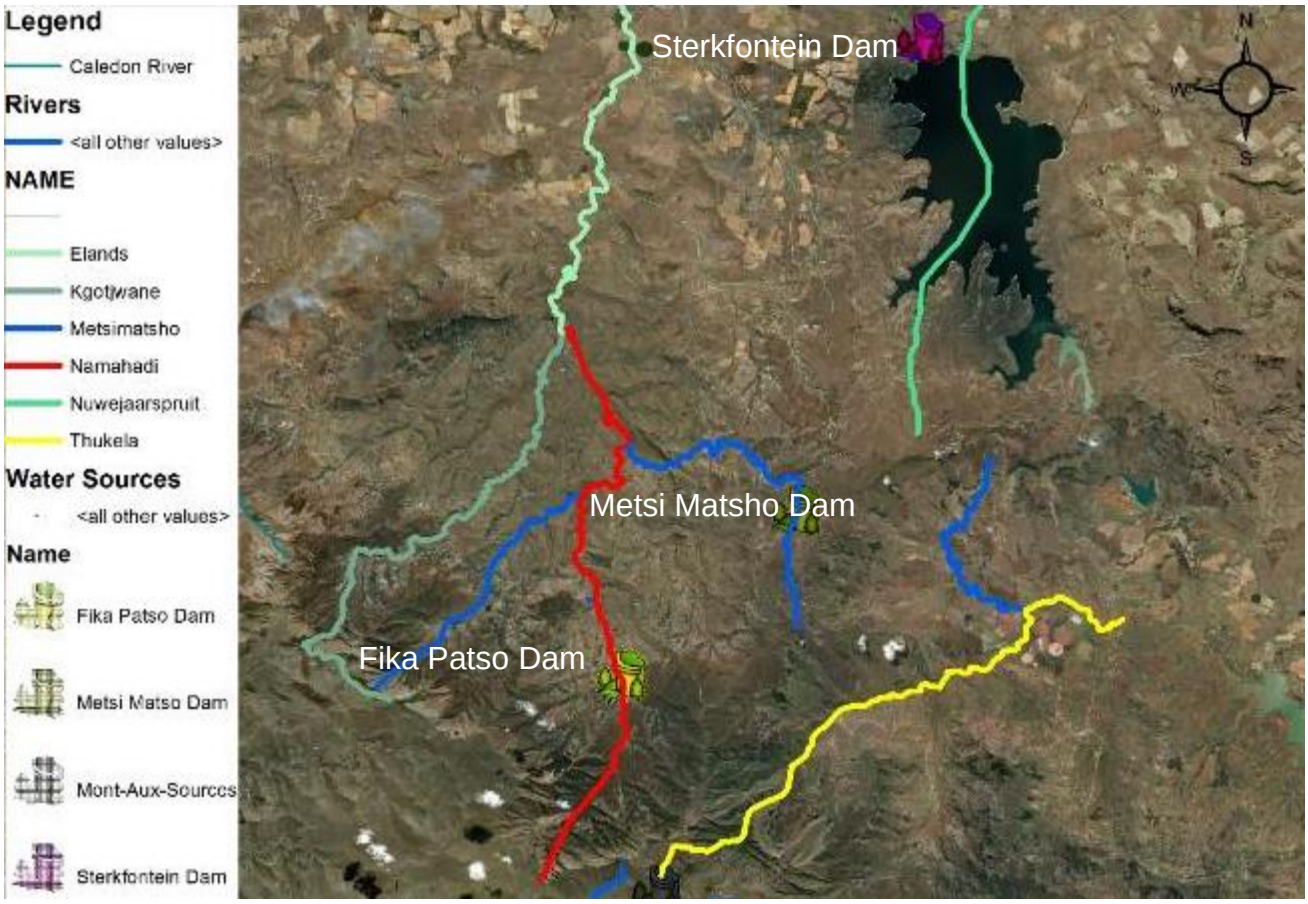


Source: Google Maps (2019)

Figure 1.5: Locality of QwaQwa and its borders

The three dams – Metsi-Matsho, Fika Patso, and Sterkfontein – receive water from the Tugela (Thukela), Namahadi and Metsi-Matso Rivers as illustrated in Figure 1.6. The Metsi-Matsho Dam was the first in QwaQwa and has been operational since 1976 (South Africa, DAFF 2008:8). The Sterkfontein Dam is located 20 km from QwaQwa and was commissioned in 1969 and construction started operating in 1974. It forms a part of the Tugela–Vaal Water project that became fully operational in 1980 after the second phase was completed. Most of the water in the Sterkfontein Dam is sourced from the Tugela River that originates in QwaQwa and supplies the Vaal Dam (fifth largest Dam in South Africa) through the Tugela–Vaal Transfer Scheme since 1974

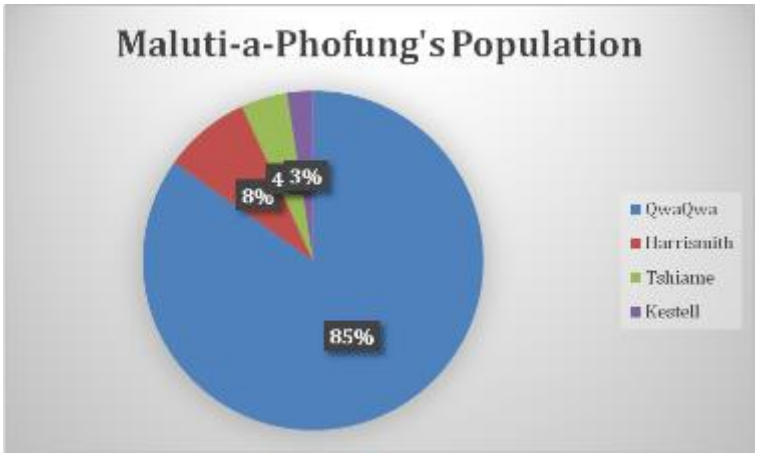
(Haasbroek 2013; South Africa, DAFF 2008; Van Vuuren 2008). The Kgotjwane and Namahadi Rivers feed the Elands (Wilge) River which is a tributary of the Vaal River. The Elands River is called the Namahadi River in the upper catchment. The Caledon (Mohokare) River originates from Mont-Aux-Sources, forming a natural border between South African and Lesotho and is a tributary to the Orange River that feeds the Gariep Dam which is the largest dam in South Africa. The Gariep Dam's primary uses are for domestic, irrigation, industrial and power generation between the southern Free State and northern parts of the Eastern Cape (South Africa 2019). The Fika Patso Dam has been operational since 1986 and supplies most of the water in QwaQwa and some water being supplied to Kestell (South Africa, DAFF 2008:1).



Source: Adapted from Google Maps (2019)

Figure 1.6: Rivers and dams in QwaQwa

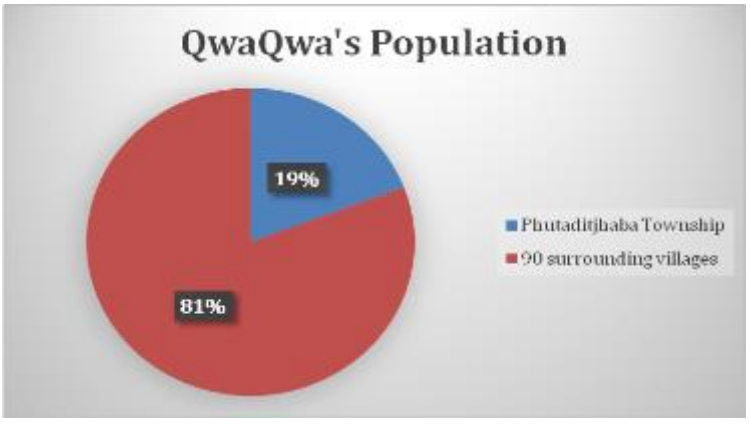
The total population of MAP LM was 335 784 in 2011 and is broken down to indicate the population density of the municipality per town as illustrated in Figure 1.7 (Stats SA 2011: online). The population breakdown indicates that QwaQwa had a population of 284 729, Harrismith 27 869, Kestell 8 269, and Tshiame 14 856, respectively.



Source: Stats SA (2011)

Figure 1.7: Maluti-a-Phofung population statistics

The data further indicates that QwaQwa accounts for 85% of the population (284 729 out of 335 784), which is made up of the Phuthaditjhaba township and approximately 90 surrounding villages which were determined by computation of statistics about MAP LM by Stats SA (2011: online). Furthermore, Phuthaditjhaba constituted 19% (54 661 out of 284 729) and the villages 81% (230 129 out of 284 729) of QwaQwa's total population as illustrated in Figure 1.8.



Source: Stats SA (2011)

Figure 1.8: QwaQwa population statistics

1.7 Research methods

The study was based on exploratory sequential mixed methods approach. According to Creswell and Plano Clark (2006:75), the exploratory approach is ideal for studying the QwaQwa water crisis because the qualitative method helps to develop the quantitative method in instances where there might not be instruments and measures available, some variables are unknown and there is not a guiding theory or framework available.

Interviews were scheduled within households, businesses, government institutions and key informants through purposive sampling that focused on those that were reliant on large quantities (±500 per day) of water on a full-time basis. Quantitative research was only administered to households because they are the most common basic form of existence of human beings. The study's population statistics was based on the 2011 census statistics (Stats SA 2011) because it allows access to household data for all different settlements in QwaQwa.

To determine the sample size for household questionnaires the study employed a multi-stage sampling technique. The first stage determined the sample size using Slovin's formula at a 95% confidence level and attrition of 25% to increase the validity of the data to get 500 households to participate as will be demonstrated in Chapter 5. The second stage was the selection of settlements in QwaQwa through random sampling. From 112 settlements in QwaQwa, only 10% (11 settlements) were selected. Systemic probability sampling uses a criteria developed by the researcher such as distance from the water scheme, economic profiling (low, middle and/or higher income), type of governance (traditional leadership or municipal area, and distances from the three dams, from the nearest to furthest settlement. For the third stage, proportionally stratified sampling was used to determine the sample size per settlement from the 500 household sample size. The fourth stage was purposively sampled that resulted in every 41st house being a participant of the questionnaire, with strict participation of adults.

1.8 Scope, limitations, and definitions

The limitations of the research were that the QwaQwa water crisis event was a politicised issue and participants were sceptical to participate. The study was at times

misinterpreted as hydrological with minimal understanding of how planning was related to water provision. A limitation of government officials that were not willing to participate in the study prolonged some processes, while others were not fulfilled.

Table 1-1: Working definitions

Definition	Description
Water crisis	The water crisis is a result of water scarcity and not a lack of arable land that has a major constraint on food production (Hanjra & Quresh 2010:365).
Water governance	Water governance is the administrative, economic and social system that influences water use and management (Bakker 2010:32).
Homeland	A homeland was one of ten self-governing states established through the Bantu Authorities Act of 1951 that was used to establish QwaQwa (Noble & Wright 2013:188).
Urban and regional Planning	Urban and regional planning creates a system that can alter or create new development and it offers alternatives, simulations, and projections in regions over a certain period and through various policies (Hall & Tewdwr-Jones 2011:6).
Effective planning	A planning process that provides per capita standards and is accessible and equally distributes resources to all (Teimouri & Yigitcanlar 2018:195).
Post-apartheid South Africa	The period in democratic South Africa that promised to address the inequalities and injustices of the past (Leibbrandt, Finn & Woolard 2012).
Accumulation by dispossession	A neoliberal process that consists of three features such as privatisation and commodification of state institutions; financialisation that is the process of a deregulated financial system that leads to speculation, fraud and thievery; and state redistributions through its redistributive policies that empower the rich (Harvey 2007:161).

Source: Own compilation (2019)

1.9 Outline of thesis chapters

Part 1: Framing the context of the study

Part 1 of the study is to give context through introducing the study, a literature review, legislative and policy framework, methodology and historical context.

Chapter 1: Introduction

The introductory chapter for introducing the background to the study and making research claims; problem statement; aims and objectives; research questions; background of the study area; research methods; and outline of thesis chapters.

Chapter 2: Review of current knowledge on water governance in former homelands

The theoretical framework chapter discusses the literature of theories and concepts reviewed. The chapter further groups literature into urban and regional planning; state and power; and water. The literature is key in framing current knowledge in which the relates to the study.

Chapter 3: Legislative and policy framework related to water and planning in South Africa

The chapter first discusses historical legislation that affected planning and access to water during apartheid. Second, international policies are present that relate to water and planning. Lastly, post-apartheid legislation and policies that relate to water and planning are presented.

Chapter 4: Methodology

The methodology chapter is essential for outlining the research methodological approach; data collection procedures and methods; and ethical conduct for the study.

Part 2: Discussion of the empirical evidence of the QwaQwa water crisis

Part 2 of the study presents and discusses critical findings of the QwaQwa water crisis from Chapter 5 to 7, while Chapter 8 is a conclusion chapter of the study.

Chapter 5: Unravelling the History of Water Policies in South Africa and Water Crisis in QwaQwa

The chapter presents and discusses the history of water governance and water crisis in QwaQwa is divided into two sections. The first section discusses the history of water governance in South Africa. The second section discusses the history of water crisis in QwaQwa.

Chapter 6: Water Struggles and Responses from the Community and Critical Stakeholders of QwaQwa

The chapter presents and discusses the lived experience of the community of QwaQwa during the water crisis and is divided into three sections. The first section discusses the oral narrative of the struggles to access water from interview schedules with participants. The second section discusses quantitative results of the QwaQwa

water crisis based on responses from households. Lastly, the manifestation of the QwaQwa water crisis through protest is discussed.

Chapter 7: Identification of Various Actors during the QwaQwa Water Crisis

The chapter presents and discussion the various actors that were involved in providing water during the QwaQwa water crisis in two sections. The first section discusses the oral narrative, while the second presents quantitative results of how the community of QwaQwa access water during the crisis.

Chapter 8: Implications of the QwaQwa Water Crisis on Urban and Regional Planning

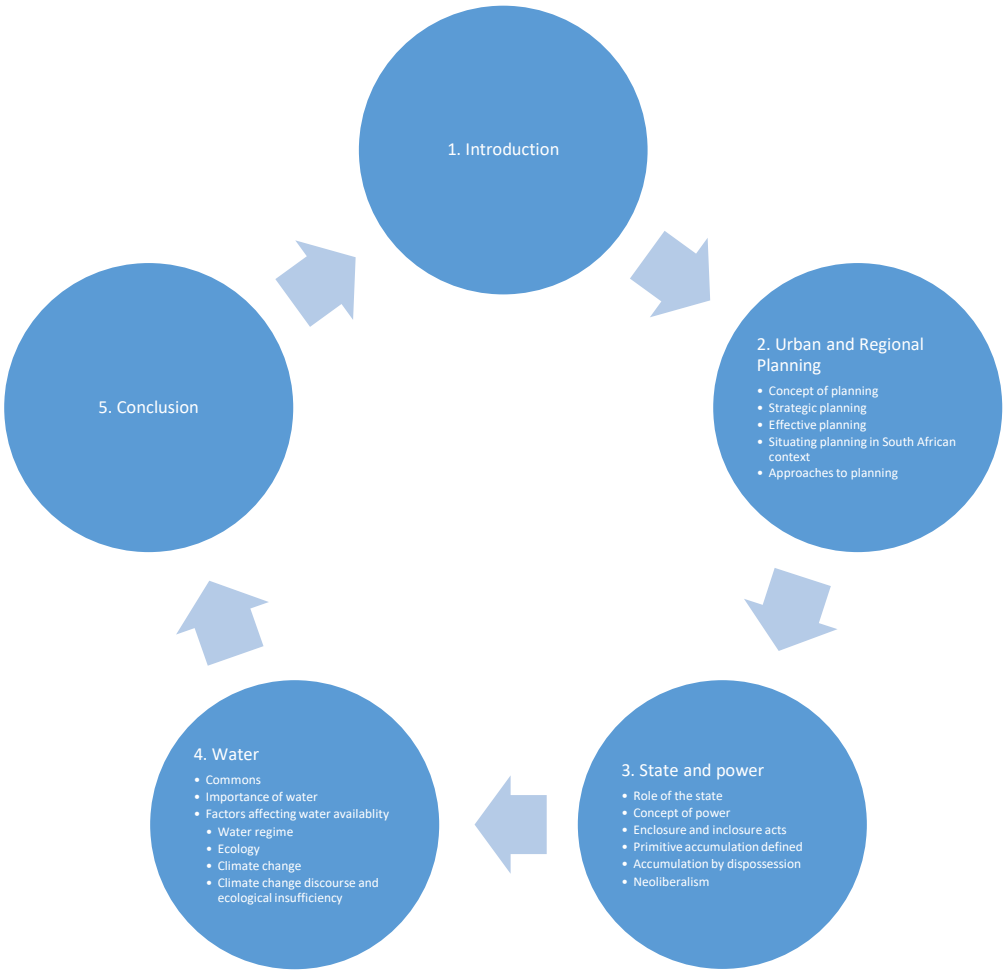
This chapter discusses the implications of the QwaQwa water crisis on urban and regional planning through five sections. The first section discusses the summary of the research findings. The second section discusses the implication of the QwaQwa water crisis on urban and regional planning. The third section discusses recommendations made by the study on how the QwaQwa water crisis can be resolved. The fourth section discusses the study's contribution to knowledge. The last section discusses areas of further research related to the study.

Chapter 2
Review of Current Knowledge on Water Governance and its Effectives on the Former Homeland of QwaQwa

2.1 Introduction

This chapter explores the scholarly literature on urban and regional planning, state and power, and water. In doing so, it seeks to set a background understanding of these subjects, highlight gaps in current knowledge and existing theoretical or conceptual frameworks, which helped the author to collect and analyse data. The study was done within an urban and regional planning discipline and sought to explore the role planning could have played in the post-apartheid era to prevent the QwaQwa water crisis.

The first part of this chapter explores effective planning in the post-apartheid era. This is followed by a discussion of the role of the state and power which were fundamental to the study because of the role, responsibilities and other related dynamics regarding water access in South Africa. Water as the primary resource in question is also discussed because it is a basic and constitutional right in South Africa as discussed in the problem statement (see Section 1.2).



Source: Author (2019)

Figure 2.1: Chapter 2 Outline

2.2 Urban and regional planning

This section discusses urban and regional planning because the study was done within this discipline. The concept of planning discusses what planning is, its origins and how it evolved over time through different movements that influenced it from an international perspective. Strategic and effective planning were discussed as proactive and deliberate actions, which produce desired outcomes that planning aims for. Situating planning in South Africa was discussed in order to demonstrate the origins of planning and the effects that is had over time. Lastly, approaches to planning were discussed because offer a framework that planning can utilise to reach its desired outcomes.

2.2.1 Concept of planning

The concept of planning has been in existence for centuries, but there is a lack of sufficient historical evidence on how and where it originated. Planning has always been concerned with organising a group of people to efficiently and effectively access resources. However, the concept of planning is explored from 1880, which was when planning became professionalised and influenced current planning practices. South African planning has been influenced by European planning practices and will therefore be discussed accordingly. Hall (2014:3) showed how planning in Britain began when a commission was established in 1880 to address slum conditions of the Industrial Revolution through housing. The Industrial Revolution resulted in high urbanisation that needed to be planned for and referred to as modernist planning (Hall 2014). Table 2-1 gives a summary of chronological modernist planning movements from 1870 to 1940.

Table 2-1: Summary of chronological modernist planning from 1870 to 1940

Movement	Description	Era
The Parks Movement	This movement was established by Patrick Abercrombie in 1943 in the United Kingdom (UK) to address fragmentation of green spaces and public walkways through modern landscape architecture (Clark 1973:31).	1885–1914
Garden City Concept	This concept was initiated in 1989 in the UK to capture the benefits of the city and countryside environment, while avoiding conflict between the two (Ebenezer Howard 2013).	1898–1930
Urban Aestheticism and the City Beautiful Model	This movement was implemented through American architecture and urban planning during the 1890s and 1900s in Cleveland, Detroit, Chicago, and Washington D.C. The movement was not only done for beautification but also for social order to improve quality of life (Jacobs 1961).	1893–1930
Plan of Chicago	Popularly referred to as the Plan of Chicago in 1909, that was co-authored by Daniel Burnham and Edward Bennett, which recommended the integration of parks, streets, railroads, civic buildings and habour facilities (Smith 2009).	1909–1915
Planning Comes of Age	After noting that city beautifying projects were not as effective as intended in the United States of America (USA), Benjamin Clark Marsh then introduced that planning would be more effective if it included public participation to adequately address the needs in 1909 (Newton 1957).	1909
Progressivism and the City Efficient	This movement was introduced during the early twentieth century in the UK, USA and other industrial nations to eliminate waste in all sectors of the economy and society, and to implement best	1890–1932

Movement	Description	Era
	practices that covered economic, mechnical, personal and social improvement (Rodgers 1998).	
Edward Basset and the Master Plan	This movement introduced zoning of land-uses in the USA through a comprehensive zoning ordinance adopted in New York in 1916 as developed by Edward Bassett (1922).	1916
Contribution of Patrick Geddes	In 1915, Patrick Geddes coined the term 'conurbation' in his book *Cities in Evolution* through which cases of population growth of cities could be addressed through agglomeration by means of motorised and electric powered transport. The term 'conurbation' is also referred to as polycentric urban areas and was initially applied in the Ruhr in Germany, Midlanton in England, North Jersey in the USA and Randstad in the Netherlands (Hall 2014).	1915–1925
Plan for New York and Environs	This movement was introduced in 1929 by the Regional Planning Association to address regional planning concerns regarding urban sprawl in New York through single interdependent and interconnected built environment plans, which was later implemented in 31 other countries (Johnson 1995).	1929–1960
Utopian Modernism	This movement in 1922 was an international professionalisation of planning and development of theories by scholars such as by Charles Eduoard Jeanneret, who was later known as Le Corbusier (LeGates & Stout 2000).	1922–1939
Cities and the Crisis of Capitalism	In the 1920s and 1930s, the Soviet Union introduced a new movement that formulated planning theory to directed society and the economy through public works and community development based on five-year plans (LeGates & Stout 2000).	1920–1940
Modern Housing for the Poor in the Depression	In the 1930s, Catherine Bauer Wurster was a central figure in public housing policy and planning education for the advancement of social housing provision and low-income housing in the USA (Oberlander & Newbrun 2000).	1929–1941
Patrick Abercrombie and the Barlow Report	Abercrombie was a university professor in Liverpool who developed planning schemes for many towns and cities. In 1937, Aberrombie was appointed by the Barlow Commission for the location of people in industrial areas.	1937–1957

Source: Compiled by Author (2019)

Based on the movements presented in Table 2-1, the planning profession then took its form to what we know it to be since the 1940s to the early twenty-first century. Furthermore, although there are various definitions of planning, there is no unanimously or internationally agreed upon definition of what planning is. First, Bruton (1974:33) defined planning as a science that has social activities that seek the practice of planning and does not have general nor special theories. Planning does not have a sharp boundary between knowledge and use because it does not only rely on theory

which makes it both a philosophy and technique (Bruton 1974:33). Fainstein and Fainstein (1994:265) viewed planning as a future-oriented, public decision-making process for specific goals, such as offering sociocultural, environmental and economic plans for the benefit of the community, but excludes private interests. For Watson (2009:2260), planning is a tool used by the government to manage spatially defined populations and territories. From Watson's definition, the issue of power is linked to understanding planning systems as they unfold. This was also confirmed by Flyvbjerg (2002:353) and Friedmann (1987:29). Lastly, for Özdemir (2019:17), planning includes policies, strategies and suggestions in planning maps and text to provide economically, environmentally and socialy balanced development. From these multiple definitions, it can be argued that planning is a complex system of an application of knowledge in order to have a desired future outcome. Desired future outcomes can therefore be reflected in environmental, economic and social factors through policies and strategies, with a central role of government through strategic planning.

2.2.2 Strategic planning

Strategic planning is often used interchangably with strategic spatial planning. The term 'strategic planning' found expression in the 1960s and 1970s in Western countries when planning began happening on different administrative levels (Albrechts 2004:743). In the same breath, Todes (2012:159) indicated that master planning was being highly critised in the 1970s because it could not affect spatial change in cities because of poor implementation links, lack of participation and non-cooperation of institutions and departments necessary for planning. Albrechts, Healey, and Kunzmann (2003:113) indicated that the European urban and regional planning in the 1980s shifted the focus from being project-centred to producing strategies for subregions, regions and cities. Strategic spatial planning was then introduced in the 1980s because it was more flexible, went beyond land use plans by integrating development intents of various institutions and sectors, involved collaborative planning and linking projects with budgets (Todes 2012:160). H. Igor Ansoff was the first scholar that was acknowledge for strategy and strategic planning through his best-selling book *Corporate Strategy*, published in 1965 (Martinet 2010:1485). The term 'strategic planning' later found expression as strategic management through a technical and

conceptual framework that deal with deliberate strategy implementation though linking strategies, bottom-up strategies, management systems and structures, and to balance economical political process and power. However, for the purposes of the study, the focus was primarily on the strategic planning process and not strategic management as it been become to be known.

As strategic planning evolved, different definitions were given for it. Friend and Hickling (2005:3) indicated that strategic planning is a choice that is seen as a universal activity, but at other times recognised as a special function associated with preparing plans. On the other hand, Spee and Jarzabkowski (2011:1218) defined strategic planning as a process that involves planning objectives by setting goals and objectives, performance indicators, developing targets and allocating resources. From the perspective of Albrechts (2012:50), coproduction is fundemental to strategic planning for opening up prospects of equity, change in power relations, working with conflicts, using political strategy for coproduction, using expertise as a contestable and integral part of the process and having a broader scope for future possilibites. The strategic planning process is important in the delivery of strategic planning intents. Albrechts (2006:1492) indicated that strategic projects such as spatial projects should be coordinated by the public sector with collaboration with the private sector and parastatals.

2.2.2.1 Strategic planning process

Strategic planning has a process it follows in its formulation. Robinson's (2014:13) illustrations of the strategic planning process was adopted because it is relevant to the South African context and how urban and regional planning strategic plans are developed. The strategic planning process can be separated into three different types: basic strategic planning process, strategic planning processes for community organisations, and more complex strategic planning processes.

2.2.2.1.1 Basic strategic planning process

According to Robinson (2014:14), the basic strategic planning process assists in responding to questions listed in Table 2-2 to collect formal inputs in the private, public and parastatals involved in urban and regional planning.

Table 2-2: Basic strategic planning process

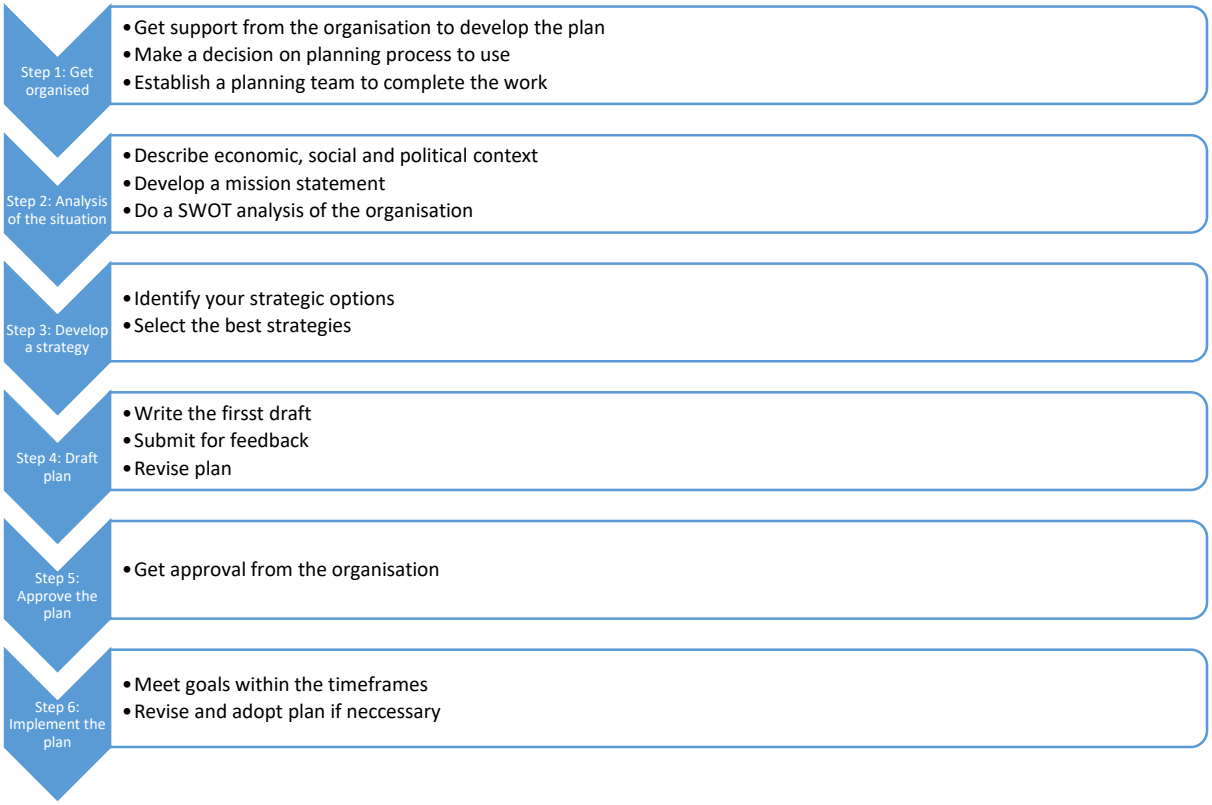
Questions	Product	Purpose
1. Where are we now?	Community profile	• Descriptive Information • Community values
2. Where are we going?	Trend statement	• Trend information • Probable scenarios
3. Where do we want to be	Vision statement	• Preferred scenario • Community vision
4. How do we get there	Strategy	• Goals, strategies and actions
5. What will we do?	Action plan and projects	• Action, agendas • Priorities
6. How will we do it?	Implementation programmes	• Medium term budgets • 5 year rolling budgets • Annual work programme
7. How will we measure success?	Monitoring and review	• Performance indicators • Critical success factors

Source: Robinson (2014:13)

The basic strategic planning process offers a simplistic approach to addressing issues related to strategic planning by responding to the questions outlined in Table 2-2. Some of the information to respond to the questions can be utilised to determine how strategic plans are packaged in QwaQwa regarding water related issues.

2.2.2.1.2 Strategic planning process for community organisations

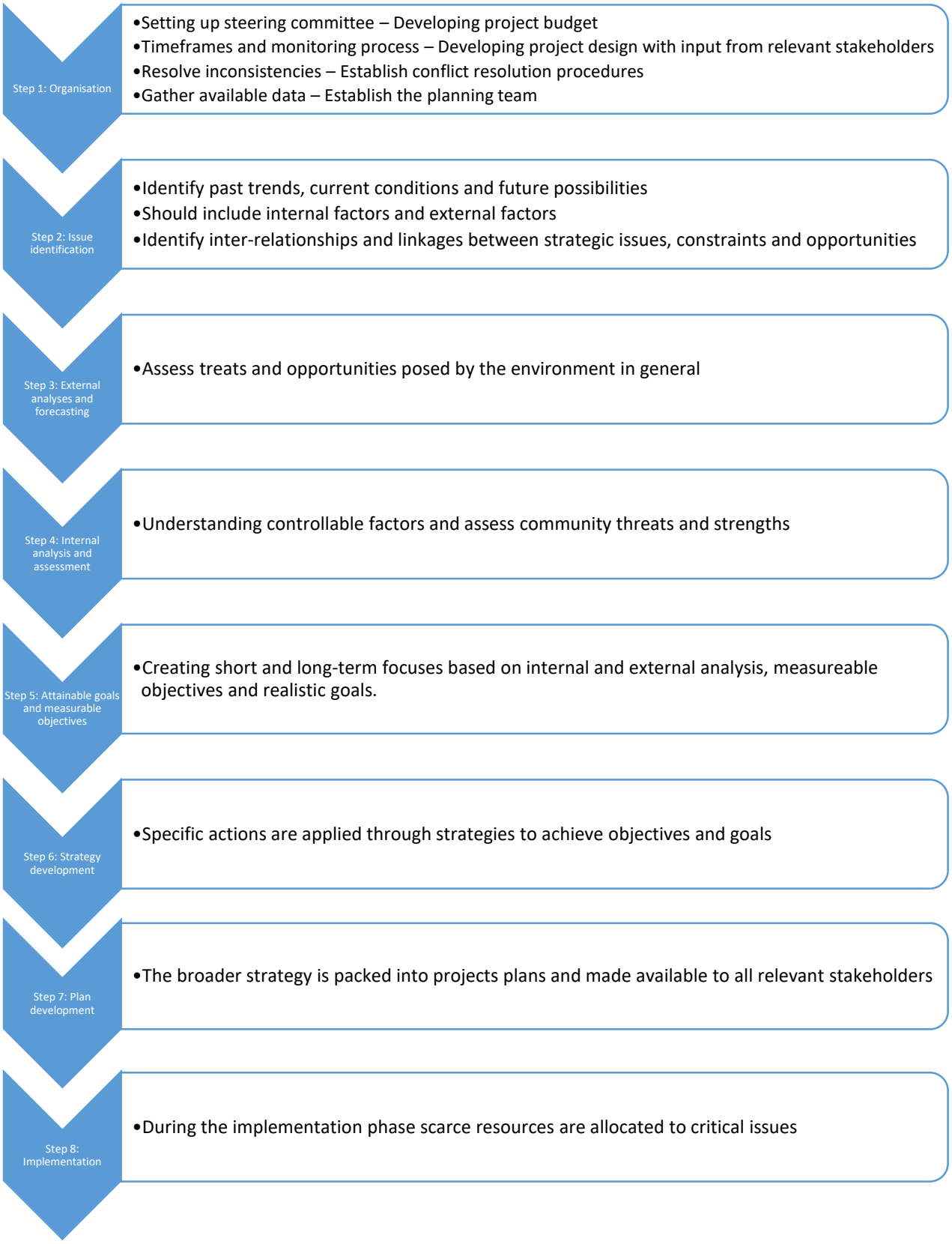
The Urban Foundation formulated the second option available strategic planning by urban and regional planners in the early 1990s for emerging civic organisations. As illustrated in Figure 2.3, it provides for six steps of realisation:



Source: Urban Foundation and SANCO (1992) in Robinson (2014:15)

Figure 2.2: Strategic planning process for community organisations

2.2.2.1.3 Complex strategic planning process



Source: Robinson (2014:17)

Figure 2.3: Complex strategic planning process

2.2.2.2 Benefits of strategic planning

The benefits of strategic planning needed to be teased out to discuss its advantages in relation to the study. Granados Cabezas (1995 cited in Albrechts 2004:747) indicated that strategy planning can appreciate new discountinuities, tendencies and surprises and allows for the taking advantage of new opportunities. Mitlin (2008 citied in Albrechts 2012:50) strategic planning allows poor people to also participate in the coproduction process through the politicial practices. For Robinson (2014:24), the strategic planning process has benefits such as a detailed understanding of issues and dynamics; assessment and exploration of different strategic options; have strategic choices informed by stakeholders; strategies to address decisions; readiness and capacity to implement strategies and decisions; and involvement of key stakeholders throughout the process.

2.2.2.3 Limitation of strategic planning

To have a full discussion of strategic planning, limitations should also be discussed. There are four limitations that present strategic planning according to BPP Learning Media (2010), and Plunkett and Attner (1994). The first limitation is a lack of knowledge because strategic planning requires a lot of training, experience and knowledge. Managers should have the necessary abilities and skills to navigate the strategic planning process. To overcome this limitation training can be offered to relevant managers. Second, if different units within an organisation or institution are not coordinated and integrated this could create a limitation as well. In this regard, coordination and integration of units will have to be sought. Third, managers might have a perception that they would not be able to achieve goals and objectives and might end up only carrying out their duties for compliance that is of minimal effect. Lastly, strategic planning requires a lot of money, time and energy. To overcome these limitations systematic, scientific and rational planning should be done because the gains of strategic planning far outweigh the losses.

2.2.3 Effective planning

Effective planning is the outcome that the study would like to address regarding the QwaQwa water crisis. Much like planning as a concept, effective planning also has multiple definitions. For Kenawy and Shaw (2014:80), effective planning is an effective

stakeholder engagement that requires various methods at different steps of the planning process for a more proactive exchange of views and information. While Musoga (2011:9) defines effective planning as a process of combining planning with the budgeting process to close the gap between implementation and planning. Effective planning is defined by Maheshwari (2006) planning for the future and preparing for desired outcomes through action. Lastly, Calthorpe (2019: online) defines effective planning as a process of shaping the future of a city on consensus and coalitions such it is a political act. Effective planning is thus a stakeholder inclusive process towards mutual future interests.

2.2.3.1 Process of effective planning

The process of effective planning according to Erkan (2009:95) is that it should include the following: First, community participation to establish clearer planning interventions, encouraging community buy-in, strengthen urban management tools, promote awareness and encourage community involvement. Second, stakeholder involvement that includes all interested parties affected by an urban planning process from initial, implementation and maintenance phases of the planning process. Third, the coordination between national policy and plans with local interests and information. Fourth, the interaction of economic and urban planning to establish clearer relations between the planning process that addresses development. Fifth, sustainability should be a consideration to address long-term sustainablity of urban development and concerns such as energy-efficient urban forms. Sixth, financial feasibility should be established to determine the financial implication of proposals including maintenance and capital costs and cost-recovery mechanisms. Last, subsidiarity involves an in-depth analysis of objectives that can maximise participation and making planning processes more effective.

On the other hand, the United Nations High Commissioner for Refugees (1999) that the effective planning process is inclusive of community participation, stakeholder involvement, coordination of national policies and plans with the local context, interaction between economic and urban planning, sustainablity, financial stability, and central governance that maximises analysis of participation and making planning processes more effectively.

2.2.3.2 Benefits of effective planning

There are benefits to effective planning that need to be discussed in order for the study to address effective planning for the QwaQwa water crisis post-apartheid. The first benefit of effective planning is that it assists in achieving desired goals and meet deadlines. Second, it provides guidelines for activities that need to be implemented to achieve goals. The third benefit of effective planning is that is improves utilisation of resources. Forth, it provides for commitment and motivation of organisation/institution and relevant stakeholders. In the fifth instance effective planning sets performance standards on how to measure goals that need to be attained. Lastly, planning allows flexibility of managers of effective planning process to identify critical resources (Maheshwari, Vandewalle and Bamber 2011:199).

2.2.3.3 Limitations to effective planning

Where there after benefits, there are limitations that need to be curbed in order to leverage from benefits of effective planning in the context of the QwaQwa water crisis. Limitations that effective planning according to the United Nations High Commissioner for Refugees (1999) are as follows: the first is that good planning requires investing time and key players might choose not to participate; second, intuition is necessary for representing unstable and highly dynamic environments; third, life-threatening situations need to be addressed before an elaborate planning process can take place; and last, the implementation of the plan could be poorly implemented in the process (Maheshwari et al. 2011).

2.2.4 Situating planning in the South African context

Situating planning in the South African context, as discussed in the concept of planning (2.2.1), was formulated using the western concepts. Planning in South Africa had been taking place for centuries but for the purposes of this study, only planning from the 1900s will be discussed. Planning in the South African context will be discussed over four periods, as adopted from Smit and Mabin (1997:193) and other literature will be fed into these periods. The periods are the Anglo-Boer war and urban reconstruction from 1900 to1913; war, public health and planning from 1914 to 1920; segregation of Africans from town planning; narrowing of town planning; depression, dislocation, modernism; global war and reconstruction; apartheid: from growth to crisis, 1950–

1976; revolt, reform and planning after 1976; ‘Slouching towards Bethlehem to be born’: Late apartheid urban planning; and democracy, reconstruction and development.

2.2.4.1 Anglo-Boer war and urban reconstruction

The Anglo-Boer War and urban reconstruction occurred during the 1900s. Smit and Mabin (1997:195) indicated that two significant reasons for urban planning to occur in South Africa were, firsly, to develop urban areas to the exclusion of black people and secondly, to enforce protection over private subdivision of land. Government during this period acted at the main developers from capital gains for the 1880s and 1890. The Orange Free State in 1984 was the first to enforce urban control and establish townships boards.

After the end of the Anglo-boer war from 1899 to 1902, urban reconstruction was sought from Lord Alfred Milner and Lionel Curtis by the British based on his experience of reconstructing London. Milner has local government experience and was appointed as town clerk of Johannesburg. The first initiative of the urban reconstruction was the extension of boundaries, laying foundations for electronic trams and removal what was considered as insanitary areas. In the process Milner’s initative removed and resettled Africans 16 km south of Johannesburg in an area called Klipspruit, which later became known as Primville in Soweto. Similar removal of black people occurred in Port Elizabeth and Cape Town too.

The challenges of the urban reconstruction is that municipalities forced colonial government to have more powers on urban form. In 1905 government introduced the idea of controlling subdivision of land and township etsablishment. Curtis, who moved from Johannesburg to Pretoria and used townships board law used by the Orange Free State. The townships board made it compulsory for all application to provide sufficient land for land uses such compounds, locations, parks, dumping sites, market square, cemeteries and a 25% allocation of land to be transffered to the state. The result of the boards requirements forced developers to employ layout designers and land surveyors for planning work.

2.2.4.2 War, public health and planning

After World War 1, that took place between 1914 and 1918, South African national government had adopted an interventionist approach that considered social urgency through the Garden City Movement that was popular in Britain. The technical and social reform of urban planning had been separated from the beginning in South Africa through zoning. Challenges facing South Africa after World War 1, included housing shortages and slum growth that needed addressing. Cape Town had slum conditions which Bishop Canon Lavis brought demands of town planning to address both industrial and residential communities in November 1917. Movements began to take place across South Africa of urban reconstruction and urban planning in places such as Durban when it appointed a Town Planning Advisory Committee in September 1918. In May 1919, the Town Planning Association (Transvaal) was formed and lobbied for the formation of the national Town Planning Commission. Cape Town in during the same period introduced the garden city movement to South Africa.

2.2.4.3 Segregation of Africans from town planning

As has already been indicated, the primary function of urban planning in South Africa was an effort to dictate the urban form of black settlements. Only allowing white people to own houses, the darker skinned population was only allowed to rent cheaper housing in the Cape Colony, and those that could not afford to rent had to move to the periphery. The location of less financially affording black Africans to the periphery excluded them from urban activities. Port Elizabeth in the 1850s had already began locating people that were not white in separate areas. In the former Transvaal, due to an abruption of mining activity in the late 1800s development began developing single-sex compounds and racially segregated areas such as Klipspruit as already mentioned. The racial segregation was active through land use zoning called racial zoning. In 1909, there was a challenge of where coloureds and Asiatics where to be located because the municipalities did not have the powers. The challenge the Transvaal has were only address by the Natives Act of 1923 that planned separately racially across South Africa.

2.2.4.4 Narrowing of town planning

Housing was closely linked to town planning. Town planning was defined as a general objects of plot development and reconstructing an area for positive outcomes for amenity, convenience, health and commercial development of an area. The national Town Planning Commission recommended that a provincial Town Planner be appointed who is an expert with energy, ability and paid sufficiently to attract the best candidate, but was not realised because the powers of planning were not on a provincial level. Department of Health's secretary, J Mitchell, supported the establishment of the various local town planning associations to support the health. But Mitchell received little support in promoting local town planning to address issues in section 132 of the Public Health Act. In 1923, Prime Minister Jan Smuts and other ministers were unable to decide whether effective planning should be done on a provincial or national level. However, in 1924 due to a change in legislation, Mitchell's proposal was adopted to add additional powers to province to conduct planning work.

The powers given to the provinces was legislated using ordinances, which allowed local authorities to also undertake urban planning. The Transvaal Ordinance of 1931 was drafted using 1919 British legislation. Ordinances assisted municipalities prepare schemes with traditional technical controls such as density, land use, position and building size. For the first time, the demand for town planners emerged and planning was undertaken through the Witwatersrand and Pretoria Joint Town Planning Committee of 1933. Longstreth Thompson, known for England joint planning schemes, became a regional planner for Witwatersrand and Pretoria municipalities for several months between 1935 and 1939. Thompson appointed Col P.J. Bowling from Northern Rhodesia that became a significant figure in South African town planning of the late 1930s. Bowling developed the first town planning scheme of Johannesburg in the 1930s, through the segregation policy which narrowed town planning because it was not an inclusive process.

2.2.4.5 Depression, dislocation, modernism

During 1930 was the great depression that resulted in a global economic crisis that had an influence on town planning in South Africa. Slum housing began to occur in towns across the country and the Slum Act was passed in 1934. The Slum Act gave

local authorities powers to demolish and replan existing areas, despite the fact that it needed substitute housing while the planning process was taking place. The substitute housing was difficult to deliver due to a lack of state funds. There was an establishment of a central state loan to local authorities to implement mechanisms within the Housing Act to confront the nature of rapid urbanisation, automobile growth and challenge of wealth accumulation and addressing poverty in cities. The planning environment has a challenge of having a few experienced town planners to tackle rapid urbanisation and complex planning issues and had to rely in academic material from abroad. South Africa was more reliant of British professional and intellectual town planning due to colonial factors. Academic architectural ideas of Leslie Thornton-White and Rex Martienssen, which connected works of Congre's International de l'Architecture Moderne and Le Corbusier to Cape Town and Johannesburg. New modernist ideas were presented a conference by architecture students of the Witwatersrand University in 1938.

2.2.4.6 Global war and reconstruction

World War II from 1939 to 1945 also had a major impact of town planning in South Africa. There was pressure mounting pressure due to industrialisation and urbanisation that increased unemployment and housing demand. In 1943, Smuts appointed H.J. van Eck to establish the Industrial Development Corporation. Due to the establishment of the Industrial Development Corporation, other departments began thinking along the lines of planning beyond neighbourhoods. In 1940, Cape Town appointed Thompson of London and Prof Thornton White from the University of Cape Town for the reconstruction of the city centre and introduction of railways. The reconstruction process of the Cape Town city centre also led to the demolition of District Six for the creation of new road links to the industrial, commercial and low-income residential areas.

In 1943, racial zoning as an instrument of port-war reconstruction and there was a Social Economic Planning Council informed a fifth report on Regional and Town Planning of 1944 that identified planning and segregation, urbanisation and modernist discourse. The Natal Town and Regional Planning Commission came into existence in 1951 to address planning issues in the province. The Social Economic Planning Council adopted British reports such as that of Scott, Barlow and Uthwatt by

separating communities with green belts for residential and employment sites, including the transport linking them. The seed of racial divide was sown by the implementation of Social Economic Planning Council. Due to the inability of Smuts to establish a national planning department, he established the Land Tenure Advisory Board (LTAB) for urban matters and Natural Resource Development Council (NRDC) for regional planning in 1947. The LTAB and NRDC's planning development bean with the goldfields in the Free State and Transvaal Highveld.

2.2.4.7 Apartheid: From growth to crisis

In May 1948, the National Party came into power based on the Apartheid Manifesto that included compulsory urban segregation. The then LTAB chairperson, D.S. van der Merwe, recommended that his institution be taken up on the task of implementing the Apartheid Manifesto. The LTAB then drafted the Group Areas Act of 1950 and the NRDC was then also brought for planning racial restructuring of cities and innumerable subsidiary planning committees that were responsible for planning African Townships. The NRDC became national planning agency for the reconstruction of urban South Africa. The chief planner of the NRDC in 1952 was quoted saying:

> *I acknowledge that race zoning, that is the creation of locations [for Africans] and residential areas for coloureds and Asiatics, is of cardinal importance in our country, but it cannot be separated from simultaneous planning of white areas, industrial areas, traffic systems, the recovery of natural resources, etc*.

South African was experiencing high economic growth that allowed for the implementation of grand apartheid.

Part of the planning scheme included developing large new public housing estates for the workforce and to better accomplish comprehensive segregation. The development of large African Townships then became known as a location. From 1900 to 1950 there were 800 public houses per year, but it increase to 4 000 houses per year thereafter. The peak for public housing provision was at its peak at 11 074 houses in 1957 and 1958. The process of forceful removal of Africans was then referred to the tidying-up of cities and tightened the control of rural urban migration of Africans. There was resistance by Africans that led to the Sharpeville Massacre in 1960 that was countered by H.F. Verwoerd's government to show force to any resistance. On the other hand, white areas (suburbanisation) had an increase demand of private home ownership,

which led to a substantial increase of private consultancy. Strict policing was put in place for racial land reservation for white middle class and suburbanisation.

In the late 1960s to 1970s apartheid government developed Bantustans, referred in the study as homelands, as urban centres for Africans. Urban planning in homelands was conducted by central authorities in Pretoria and minimally by authorities in homelands. The apartheid government had moulded the type of work planners do in South Africa in the 1970s. Urban planners were divided into two groups, firstly the private planners and white local authorities that presided over land and property markets in South African cities and secondly those that planned for homelands and provincial regional planning. As a result, cities started developing skyscrapers in the city centre, decentralisation of retail activities, introduction of freeways and industrial parks. Planners began to see themselves as technicist-built-environment professional. From 1965, seven university offered the planning programme and only three allowed black students. Even though black students were allowed in three universities, they failed to recruit back students through the permit system until the end of the 1970s. This meant that planning remained in the hands of white planners and continued to affect the African majority. Due to national government planning homelands and townships conflict arose between it and local authorities and the Bantu Affairs Administration Board was established. On the other hand, the Department of Community Development was responsible for the planning white, coloured and Indian group areas. The Department of Community Development brought town planning and housing closer to each other.

2.2.4.8 Revolt, reform and planning after

On 16 June 1976, there was a widespread attack on schoolchildren in Soweto against a school curriculum in Afrikaans in general, but also a revolt against the oppression of Africans from meaningful participation socially, economically and politically. After the June 16 revolt, the apartheid state attempted to mend the effects of the social structure. The apartheid state resorted to including planners when developing policies that were relevant to the context of the areas they influenced. Through private sector involvement of the state the Urban Foundation was established which primarily involved in policy formulation for urban reconstruction. The Financial Mail made a contribution through an editorial piece that the three areas of focus should be the

provision of adequate infrastructure in Townships, security of tenure for Africans and allowing blacks to trade in white areas. Government intervened by introducing legislative changes and infrastructure projects by private sector developers in townships and referred to as extensions. The houses developed in extensions was generally for better-paid black people that could afford a bonded subsidy.

In 1978, the ruling National Party elected P.W. Botha to be its leader after widespread scandals over misuse of state funds. Botha then created central control of power for purposes of reform of urban planning and policy. The planning function was moved from the Department of Planning to the Prime Minister's office. The physical planning functions however reminded with respective departments. In 1981, there was a state constitutional reform and by 1983 a new tricameral parliament was introduced that included coloured and Indian people. The agreement of the tricameral parliament was for the three race divided house to be responsible for housing and planning matters for their constituencies. The tricameral parliament period created confusion and fragmentation because black planners in homelands were not allowed to participate in contributing to policy but were hired to carry out the planning function.

Despite the fact that Botha's approach was seen as progressive, but it was regarded as illegitimate because it continued to oppress a majority of the population. Through the intervention of the late 1970s to allow black students to enrol into planning school, students from abroad and from some African countries were also enrolled. Two major changes too place when black planners were available. The first was the establishment of a Regional Development Advisory Committees as a non-statutory national regional development system. The Regional Development Advisory Committees constituted of nine committees that included territories that acknowledge that the fragment homelands were not going to be economically viable on their own. Government established the Development Bank of South Africa (DBSA) that was linked to supporting homeland governments for urban planning activities. The second changes was when provincial administrators were defined as general affairs and branches of national government, while continuing their old planning functions. General affairs included African areas through autonomous fully-fledged black local authorities in 1983. The urban planning functions were implemented through the Black Communities Development Act and provincial development boards. The townships in

the black local authorities had a few industrial or commercial activities that resulted in an inadequate tax base. The state acknowledged the issue of insufficient revenue collection in black local authorities and developed redistributive policies that were implemented by the Regional Service Councils, which had the powers to raise business tax in white areas to, in theory spend in black areas. Despite the progress from exclusionary planning before the revolt of 1976, it failure of this is that planning was still based on the old form of racial segregation.

2.2.4.9 'Slouching towards Bethlehem to be born': Late apartheid urban planning

There was political outrage due to the black local authorities and tricameral parliament. black local authorities were accused of being corrupt by raising rents on public housing. From 1984-85 there was revolt, which on the third day of September in Sebokeng. Approximately 25 000 troops were deployed in 1985 to Sebokeng and approximately 26 000 people were arrested by mid-1986. The period in Sebokeng was viewed a civil war between residents and the military, which order was only restored in 1987. In Botha's notorious Rubicon speech that rejected negotiation, government increase their reaction to political revolt. The National Security Management System was affected by political revolt and came with two interventions. The first was work on material improvements of existing Townships to win the hearts and minds of the urban population. The second was joint management committees for all levels of government so that every public service office had a representative involved in the security system.

During the 1970s and 80s, rapid urbanisation continued. The population of Durban doubled from 1970 to 1980. In many South African cities, unauthorised shack settlements began mushrooming. As a response, in 1986 government released the White Paper on Urbanisation. The White Paper aimed to reverse years of anti-urbanisation of Africans and encourage positive urbanisation to increase the quality of life of all South Africans. The tension between rapid urbanisation resulted in the creation of new economically and politically autonomous satellite towns in large metropoles. In grand apartheid, reconstructionist planning focused on tight control of cities by offering black South Africans rental housing provided by the state in Townships. In the late apartheid state control of black people in urban areas became a challenge leading to large and controlled informal settlements. These large informal

settlements were in areas such as Khayelitsha, east of Cape Town, Orange Farm, south of Johannesburg and Motherwell, north of Port Elizabeth on the urban periphery. This meant that racial allocation still maintained the central vision of apartheid. A few number of middle and upper income black people were afforded the opportunity to buy houses in to white residential areas after the reform of the Group Areas Act (GAA).

2.2.4.10 Democracy, reconstruction and development

Leading up to the idea of a democratic South Africa, in the late 1970s and 1980s, there were a raise of civic organisation that were funded by the non-government organisations Planact Development Action Group and Built Environment Support Group. The mandate of the civic organisation were established to fight transport and rental issues. The civic organisations were primarily focused on Townships. For the first time since the 1930s planning started considering inclusive planning. Throughout the 1980s annual economic growth was below 1%. In late 1989 Botha was ill and on 2 February 1990 F.W. de Klerk was appointed as president, announcing transitional period towards democracy. Liberation movements, organisation and political parties were unbanned and willingness to negotiation for the future dispensation of all South Africa. The decision was influenced by economic stagnation.

De Klerk revoked laws that affected urban planning such at the Land Act of 1913 and 1936, Abolition of Racially Based Land Measures Act of 1991, Group Areas Act, Native Urban Areas Act of 1923 and Black Communities Development Act of 1984. The revoking of the laws meant that planning got divorced from racially segregated planning. To speed up land development the Less Formal Township Establishment Act of 1991 was promulgated and the Independent Development Trust was the driver of this through state funding. The Independent Development Trust delivered 100 000 serviced sites to low-income households for existing informal settlements and greenfield projects. Community participation made compulsory for allocation of funds on all spheres of government. On a local level development were under negotiation and on national level urban policy was discussed in various forums.

In 1990 and 1991, the Urban Foundation released multiple policy documents called *Policies for a New Urban Future*. The World Bank came back to South Africa since sanctions so that South African cities for compact urban development and higher

densities. The National Housing Forum funded programmes on restructuring the build environment. Various academic also called for exploitation of urban reconstruction and linking reconstruction to its initial motives of Global Reconstruction 1940s. Other public and private sector stakeholders wrote much on how they thought the South African urban reconstruction process could take place.

In 1994, the ANC-led government developed the RDP after the government of national unity. The RDP was turned into White Paper through the office of the President and an idea that the urban planning environment was happy with. Presidential Lead Projects were funded by the national RDP budget to reconstruct the injustices of apartheid, rebuilding community facilities and houses in Townships like Katlehong. Another area being Cato Manor in Durban that were demolished in the 1950s and 60s. The post-apartheid South African Institute of Town and Regional Planners held four conferences to support the redress of South Africa. There were frustrations with planners across all races to create a new professional organisation hence the establishment of the Development Planning Association in 1993. In 1996, the South African Institute of Town and Regional Planners and the Development Planning Association negotiated between two bodies to form the South African Planning Institution which had more black leadership.

2.2.5 Approaches to planning

Approaches to planning follow because on what was discussed in the concept of planning (section 2.2.1) with the influence of operation, distribution of consumption and investment processes for the common good through policies. The study discussed four planning approaches because these were relevant to the study. The four planning approaches are communicative, advocacy, participatory and collaborative planning.

2.2.5.1 Communicative planning

Communicative planning is an approach to problem-solving that identifies issues and challenges that need strategic planning; and further goes beyond the norms in the distribution of material resources (Healey 1996:241). Human beings are diverse and live in a world that has economic and social complexities with various development potentials while sharing values, interests, and relationships with others (Healey 1996:241).

Communicative ideology has meaning in current planning practice and has been demonstrated by works such as that of Faludi and Korthals Altes (1994) and Healey (1997). For Voogd (2001:77), the communicative planning theory was starting to dominate in the field of urban planning in the beginning of the twenty-first century. Communicative planning's popularity coincides with the current political libertarian climate that is dominated by the market. According to Healey (cited in Voogd and Woltjer 2016:70), *"Communicative planning takes many forms of which collaboration, persuasion, learning, mediation, negotiation, and bargaining are an essential ingredient."*

2.2.5.1.1 Benefits of communicative planning

Communicative planning has its benefits as will be discussed. Voogd (2001:78) indicates communicative planning as a pro-active way of planning with and by stakeholders. Good planning also required collaborative or participatory activities that should be included in planning. Furthermore, communicative planning considers the existence of social dilemmas of which refers to the existing conflicts between an individual choice to maximise his or her interest and the decision that would benefit the society. Moreover, communicative planning also comprises of an intrinsic paradox that has resulted in this concept to be vulnerable. However, social dilemmas could not only be solved through communicative planning (Innes 1998:53).

2.2.5.1.2 Challenges of communicative planning

Challenges of communicative planning are the difficulty to distinguish between argumentation forms discourses of planning, power relations, and transformation bearing discourses. Matters at hand have to be relevant with modern times and have the potential to open up the public realm for inclusionary argumentation (Healey 1996:241). If inclusionary argumentation is applied as public realm, there is no certainty of which practices to be followed to achieve the creation of diverse shared urban spaces (Healey 1996:241; Innes 1998:57). The key concern is that interests being conceived, ways of understanding them, valuating and applying knowledge and methods of communicating cultural differences is often a challenge. The last challenge is identifying tasks in strategy development and strategic consensus building to promote inclusionary argumentation and the skills need to facilitate the performance.

With the history of the establishment of QwaQwa in colonial and apartheid epochs, communicative planning has been a challenge because the community was subjected to unfavourable living conditions as discussed in Chapter 1. According to Healey (1996:242), the issues that are raised on through communicative planning do not have a bias due to the subject matter.

Based on Healey's definition of communicative planning, the study through its effort will discuss the QwaQwa water crisis to include definitive approaches of collaboration, persuasion, learning, mediation, negotiation and bargaining based on contributions from participants of the study through the synthesis of recommendations.

2.2.5.2 Advocacy planning

Advocacy planning requires that the community's well-being and individual interest are allowed to be addressed and deliberated effectively through a democratic process (Forester 1994:154). The QwaQwa water crisis is an indication that the community's wellbeing is affected and thus the study consider advocacy planning as an approach. Planners play a critical role in mediation and political community-building roles as a part of their work. It is critical for planners to seek public participation and better planning products. Advocacy planning, as alluded by Davidoff (1965:332), focuses on what planners do in both public participation and planning products to enable the readers to understand the problems that exist within individual interest and community welfare. Through advocacy planning issues can be addressed through the processes of democratic deliberation. The notion of interest and community are also politically shaped and not only by planner's imaginations but also by those that participate or choose not to. Therefore, planners have to learn and gain experience as they deal with situations. Advocacy planning should also be noted as an informal role because it requires personal commitment to a course beyond the call of duty. This, in turn, means that advocacy planning is a process that aims to support public/community needs and recommend policies based on their needs.

Advocacy planning also has its own challenges. Forester (1994:154) indicates that people do not always say what they mean and will only give their needs based on what they have been exposed to. Planners should be able to listen attentively and be able to protect the community's needs and interests when involving the private sector. This helps to shape development with options and priorities of both party's hands.

Community representation is politically shaped because they elect representatives who generally attend meetings on their behalf and know their interests and what is not immediately needed. The study had gone through lengths to consult with participants as is discussed in Chapters 6, 7 and 8 for their contributions.

There should be a planner in every community according to Davidoff (1965:333). Davidoff further states that there should be a ‘plural plans' argument and debate which means that planners would be asked to work in the realities of contentious meetings, where substance and exaggeration are being seen as completion, where respect and racism are being seen as competition and where listening carefully is in completion with irate presumption. Moreover, planners should have skills such as listening, acknowledgment, negotiation, meditating, probing, inventing, reconciling, facilitating and organising. If planners do not have these skills, it will result in them tackling the ‘plural plans' with fear and not in relish. Consequently, planners without these skills will experience a lot of challenges rather than being able to improve plan qualities while making democratic politics a reality. Therefore, planners should be able to propose well-crafted solutions, especially in unpredictable situations. Moreover, planners that have experience have dealt with challenges in democratic parties at all times and have seen that power does play a standard role while planners have to estimate on their capital on how much to expand to make for the uncertain and risky business of ‘participation' work. As well as how little they should know considering that too much is changing rapidly while neighbours and developers declare political candidacies and self-promote themselves using planning issues:

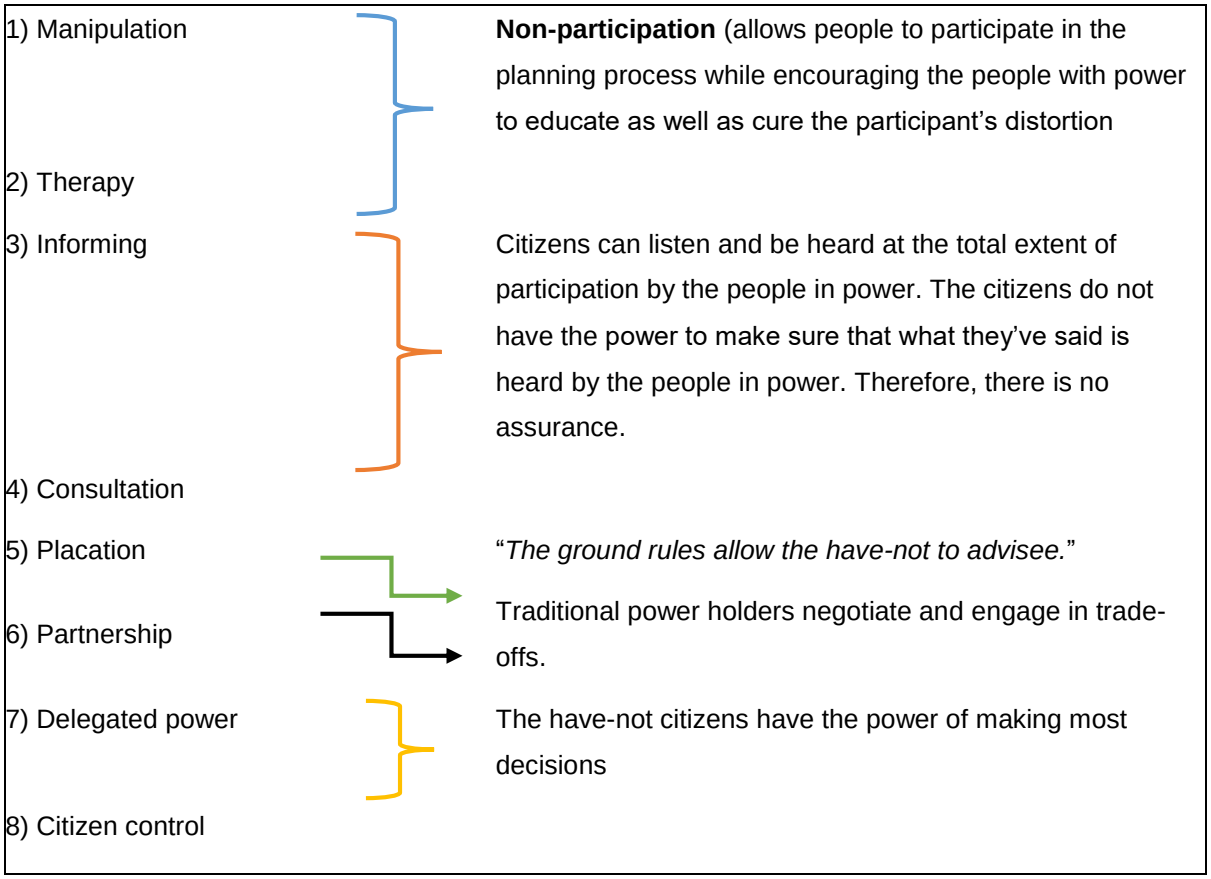
> *City planning is a means for determining policy. Appropriate policy in a democracy is determined through political debate. The right course of action is always a matter of choice, never of fact. Planners should engage in the political process as advocates of the interests of government and other groups. Intelligent choice about public policy would be aided if different political, social, and economic interests produced city plans. Plural plans rather than a single agency plan should be presented to the public. Politicizing the planning process requires that the planning junction be located in either or both the executive and legislative branches and the scope of planning be broadened to include all areas of interest to the public* (Davidoff 1965:331).

Therefore, planners can learn more by reflecting their own experiences, by watching others, from listening to different realistic accounts of how another planner handled a

certain challenge or situation or from reading other commentaries on actual cases. QwaQwa's water crisis indicated signs of a lack of advocacy planning because the functioning of the three dams were not significantly altered to cater for the community sufficiently.

2.2.5.3 Participatory planning

Participatory planning is a planning approach for citizen participation. Citizen participation, citizen control and maximum feasible that is also inclusive of the poor because it's topic because that has been a much debated issue (Arnstein 1969:216). Citizen participation is a form of power. The Ladder of Citizen Participation comprises of eight rungs because citizen participation is not always understood without the illustration offered by Arnstein (1969:216). Furthermore, the ladder also shows the level of citizen power as the last level of the process of planning taking into consideration the types of participation and non-participation. The ladder of participation is illustrated as in the eight rungs below:



Source: Arnstein (1969)

Figure 2.4: Ladder of citizen participation

Therefore, the higher a citizen goes up the ladder, the more power they have about making decisions. The have-nots are usually seen as “those people” due to them being different and not having enough knowledge to make decisions (Arnstein 1969:218-223). The ladder of citizen participation will in Chapter 9 indicate how the study perceives the level of participation of QwaQwa’s community.

2.2.5.4 Collaborative planning

Collaborative planning is an urban planning concept that aims to resolve complex and multi-stakeholder situations. When applied to plan it encourages public participation, mediating and resolving stakeholder disagreements (Healey 2003). For Healey (1997:85), collaborative planning offers mediation among various stakeholders and building context specific institutional capacity. Brand and Gaffikin (cited in Gaffikin & Morrissey 2011:118) defined collaborative planning as an overarching concept for collaborative governance through public policy decision-making that is based on stakeholder consensus. The execution and implementation of collaborative planning can be challenging, hence Gunton and Day (2003:9) suggest the following four criteria to evaluate its effectiveness: ability to reach an agreement successfully; efficiency of the collaborative process; outcome of the stakeholder satisfaction; and achieving social capital among stakeholders.

2.3 State and power

This section on state and power outlines the concepts that are relevant to the study. The role of the state is discussed to describe how a state is composed, its function and different types of states. The concept of power is discussed to indicate who power relations, power of planners and social engineering have had an impact on planning and water in QwaQwa. Lastly, enclosure and enclosure acts, primitive accumulation, accumulation by dispossession and neoliberalism as discussed as socio-economic theories that have had a historical impact on how resources such as water have been allocated and their impact on planning.

2.3.1 Role of the state

Government and its department is organised through the state and the term needed to be discussed for the purposes of the study to discuss the role of the state. Gettel

(Asif 2008:20) defined political science as a science of the state, which Garner (1952:44) indicated that political science is based on the state. For Machiavelli (2008), the concept of the state is the authority over man. For Weber (Dusza 1989:71), a state is community of people that successfully claim to be use physical force within a boundary. MacIver and Page (1949:15) viewed the state as different from other associations because it can make exclusive investments with the final decision making powers. MacIver and Page (1949:15) further indicated that the state has to conform to a specific territory and must maintain social order in this territory. However, Watkins (1968:150) defined the state as a geographically area that consists of human society under one rule of law. Lastly, Roberts (1972:38) described the state as a territorial area that is governed by a political regime and has a set of laws that if broken legitimate force can be applied.

The sovereign country or state has one centralized government run by a political entity that has sovereignty over a territory. Another definition of a sovereign country has a permanent population, one government, defined geographical area and capacity to have relations with other sovereign states. The last definition of a sovereign state is not dependent or any state or power (Connor 1978; Paleri 2014; Tishkov 2000).

The term nation states cannot be traced from its actual origins, but literature suggests that only in the fifteenth century intellectual discoveries such as capitalism, political economy, geography that worked with cartography and map-making instances, political geography and mercantilism (Branch 2011). For others, sovereignty was the source of nation states so that the demand could be met. Nation states can also be viewed as government unifying its policies and modernising existing states. For historians, the theory of states occurred after the unity of states in places such as the Dutch Republic and Portugal (Lansing & Edward 2012:4).

A nation state has a majority of people that share the same culture and is aware of that (Yuval-Davis 1997:14). For Paleri (2014:88), a nation state has cultural boundaries that match with its political composition. Another definition of a nation state is a sovereign state that has subjects with common factors such as descent and language. The difference between nation state and country is that a country does not have a predominant ethnic group.

There are five different types of states, namely empire that consists of multiple countries and nations that are under a single ruling state or monarch; city-state are smaller than large sovereign countries and it dominated by a common ethnicity; multinational states does not only have one ethnicity; federated state might not be a nation-state and some partially self-governing; and confederation consists of sovereign state that might be nation-states (Boll 2007:67). In this context, South Africa in a multinational state because it comprises of multiple ethnicities under one rule and law.

2.3.2 Concept of power

The concept of power has been in existence for many centuries. In the sixteenth century, it was through the work of Machiavelli (2008) that indicated total power over servants and people was a desired end product and could only be attained in few instances. Looking at power from this lens, it indicates that power is about domination of those in a previllage position over those they claim to serve. Hobbes (1980) wrote about how from seventeenth century there was evidence that power had to do with the state or social group being dominant over its people. Hobbes's work further indicates that the political landscape as is represented by the state, society and community in a single unit that has a single principle that is obssessed with power. In the nineteenth century, power according to Engels (1954) had created a social order where distributive power had resulted in preventing the majority from reaching their full potential. For Dahl (2005), power is a dominant force that is based on authoritarian and economic interests. Dahl's work further indicates that an actor with power within a social relationship should be able to carry out his duties even when it will not serve them a major benefit (Polsby 1980). Bachrach and Baratz (1962) indicated that power should set out to do what is shown in public and decision-making done are on par with each other. Lukes (2004) introduced new dimension called community power that concurs with Bachrach and Baratz (1962) that those in power to should act in the favour of those they serve. Lastly, Johnson (2006) indicates that the social order of power is for a privilaged class that is linked to gender, race and sexual issues. The concept of power then gives an opportunity for discussion of power relations and how they are navigated in the decision-making process.

2.3.2.1 Power relations

Knowledge is power

~ Francis Bacon

The influence of development and rapid urbanisation, particularly during apartheid years in South Africa led to systemised power relations that still affect effective governance in QwaQwa. Bacon's quote is ambiguous because it states that knowledge is power, but in hindsight also implies that without knowledge planners will not be able to recognise or diagnose power. Power in the broadest terms has multiple definitions. According to the Oxford Dictionary (2017) power is *"the ability or capacity to do something or act in a particular way*". Another definition of power is "*the capacity or ability to direct or influence the behaviour of others or the course of events*" (Oxford Dictionary 2017).

Foucault (1980:91) presents two systems of power:

- Power is an ideology of giving up sovereignty and the contract as a form of political power. This means that if power becomes sovereign it over-extends itself beyond the limits of the contract and becomes oppressive and transgressive.
- The influence of power on political power has not been expressed sufficiently through contract-oppression, but rather focuses on war-repression, which is that power does not oppress, but rather brings about an effect and continuation of a dominating relationship.

The extension of power on how people live manifests through power relations, where interests of those that are preserved to have economic power have a bargaining power.

2.3.2.2 Power of planners

Fenster (2002:79) insists that *"if planners ignore those in power, they assure their powerlessness.*" Forester (1982:67) supported Fenster's definition by indicating that if planners do not pay attention to those in power, they perpetuate their powerlessness. While Mphambukeli (2015:49) reiterated that the avoidance of power can impact negatively on adequate basic service delivery within the planning discourse. Therefore, if planners fail to understand and intepret power they will fail to structure the planning process. Planners should be more equiped to dealing with issues that

have to do with power because planning education and training should equip them with skills to address these. Dealing with power would, in turn, involve the community voicing their needs and planners reflecting those to give the community power in planning. The challenge with the realisation of plans is that planners are not the implementers of such plans (Forester 1982:67).

For purposes of the study, power is defined as an act of recognising the influence of those in positions of privilege affect the socio-political, economic and cultural factors outlook of the community. With South African being in the democratic dispensation, the power of planners have been challenged to deal with the inequalities of the past which the study does not feel have been rendered to the majority of the community and specifically in QwaQwa.

2.3.2.3 Social engineering

Social control is done through social engineering. Noyoo (2018:25) defines social engineering as a process of redefining a society with the desired outcome. For Berti and Rogers (2003:52), social engineering is “the process of attempting to change people’s behaviour predictably, usually in order to have them comply with some new system”. Neoliberalism as a practice does not only affect the economic sphere but society too and makes it a social engineering model too (Harrison 2010:32). Hadnagy (2011) indicated that social engieneering is used daily by ordinary people and in every situation, for example, an employee trying to get a raise at work or child navigating for candy in a store. Lastly, Larsson, Letell and Thörn (2012:12) defined social engineering builds a machine-like citizen home through social science.

According to Karl Popper (Hayes, 2001), social engineering has two distinctive forms, holistic and piecemeal social engineering. Holistic social engineering remodels a society according to a definite plan or blueprint through key positions and extends the power of the state until it matches society. Piecemeal, on the other hand, is a process applying certain ideas to society as a whole with a rejection of the impractical remodeling of an entire society.

Tomba (2004:11) gives an example of how social engineering was used to enlarge to the middle class of Beijing through residential segregation by two processes. First, holistic engineering was used to commercialise the urban environment around gated

communities. Second, piecemeal social engineering was done through state subsidises for housing ownership and was offered to public employees to enhance homeownership.

As discussed in section 1.1, holistic social engineering was applied using the apartheid social model of balkanisation. Centrally governed was ruled by the white minority and black homelands were legislated by the central government as "independent and self-determined states according to language. Urban and regional planning was a tool that was used to move black people to homelands that constituted a maximum of 13% according to the Land Act of 1913 and the Group Areas Act of 1950. The effects of holistic social engineering still face QwaQwa because piecemeal social engineering is being used through welfare programmes such as low-income housing and social grants that keep previously disadvantaged communities impoverished. The Sterkfontein Dam has continued to serve its primary function of supplying the Vaal Dam, while the Fika Patso and Metsi Matso Dams that were strained continued to be the primary source of water for QwaQwa.

2.3.2.4 Five faces of oppression

This section discusses Marion Young's (2004) Five Faces of Oppression, however to give context oppression will first be defined. According to Gove (1961), oppression is an unjust act or exercise of power that is often displayed by government authority or cultural norms. The Oxford Dictionary's (2020) definition of oppression is an unfair and cruel treament of people by not giving them equal rights and freedom as other people. For Frye (1983:2) oppression has an ubiquitous feature through which a group of people are exposed to deprivation at the expense of others. What all three definitions discussed have in common is that oppression is a societal feature where a group of people does not the same rights, freedom and previlages as another resulting in cruel and depriving circumstances. As already expressed in section 1.6, the study area is a water source for major rivers in South Africa, whilst the community of QwaQwa is experiencing a water crisis that displays a sign of oppression.

The result of oppression offered by Young (2004) is that in as much as people are not oppressed to the same extent or in the same ways they suffer prohibition to develop and exercise their capabilities and express their thoughts, needs and feelings. Frye

(1983) gives an example of an oppressive situation requiring people to be cheerful and smile, unknowingly giving premission to the oppression, otherwise they'll be viewed as bitter, mean, angry or dangerous. Young (2004) further discusses five faces of oppression namely: exploitation, violence, powerlessness, marginalisation and cultural imperialism that become the result. First, exploitation is an act of using people as active agents in a process, but not adquately compensating them. Exploitation is the context of water and planning is inequitable access to water based on race, class, and/or gender. Second, violence in the context of oppression is normalised fear by people of being attacked unprovoked at random. Violence in the context of water and planning is the act of using force on people that demanding adequate access to water. Third, in an oppressive powerless situation where people are dominated by the ruling class in which they have to take instructions but cannot give them. In the context of water and planning this relates to class segragation and based on South Africa's history has taken shape in the form of race. Fourth, marginalisation is an act of confining a group people to a lower social order than others within society. In the context of water and planning this means that a group of people considered to have a higher social order will have more access to water than those that are lower than them. Lastly, cultural imperialism normalises the culture of the ruling class as the way things should be done. In the context of water and planning cultural imperialism takes place in a situation where a dominant culture dictates how water should be accessible to a society.

2.3.3 Enclosure and inclosure acts

Enclosure acts, used interchangeably with inclosure acts, are a series of acts that were conceptualised in England and Wales. These acts highly influenced the enclosure of common land and open fields that created property rights to land that was previously held commonly in eighteenth century Britain (Birtles 1999; Cooke 1846). They were a tool used for primitive accumulation. Slater (1907:35) defines enclosure to places such as common land/fields, a part from air and water. The enclosure of land more commonly affected smallholder farmers whose land was consolidated to form larger farms. Due to enclosure acts originating from Britain, the study acknowledges that they might seem to be an overextension in that regard, but this is important for the historical context.

According to the United Kingdom Parliament (2013), between 1604 and 1914, over 5 200 enclosure acts were passed over 2 800 000 ha (28 000 km^2). During the process of land enclosure, common land would belong to an owner. This saw a change of ending traditional systems of farming arable land because mechanisation started playing a role. By the nineteenth century remaining land that was not enclosed included land that was agriculturally cost intensive and in mountainous areas. Birtles (1999:74) raised concerns about how much poor people were dispossessed in Britain. A common factor was that enclosure commissioners had not adequately compensated people that had local access to common land, and more so when new landowners could not demonstrate how they came to own the common fields. Through enclosure, there was a large phasing out of smallholder farmers and the beginning of a rural working-class that depended on labour wage. When the enclosure was opposed, the emphasis was usually placed on how labour wage was going to benefit the poor.

Beyond the context of the impact of enclosure acts in Britain, South Africa's colonial history by the British in the nineteenth and twentieth century these were extended. The impact of primitive accumulation will be explored in QwaQwa because even though there has not been sufficient provision of potable water, there is still availability of water in rivers. From the current stance of the study, the community of QwaQwa has been separated from the means of providing water for themselves.

2.3.4 Primitive accumulation defined

Primitive accumulation is a critical socio-economic theory that defines how land and resource ownership was constructed in the twenty-first century. Perelman (2000:13) defined primitive accumulation as a process of separating people from means of providing themselves and was a basis for capitalism. Hall (2012:1188), on the other hand, defined primitive accumulation as a way in which capitalist social relations and are created and reproduced overtime. Karl Marx defined primitive accumulation as a process of divorcing the producer from their means of production and converting these means into capital and the producers into wage labour (Harvey 2007). McCarthy (2004:329) viewed primitive accumulation as the enclosure of nature and creating new permutations of the process through privatisation of nature-based means of production through an accumulative strategy. While Harvey (cited in Benjaminsen and Bryceson 2012:336) defined primitive accumulation as a process of taking the land, enclosing

and expelling its occupants to create a landless population and releasing land to the private sector for capital accumulation.

As indicated in the background of the study area, QwaQwa is a water basket to major town and cities in South Africa. All the outlined definitions points to the fact that primitive accumulation was and is a means of disempowering people from providing for themselves to privatisation through which people are employed as labour for capitalists.

2.3.5 Accumulation by dispossession

Accumulation by dispossession is a neoliberal socio-economic principle. Banerjee-Guha (2010:13) was concerned about the contemporary transformation of cities that are integrally related to economic globalisation and contemporary neoliberal order. This trajactory has resulted in creative destruction through accumulation by dispossession and displacing a majority of the urban poor. On the other hand, Levien (2011:455) defined accumulation by dispossession was a historical process of divorcing the producer from their means of production. It originates from capitalism in the West and has transitioned to capitalism in the Global South. Harvey (cited in Benjaminsen and Bryceson 2012:336) described the ongoing process of primitive accumulation that has led to the current term of accumulation by dispossession. For Shivii (cited in Benjaminsen and Bryceson 2012:336) accumulation by dispossession in the development context is the process of land grabbing and commodifying water. QwaQwa is relatable to Shivii's example because land 20 km outside of QwaQwa was used to construct the Sterkfontein Dam for the commodification of water in the Vaal Dam.

Harvey (2007:160) has written on how neoliberalism is also referred to as dispossession by accumulation through the four features. First, privatisation and commodification through a single key feature of corporatisation, commodification, and privatisation of public assets such as social welfare provision (social housing, health care, pensions, and education), public utilities (water, telecommunications, and transportation), public institutions (universities, prisons and research laboratories) and warfare. Second, financialisaton has created financial systems that are deregulated and became the main centre of redistribution through predation, speculation, fraud,

and thievery. Third, there has been management and manipulation of crises by accumulation by dispossession. Fraudulent manipulation of crisis less common in the 1960s and became more common in the 1980s and 1990s were third world countries were the most affected. Interest rates are increased to dispossess the poor and making the rich wealthier. Lastly, state redistributions reverse the flow of money from the poor to the rich through redistributive policies. Redistributive policies privatise state resources with an illusion that they will solve community issues but end up costing it more in the end. The first feature of privatisation and commodification is the focus of accumulation by dispossession of water in QwaQwa to the disadvantage of the community.

2.3.6 Neoliberalism

Neoliberalism is an economic policy that advocates for free-market capitalism that has minimal government intervention (Cahill 2009; Harvey 2007). It is referred to as excessive greed and extreme capitalism, through privatisation of key strategic economic sectors. For Banerjee-Guha (2010:95), neoliberalism is the process of discouraging government and encouraging market-based practices. While Cahill (2009:12) firmly advocated against neoliberalism because of the credit meltdown and recession caused by big corporates that use markets for their selfish benefits. The absence of government in regulating strategic sectors of the economy is also a cause for concern. Neoliberalism deals mostly with redistribution instead of the generation of wealth and income (Harvey 2007:159).

Neoliberalism has both an advantage and a disadvantage. The advantage of neoliberalism according to Johnson (2011:449) and is that it is an economic policy that improves the efficiency economy's market. For Clarke (2005:54), the advantage of neoliberalism is for capitalists is without government regulation a monopoly can be formed through the exercise of a power or fiscal privileges. As already mentioned, neoliberalism reduces intervention from government, group of producers and companies to gain bargaining power in the market. As a result, the production of goods is maximised to increase profit gains. The development process of products is maximised because of the creativity and competitive power. Neoliberalism is the main driving power for globalism.

On the contrary, for Johnson (2011:450), neoliberalism has been blamed as the root cause of the increased gap between the rich and power across the world. The disadvantage of neoliberalism for Clarke (2005:47) is that only competitive sectors gain and disadvantaged sectors suffer. Therefore, sectors that are expanding would increase jobs and those that are contracting would lose jobs. Currently, 1% of the population owns 40% of the financial assets in the world. Since neoliberalism is driven by the expansion of markets through unregulated competition between individuals, it also causes an increased gap between the rich and poor. The phenomenon does not only occur between individuals but between companies too. The unemployment rate can increase due to the results of globalisation in a neoliberal environment. Lastly, neoliberalism forces Third World countries to follow economic mechanisms or pressures of First World countries.

The contracting of private water tankers to deliver water to the affected community of QwaQwa has a neoliberal feature of enriching contractors and not empowering the mostly poor community of QwaQwa. Further to that, the commodification of water in the Sterkfontein Dam also has a neoliberal feature.

2.4 Water

The section on water creates an outline on water related issues that are relevant to the study. Commons were discussed in order to define the categorisation of water from a global perspective. The importance of water was discussed to place emphasis on why it is a course worth study. Factors affecting water availability were discussed in order to outline causes influencing the availability of water globally.

2.4.1 Commons

Commons are air, land, and water that affect a community and are supposed to be equally accessible to all. There are multiple definitions of commons. Agrawal, Brown, Rao, Riolo, Robinson and Bommarito II (2013:138) referred to commons as a common-pool of resources for governance. Ostrom (1992:415) best described commons as a common-pool of resources that are subject to subtractability because if one user makes use of the resource, there is less of that resource accessible to other users. Another definition of commons, by Basu, Jongerden, and Ruivenkamp

(2017:144), is that they are rival, natural and subtractable resources that need sustainable development. Commons are therefore natural resources that were owned in common by the community. Water and land are commons that are often inseparable because water is extracted from land (boreholes, wells, and springs), land is used as transportation (rivers, streams and fabricated channels) and storage is done on land (dams, retention ponds and reservoirs) (South Africa, 2000b). Commons that are relevant to the study are land and water due to South Africa's history of colonialism and apartheid.

According to Bakker (2007:430), through neoliberalism, capitalists have commodified a common such as water for profit. For instance, in 1987 the privatisation of water provision became a global phenomenon for the Organisation for Economic Cooperation and Development (OECD) and non-OECD countries such as South Africa (Bakker 2007:431). Rapid urbanisation in Johannesburg resulted in the construction of water-transfer schemes that commodified water because of its financial economic benefits over place where such water originated. South African government continued to support the Lesotho Highlands Water Project, which is Africa's biggest transfer scheme despite the negative reports about the environmental, economic and social impact of the Lesotho Highlands Water Project at the World Commission on Dams (Bakker 2007:439). In the context of QwaQwa, water that originates from QwaQwa was and still continued to be commodified by government when the study was conducted, from the Sterkfontein Dam to benefit the Vaal Dam that supplied Johannesburg and other towns within Gauteng.

Well-managed commons, according to Ostrom (1992:416) should equally benefit community members because they are limited. For instance, cattle grazing a field should be properly managed to reduce overgrazing that would affect the potential of the land in the future. The discussion of commons has not gone without criticism, as Hardin (1968:29) warned about the dangers of degradation and overexploitation of these by the population and capitalists. Population growth will continue to decrease the per capita of commons available and there would be a need for a point where population growth was at zero for them to cope with their demand. The management of commons requires collective action with elements such as trust, reciprocity and face-to-face communication for a meaningful contribution (Agrawal 2014:87).

Over the past 20–25 years, most developing countries have been established prominent rural development strategies (Dixon, Gibbon & Gulliver 2001:70). These rural development strategies are implemented through common projects to enable local people to have control over resources vital to their livelihoods. Moreover, common projects also combine conservation and development ambitions. There have been negative outcomes in the practice of these projects. For positive outcomes, commons need to participation, social capital, social learning and empowerment of which have been difficult to include in common projects. Boyle (2008:8) reflects that the tragedy of commons is that there is poor management of collectively owned or unowned resources, such as overgrazing of sheep if no person one has the incentive to oversee a common.

However, Saunders (2014:638) indicated that the positive shift from the central state to communities is that commons would be better managed. Saunders further indicated that commons are community-based natural resources. It was said that the management of community-based resources being overgeneralised by non-governmental organisations and development agencies where the community is given promises of having control over resources to those that are dependent on them. Most of these communities have customary rights or claims over resources which has been so for many years. This had been so before the government even had control, for example, private ownership (Saunders 2014:639). In the context of the study, water as a common was interrogated because it originated from QwaQwa, yet the local community was not benefiting from it.

2.4.2 Importance of water

Water is the most consumed fluid/liquid in the world. As has been already indicated in Chapter 1, the United Nations and the Constitution of the Republic of South Africa (1996) regard access to water as a basic human right. Therefore, being denied access to water then constitutes a violation of human dignity. Biltonen and Dalton (2003:1) asserted that water is a crucial resource for all production, life, and development, while the lack of access to it is view as poverty. Further water is used to meet social goals such as sanitation, hygiene, irrigation and meeting environmental needs.

Water is an important human survival. Moreover, the changes that may arise on overflow can result in implications especially in Africa because most of this population is dependent on local rivers to access water (De Wit & Stankiewicz 2006:1917). According to the World Health Organization (2016:8-10), in 2004, 83% of the world's population made use of water from improved sources. This increased from 1990 due to the increase in population growth. One-sixth of the world population does not have access to improved drinking water whereas about 84% of this population lives in rural areas. Almost 50% of the people worldwide do not have access to improved drinking water are located in Eastern Asia whereas 30% of the people live in sub-Saharan Africa. Moreover, women and children in Africa, travel long distances daily to fetch water. Improved source of drinking water is mostly accessible in urban areas than in rural areas. Rural areas in almost the developing world have low drinking water coverage that is supported by Anand (2007:519) who showed statistics of how in 2004 the general water access in South Africa was 88% with 99% of urban households having access and only 73% of rural households having access to water.

There is a worldwide consensus that water is becoming scarce and that more effective and efficient ways of using it should be developed. Approximately 20% of the world's population does not have access to potable water (Bakker 2007:430). Howard (2003:2) indicated that at a household uses of water include consumption (cooking and drinking); amenity use (lawn watering and car wash); and hygiene (domestic and personal cleanliness). Other areas find it more difficult than others to access water. As far as water is concerned, human beings have the following rights to water (see Table 2-3):

Table 2-3: The human right to water by the United Nations

Factors	Prescriptions
Quantity	50 to 100 ℓ per day
Range (distance)	1 km from the home
Time	Should not exceed 30 minutes
Cost	Should not cost more than 3% of a household’s income

Source: UN-Water Decade Programme on Advocacy and Communication and Water Supply and Sanitation Collaborative Council (2010:5)

According to Anand (2007:518), South Africa is part of a small number of countries such as Uganda, Gambia, Ethiopia, Uruguay, and Panama that have made

constitutional provisions for the right to water access. Access to water can also be viewed from a power relations point of view. Sultana (2011:163) argues that access to the resource of water does not only embody social power relations but also involves emotions that are received differently based on gender daily.

United Nations High Commissioner for Human Rights (2010:40) relays a court matter titled *The case of prepaid water meters in South Africa*:

> *In Mazibuko v. City of Johannesburg, the applicants challenged the legality and constitutionality of the City's policy of imposing prepayment water meters, as well as the provision of a free basic water supply of 25 litres per person per day or 6,000 litres per household per month.*
>
> *The prepayment meters in Phiri, a township in Soweto, were designed to supply the free basic water supply of 25 litres per person per day or 6,000 litres per household per month. Once this allocation was reached, the meters automatically shut off the supply. For the applicants, this meant that they went without water for the last 15 days of each month.*
>
> *In its judgement, the High Court ruled that the City of Johannesburg's forced prepayment water meters scheme in Phiri with automatic shut-off mechanisms was unlawful, unreasonable and unconstitutional, as it did not give reasonable notice to enable representation to be made before any cut-off of water. The Court also noted that the introduction of prepaid water meters could inhibit the right of access to water as it did not take into account the inability to pay or the specific needs of users. The City was therefore directed to provide Phiri residents with the option of a normal metered water supply.*
>
> *The judgement also held that Johannesburg's water policy was discriminatory. While people in low-income, historically black townships were required to pay for water in advance, those in wealthy, historically white suburbs were entitled to water on credit and to negotiate payment with the City.*
>
> *The Court also ordered the City to provide Phiri residents with 50 litres of free water per person per day. This was an increase from the previous allocation whereby each household (on average containing 16 persons) was provided with 200 litres per day. The Court noted that 25 litres per person was insufficient, especially for people living with HIV/AIDS. The Court noted that the City had the water and the financial resources to provide 50 litres per person per day, including through funds provided by the national Government for water provision that the City had chosen thus far not to use for the benefit of the poor.*

In examining the process by which the prepayment water meters had een introduced, the High Court concluded that it had been procedurally unfair, lacking consultation, adequate notice, advice on legal rights and information on available remedies.

The City of Johannesburg appealed against this judgement to the Supreme Court of Appeal. It upheld the appeal and ordered that 42 litres of water per Phiri resident per day would constitute sufficient water instead of the 50 litres ordered by the High Court.

Contradicting the findings of both the High Court and the Supreme Court of Appeal, the Constitutional Court found that the free basic water policy adopted by the City of 25 litres per person per day was reasonable with regard to the Constitution and that the use of prepaid water meters was lawful.

The Constitutional Court also recognized how social and economic rights entrenched in the Constitution contributed to the deepening of democracy by, inter alia, enabling "citizens to hold Government accountable not only through the ballot box but also, in a different way, through litigation." The Court stated that during the litigation, and perhaps because of it, the City has repeatedly reviewed and revised its policies to ensure that they did promote the progressive achievement of the right of access to sufficient water.

It was important to quote the entire judgement of the The case of prepaid water meters in South Africa because there was important information to be noted.

2.4.3 Factors affecting water availability

According to the Muller, Schreiner, Smith, Van Koppen, Sally, Aliber, Cousins, Tapela, Van der Merwe-Botha, Karar and Pieterson (2009:15), water resource crises involves water problems that could result into serious and rapid impact on a community's social and economic life. Water is a renewable natural resource. However, water availability constantly fluctuates, the national or basin crises makes it difficult to predict and/or difficult to manage once they occur. Poor people are often the first to get affected by the water crisis either through shortage of supply, flooding, pollution and allocations.

Shortage of supply is relevant to the QwaQwa water crisis and according to Muller et al. (2009:15-16) is the easiest to manage. This happens through construction and by appropriate use of storage facilities. However, this can take longer to resolve. Moreover, the facilities used should be present before the shortage even happens.

Specialised expertise is required as well as timeous management intervention who will use their knowledge about local hydrology and water use to guide them. It is important to note that stored water gets used up faster, which will result in having inadequate reserves. Therefore, it is vital that the management of drought has a good understanding of the climate and hydrology of the county. For water supply to be managed operational rules designed should be used. Shortage of supply in the context of QwaQwa could be addressed through effective planning because it is an origin of water and the topography allows.

2.4.3.1 Water regime

The water regime is a prevailing pattern of freshwater flow over a specific period. This means that the variability of water discharge through the course of the year is measured in response to temperature, precipitation, evapotranspiration and drainage (Verhoog, in Solomon, Beran & Hogg 1987:315). In a nutshell, it is the duration and timing of flooding which could result in an overflow, precipitation and groundwater inflow (Queensland Government, Australia 2013: online). According to Nienaber (2013:14), in the SADC region, 74% of people have access to water that constitutes 91% of available surface water. QwaQwa's water access is also below the SADC average besides the presence of water.

According to the Queensland Government (Australia 2013: online), it is important that water regimes for wetlands are understood because many wetlands. The understanding of wetlands will assist understand natural and often extended dry phases that support adapted organisms. Wetlands that hold water permanently are of good value to the ecology. The main features of wetlands include timing, frequency, duration, extent, and depth as well as variability.

2.4.3.2 Ecology

Begon, Townsend and Harper (2006:xi) defined ecology as a scientific study of the interaction beween organisms and their environment, while Legesse, Mulugeta, and Ambelu (2002:1) defined ecology as a study about the interaction between organisms with each other and with their chemical and physical environment. Human ecology is about how different cultures provide their shelter, food, water and energy by extracting materials and energy from their surroundings (Smil cited in Orr 2002:14).

Human activities are the main contributors to affecting the ecosystem. The key elements of providing humans with shelter, food, safe clean water, and recycling wastes are influenced by the atmosphere, fertile soils, freshwater resources the ocean and the ecosystem. Approximately a billion of the world's population does not have safe nor adequate water supplies. Moreover, there are uneven and limited freshwater resources that are redistributed globally. The demand for water continuously keeps increasing for use of drinking, food production (agriculture) and product manufacturing (industry) (Legesse et al. 2002:4).

Spatial ecology, according to Kerr (2007:130), is a recent area of interest that describes the relationship between global patterns as a result of local processes. Put in a different way, Collinge (2010:70) defined spatial ecology as spatial arrangements of population, organisms and landscapes, with their ecological dynamics. Spatial ecology is closely related to conservation because it also focusses on fragmentation and loss of habitat due to human activity. Spatial ecology therefore provides a link between environmental applications such as restoration, planning and conservation.

Both human and spatial ecology are going to be explored as possible causes of the QwaQwa water crisis. Human activity such as extraction of water for human consumption is the human ecological factor often associated with the water crisis and will thus be explored. Spatial ecology will also be explored within the confines of this section for effective planning of spatial arrangements that address the QwaQwa water crisis.

2.4.3.3 Climate change

Climate change is an attribute that is directly or indirectly caused by human activity and leads to natural variability over time (United Nations Framework Convention on Climate Change [UNFCCC] 2019). For Houghton (2002:3), climate change is used to indicate all climate variability that can lead to considerable confusion. Climate change influences temperature extremes. Both cold and hot temperature extremes can increase society's demands. Even though seasonal temperature changes are normal and vital for a certain number of social sectors such as tourism and farming. Extreme temperatures either heat or cold have negative impacts (Gosling, Dunn, Carrol, Christidis, Fullwood, Gusmao, Golding, Good, Hall, Kendon & Kennedy 2011:13).

Climate change also has a huge impact on precipitation extremes. Bolin (2007:35) indicated that precipitation extremes in deficit or excess can result in hazardous conditions for human health, livestock, societal infrastructure and agriculture. Season variations in precipitation also lead to negative impacts such as droughts and flooding. Drought is a recurrent feature in South Africa. Droughts affect the economic, social and environmental impacts while exposing South Africa's vulnerability to natural phenomena. Drought in South Africa is caused by rainfall inconsistency. El Niño comprises about 30% of rainfall variability. The warm events of El Niño resulting in droughts (Gosling et al. 2011:21). Climate change had been attributed as a major contributing factor to the QwaQwa water crisis.

2.4.3.4 Climate change discourse and ecological insufficiency

Climate change has been a hot topic since the late 1980s. In 1992, the UNFCCC negotiated an international environmental treaty at the Earth Summit in Rio de Janerio, Brazil (Meakin 1992: online). The objective of the UNFCCC is to stabilise greenhouse gas emissions (carbon dioxide emission) into the atmosphere to prevent adverse changes in the climate system. The phenomenon has often also referred to as global warming.

According to the National Geographic (2019: online) global warming facts, the temperature of the world has been increasing at 0.9°C since 1880 based on studies done by the National Aeronautics and Space Administration’s Goddard Institute for Space Studies. Furthermore, the 19 years prior to 1997 have been the warmest since 1850. The Arctic has also felt the effects to the extent that average global temperature increase has doubled in countries such as western Canada, Alaska and Eastern Russia according to the Arctic Climate Impact Assessment Report between 2000 and 2004, which could lead to a completely ice free summer by 2040 is not earlier. Lastly, there has been an upsurge of extreme weather change events such as wildfires, strong tropical storms, and heatwaves (Jentsch & Beierkuhnlein 2008:622)

South Africa has not been an exception to global warming, even though the temperature increase has been steady and gradual. The temperature changes over the previous 60 years increase significantly according to Griffin (2012). The expected temperature increase by 2050 is 1–2°C in coastal areas and 3–4°C in interior areas.

The impact then has the effects of the following impact: First, poor people living in impoverished circumstances, where people live in areas that have extreme weather events are affected the most because of a lack of adequate housing materials to protect them against the wind, rain, and cold. Second, impoverished people are exposed to high incidences of disease. Much of South Africa experiences low and variable rainfall, with access to safe drinking water posing a problem in some communities. As most of the surface water resources are already utilised to their full potential, water shortages could pose a problem in the future, and climate change could exacerbate this further.

2.5 Conclusion

Chapter 2 reviewed current knowledge of what planning for water access in QwaQwa post-apartheid means. First, urban and regional planning was discussed extensively through defining the concept of planning, what effective planning means, situating planning in the context of South Africa and approaches that can be following in planning. Second, the dispensation of urban and regional planning occurs within an environment led by the state and subjected to power relations. Due to the colonial history of South Africa, much of what was discussed stem from British socio-economic developments of enclosure acts, primitive accumulation, accumulation by dispossession and neoliberalism. The last issue that was discussed had to do with water as a common, its importance and factors affecting its availability.

Chapter 3
Legislative and Policy Framework related to Water and Planning in South Africa

3.1 Introduction

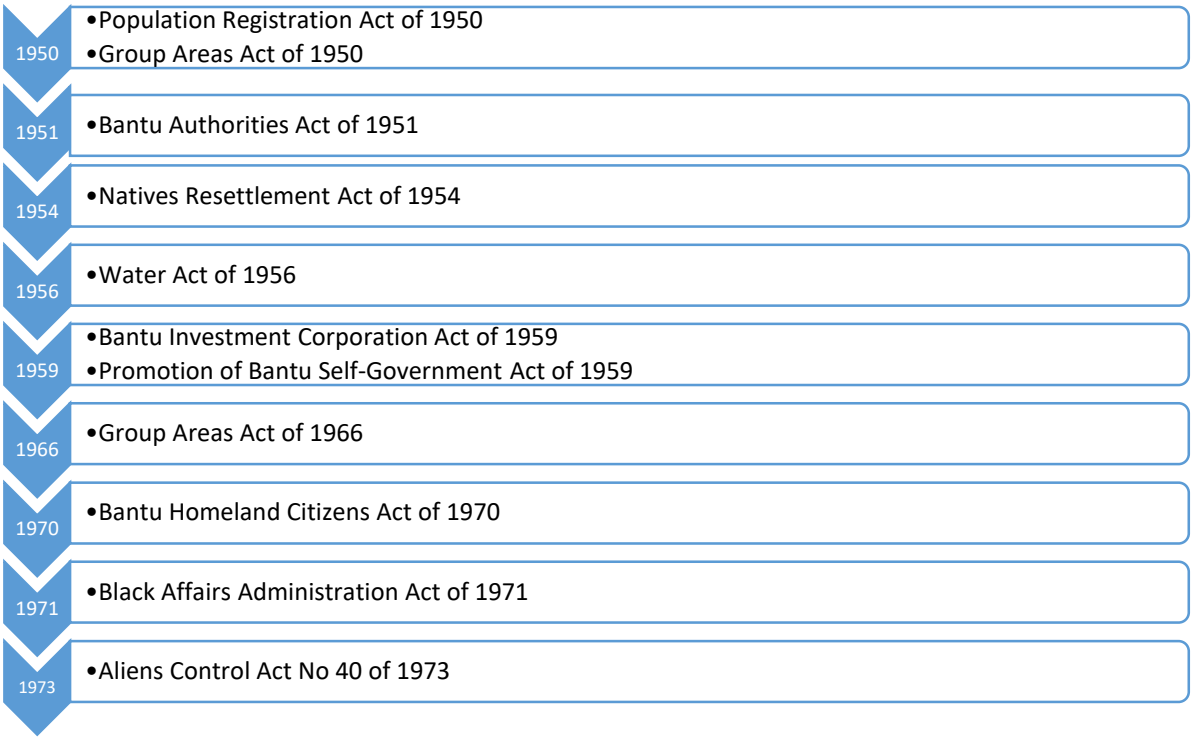
The third chapter presents various legislation and policies that gave effect to water and planning in South Africa. Because the three dams in QwaQwa were established during the apartheid era, legislation and policies were explored from 1948 to 1993 during apartheid, and those from 1994 to 2019, to seek understanding of their impact on water access in QwaQwa. This chapter attempts to situate the universal human rights discourse on water access. The legislation and policies were analysed from both an international and national perspective.

3.2 Historical legislation and policies promulgated during apartheid (1948–1993) that influenced planning and access to water

Apartheid was a period in the South Africa history that used planning to achieve a lot of its objectives through the promulgation of legislation (Christopher 1987; Harrison, Todes & Watson 2007; Hendricks 1990; Oranje & Berrisford 2016; Turok 1994). Although formally passed as a policy when the National Party came into power in 1948, racial segregation and social apartheid had been a common occurrence in South Africa (Hill 1964:1).

In this section, therefore, a timeline of legislation and policies that influenced water access in South Africa and the former homelands, particularly QwaQwa, is presented. The laws discussed in this section were all repealed by the interim Constitution that commenced on 27 April 1994 (South Africa 1993; South African History Online 2019c; Spies 2002:28). Annexure F og the Black Communities Development Act of 1984 was cited by both Juries-Whiteman and Campbell (2001:17) and Schoeman, Cilliers and Retief (2017:162) because land use schemes were not developed for black areas.

Figure 3.1 provides an outline of all the legislation and policies that were promulgated during apartheid from 1948 to 1993, which related to planning and access to water for homelands in South Africa.



Source: Author's synthesis of literature (2019)

Figure 3.1: Legislative and policy promulgations from 1948 to 1993

3.2.1 Population Registration Act, 1950

The Population Registration Act (PRA), Act 30 of 1950, also known as the *Book of Life*, was passed in 1950 to classify people and register them racially in South Africa (South Africa 1950a). The Department of Home Affairs then classified races into black, white, Indian and Coloured people (Posel 2001:51). Through the PRA, this was the birth of apartheid for laws to be passed based on racial classifications (Leach 1986:70). There were instances where there was no proof that people fell under the races under which they were classified, and it caused social problems (South Africa, Department of Health 1998: online). Posel (2001:52) indicated that after apartheid, the South African race classifications have still been done according to the PRA. Colonists referred to blacks as Bantu people, which came from the Zulu word *Abantu*, meaning people (Oliver 1966:361). Furthermore, Oliver (1966:370) indicated that there are a major linguistic African group in sub-Saharan Africa that are closely related to

languages such as Sotho-Tswana, Nguni and Tsonga. White people's first encounter with the Bantu was in the sixteenth century in the Cape (Botha 1968:40). Due to the encounter, white people referred to them as 'non-white' people, which in the years to come became a word of reference to black people. Wilhelm Bleek, a German linguist, was the first white person to put this word in writing in the late 1800s which shaped racial theory (Bank 2000:163). Due to black people being referred to as Bantu people, this later made it convenient for the apartheid government to promulgate the GAA and the Promotion of Bantu Self-Governance Act that led to the formation and planning of Bantustans or homelands. Furthermore, the PRA, through racial categorisation, led to how planning and access to water as basic service affected people racially.

3.2.2 Group Areas Act of 1950

The GAA, Act 41, was passed in 1950 to primarily control property occupation and transactions among racial classifications based on the PRA in South Africa (South Africa 1950b; Horrel 1982). The GAA created neighbourhoods referred to as group areas where people were forced to reside according to their race (South African Institute for Race Relations [IRR] 1952:32). Africans were the most affected by the GAA because they were displaced. After a declaration of a group area was made, existing structures were demolished and people that were not designated for that area were displaced from their areas of previous residence and relocated (Mabin 1992:422). Mabin further indicated that more restrictions were imposed on Africans than over Coloured and Indian people. The advancement of the GAA was given weight by the Land Act of 1913 on land ownership, even though colonial masters had already been conducting segregated planning as early as 1659, as discussed by Mphambukeli (2019:44). Because citizens were classified racially and in their group areas they were not allowed to own land in urban areas.

The GAA did not go unchallenged because Dugard (1979:324) indicated that every attempt to overturn it, was unsuccessful. Civil disobedience and protests were demonstrated across South Africa, such as Africans sitting in restaurants in white areas and being subjected to the discrimination that they expected (IRR 1961:183). From the commencement of the GAA up to 1983, over 600 000 people had been forcefully removed and relocated (Pirie 1983:348). For example, due to the GAA, by 1977 squatting had become a challenge for the apartheid government and

approximately 15 000 squatters were removed in Modderfontein, Cape Town, during this time (IRR 1977:438). The GAA was important to discuss in the context of the establishment of QwaQwa and other homelands because it gave birth to the Bantu Authorities Act of 1951 that had similar motives. The GAA was amended in 1966, to become more advantageous to Whites (Dugard 1979:82; South Africa 1966).

3.2.3 Bantu Authorities Act, 1951

The Bantu Authorities Act, Act 68 of 1951 (South Africa 1951), which was later renamed to the Black Authorities Act, gave traditional leaders authority to govern homelands and gatekeepers for the apartheid state (Claassens & Boyle 2015:1). The Bantu Authorities Act succeeded the Native Affairs Act of 1920 that had created the right of self-determination of blacks into their respective tribes in native reserve areas and had established territorial, regional and tribal authorities. The tribal authorities included chiefs and headmen that were responsible for allocating welfare (inclusive of water), land, and development within the native reserves. The traditional leader of the tribal authorities had become an extension of white government because anyone that challenged it was dealt with such, as in the case of Chief Albert Luthuli who lost his chieftaincy because he did not want to resign from the ANC (Couper 2007:253). Through the Bantu Authorities Act, QwaQwa had two tribal councils that were not recognised as legitimate according to a government news statement made by former President Jacob Zuma on 29 July 2010, based on investigations that were initiated by former President Thabo Mbeki in 2003 of legitimate tribal councils (Rice 2010; Shiceka 2010). Furthermore, based on reports by Rice (2010) and Shiceka (2010), Kings Lekunutu Cavandish Mota and Thokwane Mopeli were not recognised as legitimate after the investigation of the Commission on Traditional Leadership Disputes and Claims initiated in 2003, and were not allowed to pass on their kingship upon death. Despite the kingship not being allowed to be passed on, Moremoholo Mopeli was inaugurated as king in QwaQwa on 13 October 2018 (Free State News Online 2018a) after the passing away of Thokwane Mopeli (Free State News Online 2018b). The report that indicated that there should not be an inauguration of a new king in QwaQwa after those that were deemed illegitimate in 2010 was not honoured and has implication on planning because QwaQwa will continue to have traditional areas that are planned and influenced tribal councils.

3.2.4 Natives Resettlement Act, 1954

The Natives Resettlement Act, Act 19 of 1954, was promulgated to allow for the removal of blacks within the magisterial district of Johannesburg (South Africa 1954; Mather 1987:119). The Act was specifically aimed at removing black people from Sophiatown to Meadowlands in 1995 (Lephakga 2013; Mather 1987:119; South African History Online 2019b). The Act was later used to forcefully remove black people from other areas across South Africa. Even though the author did not find much literature regarding the Act, it had a significant contribution to the planning of QwaQwa as a homeland and how water was accessible, because the water was not equally provided for black people, as will be discussed in section 3.2.5. of this chapter.

3.2.5 Water Act, 1956

The Water Act, Act 54 of 1956, was passed after the Department of Irrigation and Conservation that was established by the Union of South Africa in 1912, changed its name to the Department of Water Affairs (South Africa 1956; Tempelhoff 2017:189). This confirms that the apartheid state continued what was started by the colonial regime in South Africa regarding access to water. Nealer and Raga (2008:36) indicated that this depatment was established for the government to have ownership of all water that flows in rivers in South Africa, even though it was not recognised as a basic human right (South Africa 1999:9). A further discussion of the Water Act follows in the findings in Chapter 5 in response to the research question: *What is the history of the water crisis and policies in QwaQwa*? The Water Act thus had an impact on planning and access to water in QwaQwa as a homeland during apartheid because water from QwaQwa through the Sterkfontein Dam was used to supply the industrialised and urbanising Johannesburg. Furthermore, even though the water was mostly from QwaQwa, according to Van Vuuren (2008:7), the Sterkfontein Dam's plan was to initially have water be in part of QwaQwa but was later re-planned because it would flood part of QwaQwa.

3.2.6 Bantu Investment Corporation Act, 1959

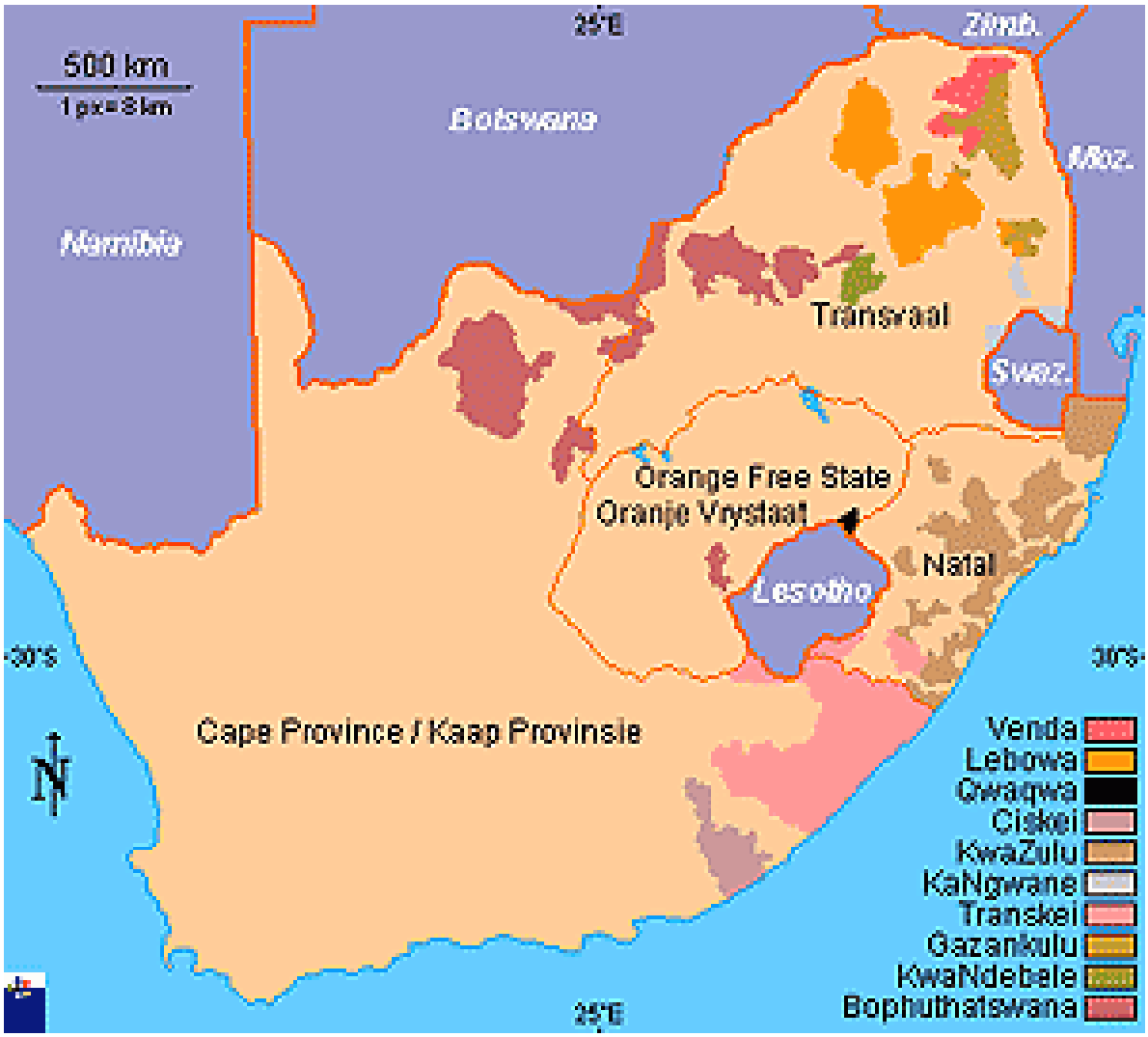
The Bantu Investment Corporation Act, Act 34 of 1959, was coupled with the Bantu Homelands Development Act of 1965 for government to capitalise on entrepreneurship in the homelands through development corporations (South Africa 1959;

Blausten 1976:217; Choe & Chrite 2014:82). The development corporations were primarily responsible for the exploitation of black labour in homelands through industrialisation, agriculture, and other commercially related activities (Davenport 1987:407). The Bantu Investment Corporation Act was used to establish the QwaQwa Development Corporation in 1967 for commercial and industrial activities in QwaQwa that affected planning and access to water for such activities (Bank 1990:9). The QwaQwa Development Corporation, therefore, could have consciously or unconsciously be manufacturing a looming water crisis that still affects QwaQwa to date by prioritising industrial activities to have access to water.

3.2.7 Promotion of Bantu Self-Government Act, 1959

The Promotion of Bantu Self-Government Act (PBSGA), Act 46 of 1959, legislatively transformed native reserves into full-fledged self-governing and independent homelands that only consisted of black people (South Africa 1959; Christie & Collins 1982:67; Van Wyk 2013:91). This led to black representation being eliminated from parliament in South Africa. The PBSGA resulted in a period referred to as 'grand apartheid' during the 1960s and 1970s because it sought to permanently remove black people from participating in meaningful affairs of South Africa (Worden 1994:110). The white minority retained control of the majority (87%) of the land in South Africa, according to the Land Act of 1913, and shared the remaining 13% of the land among the 10 homelands (Walker 2013:286). This 13% of the land that was shared with homelands was generally deprived of agricultural potential and mineral and natural resources such as water (Worden 1994:110). The PBSGA elevated the traditional authorities that had been established through the Bantu Authorities Act of 1951 to become the representation of power and progress of black people, even though it was for the benefit of the apartheid government to retain control of black people (Christopher 1994:66). The government of the homelands was allowed to collect taxes (some which were paid to the apartheid government), allocate licenses, trading rights and controlling public works (Lapping 1986:181). Through the Bantu Homeland Constitution Act of 1971, homelands could apply for full independence or self-governance under the control of the apartheid government. QwaQwa was established through the PBSGA as a self-governing homeland and through its self-governance status relied on the apartheid government for funding for its budget towards functions,

inclusive of planning and provision of water. Figure 3.2 spatially represents the locality of 10 former homelands in South Africa.



Source: South African History Online (2019d)

Figure 3.2: South African map, with a depiction of former homelands

3.2.8 Bantu Homelands Citizens Act, 1970

After the PBSGA, the Bantu Homeland Citizens Act, Act 26 of 1970, later known as the Black State Citizenship Act of 1970, was promulgated (South Africa 1970; Ehrenreich-Risner 2018:115; Richardson 1978:185). The Act meant that black people were classified into eight linguistic groups and divided into 10 homelands (Davenport 1987). After the passing of the Act, black people were regarded as aliens in urban areas of South Africa and could only reside in urban areas through special permission (FitzGerald 2017:12; South African History Online 2019c). The classification of non-

white people was done through the Aliens Control Act, Act 40 of 1973, which for example, forbid Indians to live in the Orange Free State and Northern Natal (South African History Online 2019c; Maharaj 2009). Out of the 10 homelands, Bophuthatswana, Ciskei, Transkei, and Venda were the four homelands that were granted full independence, even though they were not recognised by other countries (Humphries 1992:57). According to the apartheid government, each homeland was supposed to develop into a nation state and grow its own culture, identity, and language but the true motive was for the white population to be citizens of South Africa and black people to be servants (Dugard 1992:v). The black people that lived in townships were only intended to provide labour to the white population (Clark & Worger 2013:75). A majority of Sesotho speaking black people were registered as citizens of QwaQwa since 1 November 1974 until the law was repealed in 1993 (Twala & Barnard 2006:162).

3.2.9 Black Affairs Administration Act, 1971

The Black Affairs Administration Act, Act 45 of 1971, was intended for black people to self-govern in townships of urban areas (South Africa 1971). The Black Affairs Administration Act was repealed by the Black Communities Development Act. The Black Affairs Administration Act was, however, not repealed in 1993 and was still being used after 1994 for land use applications in townships because town planning schemes were historically not developed for these townships (Van Wyk 2013:93). QwaQwa consisted both of townships and villages that neither had town planning schemes which impacted the quality of planning decisions and water access.

3.2.10 Aliens Control Act, 1973

The Aliens Control Act, Act 40 of 1973, was passed to allow Indians to travel without permits within South Africa (Dugard 1979:72). The only areas that Indians were not allowed to reside in were the Orange Free State and Northern Natal.

3.3 Post-apartheid legislation and policies that influence planning and access to water

The national policy and legislation section deals with policy and legislation at a national level of governance that ensures that there is uniformity of policy intent, with the assistance of legislation, to ensure that goals are met to address South Africa's needs in general.

Figure 3.3 provides an outline of all the legislation and policies that influence planning and access to water.

Source: Author's synthesis of literature (2019)

Figure 3.3: Post-apartheid legislation and policy

3.3.1 Constitution of the Republic of South Africa

The Constitution of the Republic of South Africa (1996) is the supreme law of the country and no person can be superior to it. The Bill of Rights, section 27(1)(b) of the Constitution, prescribes that everyone has the right to have access to sufficient food and water. This, therefore, holds the government liable to ensure that every South

African has access to water as a right. The QwaQwa water crisis then means that there has been a violation of human rights by not adequately providing water and not effectively planning for its provision.

3.3.2 White Paper on Reconstruction and Development

The RDP was a socio-economic reform framework by the ANC-led government to address the injustices of colonialism and apartheid (Blumenfeld 1997:65). The RDP set out to address social problems such as access to housing, electrification, clean water, health care, land reform, and public works. During the tenure of Dr Kader Asmal as Minister of Water Affairs by 1998, the government began constructing water pipelines to provide 1.3 million rural people with water access within 200 m from their households. By 2000, 236 projects had been completed to provide piped water to approximately 4.9 million people who mostly were from former homelands (Lodge & Phillip 2003).

However, despite the figures reported by the government about the RDP to provide clean water, critics indicated that projects were mostly partially completed. Marais (2001:237) indicated that from 1995 and 1999 households that used streams, rivers, and dams to access water slightly increased because territorial borders of homelands were broken down and there was rapid urbanisation. By 2000, the government indicated that 6 000 ℓ per month of water were allowed to resolve financial restrictions mostly faced in rural communities (Lodge & Phillip 2003; Von Holdt 2013).

3.3.3 Water Services Act, 1997

The primary objective of the Water Services Act (WSA), Act 108 of 1997, is giving rights to all to have access to a water supply and basic sanitation. The WSA makes it mandatory for municipalities to be a water services provider (WSP), while promoting water conservation and demand management (Wegelin & Jacobs 2013:415). Section 11(4) of the WSA states that the WSPs may not unreasonably deny consumers access to water within their area. In section 11(5) states that in case of emergency situations the WSP should take reasonable steps to provide basic water access and sanitation to people within its area at the WSP's cost. The WSA directly implicates MAP Water and therefore, based on the prescripts of the Act, some findings will be made to

determine whether it was compliant to delivering the prescripts of sections 11(4-5) to QwaQwa.

There have been challenges for implementing the WSA because Malzbender, Goldin, Turton and Earle (2005:27) indicated that democracy faces financial and institutional constraints to achieve integrated water resources management. Over and above financial and institutional constraints, WSPs have not been able to effectively address the challenge of climate change and how they access water, because they still rely on large dams to store water that is vulnerable to increased evaporation and precipitation patterns (Herrfahrdt-Pähle 2010:111). MAP Water as WSP for QwaQwa should be able to adequately supply water to QwaQwa according to the WSA, and at its own cost supply sufficient water in cases of an emergency. Planning should further support the allocation of land for alternative means of water access to reduce the reliance of large dams as water reservoirs.

3.3.4 Development Facilitation Act, 1995

The Development Facilitation Act, Act 67 of 1995, was promulgated to implement the RDP successfully and speedily (South Africa 1995; Berrisford 1997:57). The Act was formulated for land development objectives nationally, with a particular focus on urban and rural areas (Rigby & Diab 2003:27). Financial assistance such as loans and subsidies were made available for land development to ordinary citizens across South Africa (Pienaar 2002:2). The purpose of the Act was to prescribe land uses and development procedures that excluded small-scale farming (Rigby & Diab 2003:28). Effective holistic planning is a desired procedure and decision-making tool of the development tribute. The Act, therefore, would have had an impact on the historic provision of water in QwaQwa.

3.3.5 Municipal Demarcation Act, 1998

The Municipal Demarcation Act, Act 27 of 1998, establishes criteria and procedures for determining municipal boundaries by an independent authority and governs these matters (South Africa 1998a). The Municipal Demarcation Board is the independent authority responsible for delimiting boundaries of South African municipalities and districts and electoral wards within municipalities. Municipalities are categorised into the following three categories:

- **Category A:** These are municipalities that have their exclusive municipal executive and legislative authority in its area. Such municipalities are referred to as metropolitan municipalities.
- **Category B:** These are municipalities that share exclusive municipal executive and legislative authority under a Category C municipality. Such municipalities are referred to as local municipalities.
- **Category C:** These are municipalities that have a municipal executive and legislative authority that includes more than one municipality. Such municipalities are referred to as district municipalities.

MAP LM was classified as a Category B municipality and was established on 5 December 2000 (South African Government 2019). The local municipalities are administered by political administration that runs the municipality with the political willingness to address socio-economic and environmental issues (Cameron 2004:210). MAP LM as a municipality has the inherent responsibility of water provision to QwaQwa through MAP Water.

3.3.6 National Water Act, 1998

The aim of the National Water Act, Act 36 of 1998, is to provide reform for unequal access to water resources and repealing the apartheid water acts. The purpose of the Act is to ensure that water resources are protected, used, developed, conserved, managed and controlled taking the following into consideration:

- Basic human needs for the present and future generations.
- Promoting equitable access to water.
- Redressing past racial and gender discrimination.
- Promoting sustainable, efficient and beneficial use of water in the public interest.
- Facilitating economic and social development.
- Providing for a growing water demand.
- Protecting aquatic and associated ecosystems.
- Reducing and preventing degradation and pollution of water resources.

- Meeting international obligations.
- Promoting dam safety.
- Managing droughts and floods.
- Establishing suitable institutions that ensure appropriate racial, community and gender representation.

South Africa has a history of limited access to water resources dominated by access to economic power and land, which has disadvantaged black people as a majority of the population because of their economic power and rights to ownership of land (Gabru 2005:1). Apartheid legislation made it seem as if the Water Act of 1956 did not discriminate racially, but the disproportionate land ownership denied black people rights to water, as already discussed in section 3.2.5.

Unfortunately, as much as the National Water Act aimed to address the injustices of the past, Kemerink et al. (2011:585) argued that the apartheid era legislation still dominate current economic and political realities because institutional arrangements still deny smallholder farmers and former homelands to claim their water rights. Nnadozie (2013:81) also confirmed that despite the National Water Act being in place, there has not been a significant improvement to the water of black people due to a lack of institutional change and will. The arguments raised here resonate with the primary functioning of the Sterkfontein Dam continuing to serve the supply to the Vaal Dam, despite the immediate community of QwaQwa experiencing a water crisis.

3.3.7 Municipal Structures Act, 1998

The Municipal Structures Act, Act 117 of 1998, has the following objectives:

- Establishing municipalities in accordance with the requirements related to types and categories.
- Establishing criteria for determining the category of a municipality to be established in an area.
- Defining types of municipalities within each category.
- Providing an appropriate division of power and functions between categories of municipalities.

- To regulate structures, internal systems and office-bearers of municipalities.
- Providing an appropriate electoral system (South Africa 1998b).

The Municipal Structures Act has an impact on municipal finance because it stipulates that the executive committee should recommend programmes, strategies, and services that address the needs in the Integrated Development Plan (IDP) and estimations regarding expenditure and revenue (Ababio 2007:7). The executive committee is mandated to review performances to improve efficiency, effectiveness, and economy, while doing credit control and debt collection (Pauw, Woods, Van der Linde, Fourie & Visser 2002:263). The Municipal Structures Act, therefore, implicates the QwaQwa water crisis in that the executive council of the MAP LM has to ensure that there are programmes, strategies, and services in place to provide water and planning.

3.3.8 Municipal Systems Act, 2000

The Municipal Systems Act, Act 32 of 2000, is based on the White Paper on Local Government of 1998 to establish democratic municipalities in South Africa (South Africa 2000a). Part of the requirements of the Act is for a five-year strategic document in the form of an IDP (South Africa 2000b). According to Eglin and Ngamlana (2015:35), the IDP is a planning instrument that informs and guides all planning, management, and development in the municipality. Community and stakeholder engagement is central to municipal affairs, and includes preparing, implementing, monitoring and reviewing the IDP for local interest to be expressed (Visser 2001:1674).

Unfortunately, as indicated by Eglin and Ngamlana (2015:36), IDPs have fallen under the trap of being replicas of other municipalities because the process of participation was flawed. Even though the IDP is a five-year strategic document, it is subject to an annual review to monitor the alignment of the progress regarding its objectives and realign them timeously in cases where they have been misaligned (Sowman & Brown 2006:700). The IDP consists of a long-term vision, development priorities, situational analysis, financial plans, a spatial development framework and budgets for three years. The IDP should ideally be implemented with cognisance of the achievement of the previous IDP, be inclusive of long-term (15–20 years) strategies of various sector

plans, including aspirations of community structures and civic society movements (Eglin & Ngamlana 2015:36). In the context of the study, the MAP IDP was analysed to determine whether sector plans were included to render water as per the constitutional and human rights for communities in QwaQwa as will be discussed in the findings. There should be project steering committees that guide project planning and implementation, with any considered adjustments informed by a review (Sowman & Brown 2006:701). The reality is that the implementation of the IDP is not a smooth process but should seek the best possible outcome of its objectives (Mello & Maserumule 2010:290).

3.3.9 Municipal Finance Management Act, 2003

The Municipal Finance Management Act (MFMA), Act 56 of 2003, simply aims to secure sound and sustainable management of financial affairs of municipalities and other spheres of local government; and to establish treasury norms and standards for local government (South Africa 2003). The MFMA separates financial governance of the roles and responsibilities of the executive, mayor and non-executive officials and councillors. The function of the MFMA is that of support to maximise the capacity of municipalities to render services to customers, residents, investors, and users. Unfortunately, as indicated by Mantzaris (2014:85), corruption hinders the ability of the MFMA to allow for development to be enhanced in municipalities. MAP LM has been clouded by allegations of corruption. According to a newspaper article by Seleka (2019: online) there has been corruption in the municipality that hinders the effective function of the municipality. Lastly, the MAP LM was placed under administration by the Department of Cooperative Governance and Traditional Affairs (CoGTA) in February 2018 due to a lack of honouring its electricity and water payments to respective service providers (Times Live 2018: online). This had direct implications on water provision in QwaQwa.

3.3.10 National Development Plan – Vision 2030

The National Development Plan (NDP) Vision 2030 is a long-term and strategic policy document that was adopted in 2013 by the ANC-led government, under the leadership of President Jacob Zuma, with the hope to eliminate poverty and reduce inequality by improving access to basic services in South Africa by 2030 (South Africa, The

Presidency 2012). The NDP states that its goals can and will only be met if energies from people are harnessed, capacity is built, growing an inclusive economy, promoting leadership, enhancing the capacity of the state and partnerships throughout society (Alloggio & Thomas 2013; South Africa, The Presidency 2012; Zarenda 2013).

The chapters of the NDP that were relevant to the QwaQwa water crisis and planning are listed as:

- **Chapter 4 – Economic infrastructure:** Before 2030, the NDP aims to provide all South Africans with affordable access to sufficient safe water and hygienic sanitation for dignified and healthy lives.
- **Chapter 6 – An integrated and inclusive rural economy:** Because QwaQwa is declared as a rural area it will also form part of the rural development strategy prescribed by the NDP. The Rural Development Strategy has three main focuses, namely agricultural development through irrigated agriculture that is inclusive of smallholder farmers; quality basic services that will have well-functioning and supporting communities that will have capabilities that will seek economic opportunities and contribute to the local economy; and in areas of greater economic potential, industries and small enterprises should be developed.
- **Chapter 7: Positioning South Africa in the world:** The NDP aims to position South Africa in a favourable position to enhance opportunities for regional and international agreements for resource sharing, with a particular focus on water because South Africa is a water-scarce country.
- **Chapter 8: Transforming human settlements:** The transformation of human settlements focuses primarily on reversing the disparities of apartheid to fight inequality of basic service provision.
- **Chapter 10: Promoting health:** The NDP aims to promote health to fight the high disease burden of South Africa; therefore, water becomes relevant in that it is a solution to and cause of health issues more so in the times of the global trend in climate change.

3.3.11 Spatial Planning and Land Use Management Act, 2013

The Spatial Planning and Land Use Management Act (SPLUMA), Act 16 of 2013, provides a spatial planning and land use management framework for South Africa (South Africa 2013; Joscelyne 2015:ii). SPLUMA provides an overarching framework for spatial policy, planning and land use management that is inclusive of informal settlements and rural areas (Nel 2016a:79). This was the first single national legislation to address spatial planning and addressing injustices of the past (Kruger 2014:94; Van Wyk 2015:27). The purpose of the legislation is for sustainability and to create equitable development through zonings as a land use management tool (Nel 2016b:257; Schoeman 2017:183).

Five development principles that guide SPLUMA are spatial justice; spatial sustainability; efficiency; spatial resilience; and good administration. Table 3-2 discusses the aims of the five development principles that guide SPLUMA.

Table 3-1: SPLUMA: Five development principles

Principle	Aims
1. Spatial justice	Spatial justice aims to 1) redress the past; 2) development of inclusive communities; 3) be flexible to all types of developments; 4) address issues of tenure and informal settlement upgrading, and 5) be responsive to planning issues.
2. Spatial sustainability	Spatial sustainability aims to 1) capacitate the state for development purposes; 2) ensure food security; 3) good environmental management; 4) make land markets favourable; 5) reduce the cost of infrastructure development and maintenance; 6) ensure sustainable settlements; 7) forest innovation for planning; and 8) be context-specific with all development challenges and solutions.
3. Efficiency	Efficiency has three aims, namely: 1) Good governance which entails optimising the use of current resources; have processes that reduce negative impacts to sociocultural, economic and environmental aspects; streamlined process in planning and other related activities; and spatial performance management. 2) Developmental planning tools. 3) Institutional efficiency.

Principle	Aims
4. Spatial resilience	Spatial resilience is important to 1) ensure sustainable livelihoods; 2) build resilience against shocks due to unexpected life events; 3) be context-specific, and 4) being flexible.
5. Good administration	Good administration is premised on the White Paper on Local Government (1998), and these include: 1) having planning and decision-making tools; 2) foster intergovernmental relations; 3) meeting timeframes; 4) being transparent; 5) community empowerment through public participation; 6) spatial performance management for milestones; and 7) enforcing the values of planning.

Source: South Africa (2013)

Based on the principles outlined in Table 3-2, the QwaQwa water crisis should be addressed through urban and regional planning to ensure that basic access to water is ensured as a constitutional right.

SPLUMA contains seven chapters but those that are relevant to the study are:

- **Chapter 1: Introductory provisions**: This chapter in section 2(1) indicates that SPLUMA was provided for in the Constitution. Section 5(1) makes provision for municipalities to compile, approve and review IDPs as per the requirements of the Municipal Systems Act that talks to planning and basic services provision.
- **Chapter 4: Spatial development frameworks**: Section 21 (b–d and h) includes, but is not exhaustive to that spatial development frameworks should comply to the five SPLUMA development principles, should be included as a five-year spatial plan; include a 10–20 year long-term spatial vision that includes spatial growth and development patterns; and include identification, qualification and provision of spatial locality for engineering infrastructure (inclusive of water) and service provision of current and future development needs for five years.
- **Chapter 5: Land use management**: Section 23(1) indicates that a municipality should have a land use scheme to be used as a tool to guide land development.

Land use schemes are useful for indicating applicable land uses that have an impact on planning and water.

3.4 International policies

As a member of the United Nations and the African Union, South Africa was subjected to their water and planning policies. This section briefly discusses the sustainable development goals (SDGs), Africa Agenda 2063, and the New Urban Agenda as long-term policies that implied the QwaQwa water crisis.

3.4.1 Sustainable development goals

The United Nations General Assembly (2015) adopted a resolution for the 2030 Agenda for Sustainable Development with 17 global SDGs (see also Gupta & Vegelin 2016:433; Mugambiwa & Tirivangasi 2017:2). This study only focused on Goal 6: Ensure availability and sustainable management of water and sanitation for all. The 2030 Agenda indicates that water scarcity further affected 40% of the world's population and the figure was going to increase due to climate change. If Goal 6 is not attained by 2050, the 2030 Agenda claims that 25% of the people would be affected by water shortages. If human water needs are not met, this may cause negative environmental effects and stress on a regional and global level (Bhaduri, Bogardi, Siddiqi, Voigt et al. 2016:1). Lastly, the SDG aims to address the claims through international cooperation, protecting rivers and wetlands, and shared water treatment technologies.

Three principles that should guide the implementation of SDGs as suggested by Gupta and Vegelin (2016:437) are social inclusiveness, ecological inclusiveness and rational inclusiveness. Table 3-1 discusses the three principles according to Goal 6 of the SDGs.

Table 3-2: Three principles of implementing Goal 6 and aims and limitations of the sustainable development goals

Principle	Aims and Limitations
Social inclusiveness ensures equitable sharing of opportunities for development; includes all types of knowledge (Western and indigenous); builds capacity for effective participation; protects the poorest; engages all political developments	This can achieve an enhanced level of protection for the poor and include everyone in the opportunity to develop. The limitation of knowledge of everyone involved; politics or lack of resources to enhance better participation.
Ecological inclusiveness has ecocentric limits at all levels of society; equitable responsibilities, risks and shared rights; builds adaptive capacity and resilience; develops green international cooperation instruments; includes all stakeholders	Possible achievements include establishing ecocentric targets, building adaptive capacity and resilience and regulating financial institutions. The limitations are that there are current measures on how responsibilities, risks, and rights can be shared among groups; international cooperation between unequal countries can be a challenge, and participation of all stakeholders is not guaranteed.
Rational inclusiveness ensures that water is not securitised or privatised; ensures that water is not exploited for individual's economic benefit; tests instruments for inclusiveness and downward accountability; and ensures global constitutionalism and rule of law.	The possible achievement could include addressing corruption, promoting the rule of law, and ending inequality by enhancing the voice of all. However, the limitations are that logical market-based economic growth is not addressed, namely, how to protect water from privatisation and how to ensure accountability.

Source: Gupta and Vegelin (2016:437)

3.4.2 Africa Agenda 2063

The Africa Agenda 2063 is an aspiration to entrench and flourish the culture of human rights, gender equity, democracy, inclusion and peace, security and safety of all citizens, prosperity, and mechanisms to defend and promote collective security and interests (African Union Commission 2015). Sparks (2016:20) raised the point that inefficient and effective provision of water to curb water-borne illnesses and water pollution. Africa Agenda 2063 has a vision and eight pillars for the development of the continent. Pillar 1 of the Africa Agenda 2063 was relevant to the study because it aims at producing inclusive growth and sustainable development (African Union Commission 2015:47). Inclusive growth has to do with equal access to basic services, and planning for water would be paramount in this regard. Pillar 2 focuses on being pro-poor by improving rural roads, water, and sanitation, infrastructure, electricity and communications technology. Pillar 4, on modern and liveable habitats, emphasises

sustainable and affordable access to basic services to every citizen, which would also be inclusive of water. The Africa Agenda 2063 is a welcomed initiative because Africa has been viewed as a continent at war with itself and would, therefore, affect positive planning for the water crisis in QwaQwa.

3.4.3 New Urban Agenda

At the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador, the New Urban Agenda (NUA) was established on 20 October 2016 (United Nations 2017:iv). The NUA was endorsed on 23 December 2016 by the United Nations General Assembly. The NUA aimed to establish a common vision for a more sustainable and better future. The NUA is viewed as a tool that could be beneficial if proper planning is done and managed to create more sustainable development in a climate of rapid urbanisation for both developing and developed countries. The vision of the NUA has eight primary focus points for human settlements of which only the following five are relevant to the study:

1. Fulfilling the social function that includes ecological and social functions of land that does not have discrimination and universal access to affordable and safe drinking water and sanitation. This focus of the vision directly addresses equitable social functioning of water infrastructure in the study area, namely the Sterkfontein Dam, playing a more significant role in the water supply to QwaQwa in the post-apartheid era.
2. Encourage participation and inclusion of all stakeholders to address the conflict of intergenerational social issues. Participation of the community and relevant stakeholders about the water crisis in QwaQwa would allow for lived experiences to be documented regarding the impact of water unavailability and effective planning.
3. There should be balanced territorial functions across different administrative boundaries for sustainable and integrated urban development at all spheres. Despite the fact that QwaQwa has often been referred to as rural, it has a peri-urban presence due to a lack of subsistence agricultural character and compaction of land parcels that receive basic services from MAP LM.

4. The NUA has a focus on disaster risk reduction and management that efficiently responds to natural and human hazards and adaptation to climate change. The NUA would, therefore, suggest that MAP LM's planning for water should include disaster risk reduction and management to curb the impact of the current QwaQwa water crisis.
5. The NUA includes a focus on protection, conservation, restoration and promotion of ecosystems, natural habitats, water, and biodiversity to reduce the environmental impact and increased sustainability. This focus indicates that MAP LM would deliberately have to plan for ensuring that water is not over-exploited in QwaQwa.

Mycoo (2017:68) acknowledged that as far as the vision of the NUA is concerned, many countries still face the challenge of planning for sustainable urban settlements. For Satterthwaite (2016:3), the NUA seems like just a condensed version of the 100-page Habitat II in 1996, because the implementation of the NUA is dependent on the political will of member states. Satterthwaite echoed the sentiments that there is nothing new under the sun and that the solutions we need are already available, depending on how deliberate we are about solving the issues. Kaika (2017:89) viewed the NUA as just a paradigm shift from the SDGs that remain to utilise old methodological tools and is bound to yield similar results of the widening gap between the haves and have-nots. Kaika suggested that to circumvent getting the same results there should be alternative methods of accessing basic services for a better holistic outcome. So much as South Africa is a member of the United Nations, it is not an exception to the global challenges of planning for sustainable urban settlements. However, it could be an opportunity for South Africa to adopt the vision and implement it to create sustainable urban settlements in which access to water will not be an issue as is the case in QwaQwa.

3.5 Conclusion

This chapter drew on policy and legislation that were a microcosm of urban and regional planning of South Africa. The discussion about apartheid legislation was to indicate whether there had been any significant changes that resulted in effective planning in post-apartheid South Africa for supplying water in QwaQwa. Post-

apartheid legislation was intended at redressing the effects of apartheid legislation of unequal provision of water as a basic need between white people and Africans. International policies have also came into light to assist particularly members of the United Nations and the African Union.

Chapter 4
Methodological Considerations

4.1 Introduction

This chapter presents the methodological considerations that guided the study's effort to explore the QwaQwa water crisis for effective planning in post-apartheid South Africa. First, the research methodological approach is discussed according to the research paradigm and design. Data collection procedures and methods are discussed to demonstrate how the study went about to respond to the research questions and objectives. Ethical considerations are discussed to indicate how the study area was approached.

4.2 Research methodological approach

This section presents the methodological approach through the research paradigm and research design that was employed in the study.

4.2.1 Research paradigm

A research paradigm is also known worldwide as philosophical assumptions, consisting of the epistemological and ontological views that are based on a basic set of beliefs that guide action (Creswell 2014:40; Guba 1990:17). Furthermore, Cohen, Manion & Morrison (2002:5) described the two research paradigm views as follows:

- Epistemology is concerned with the basis of knowledge in terms of how it exists and its forms, how it can be communicated and acquired by other human beings.
- Ontology is concerned with the social phenomena that are being investigated. It acknowledges that the objects being investigated have an independent existence.

Four worldviews are used to approach research, namely postpositivist, transformative, constructivist and pragmatic views. This study employed a pragmatic worldview, which is defined as a worldview that arose from situations, actions, and consequences rather

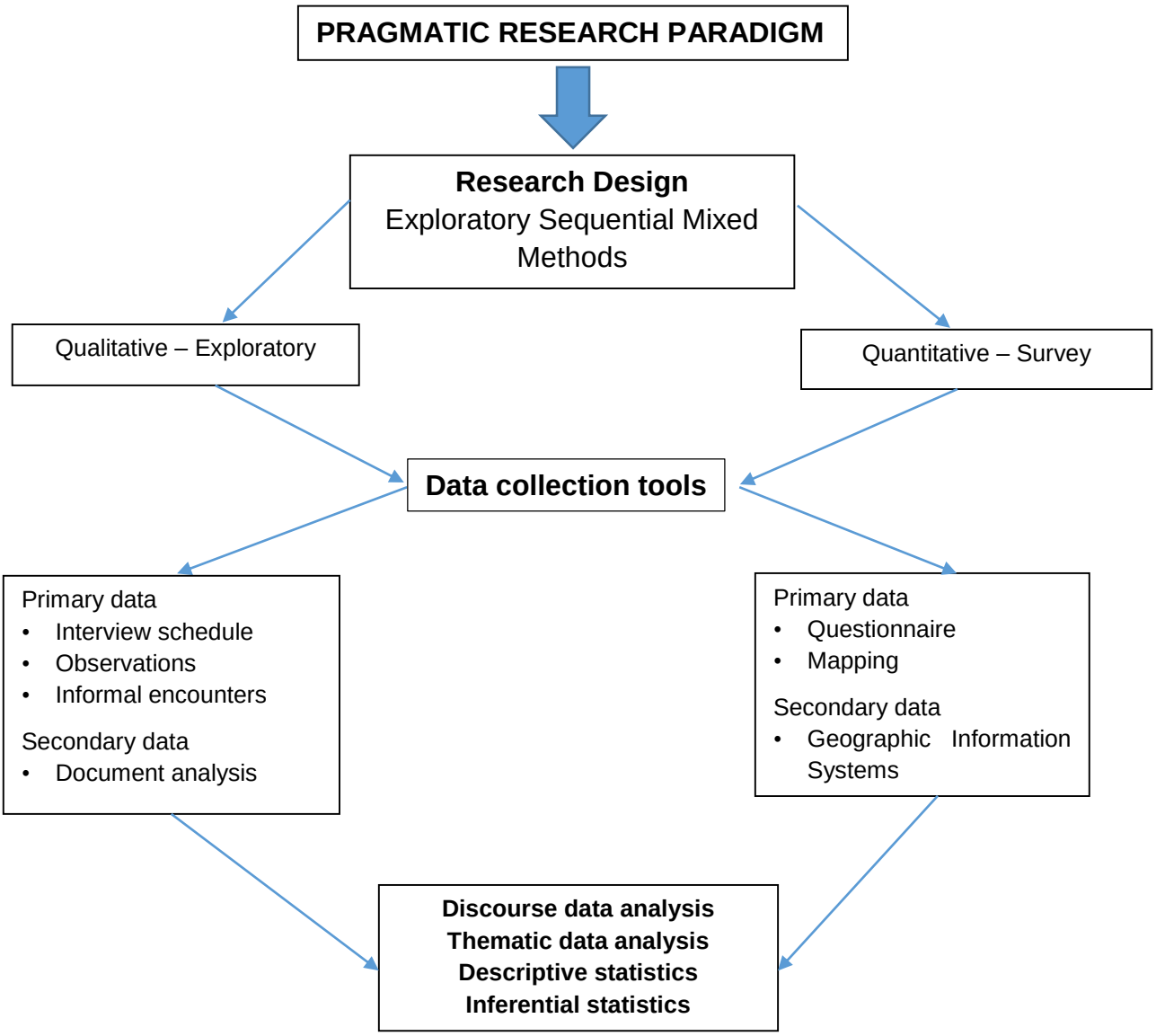
than past conditions (Creswell 2014:10). Through the pragmatic view, the QwaQwa water crisis was treated as a current event that was informed by situations, actions, and consequences of the apartheid and post-apartheid South Africa. The pragmatic view, instead of focusing on methods, emphasises the research problem and uses multiple approaches to understand the problem (Rossman & Wilson 1985:628). The study employed a mixed methods approach to understand the factors that contributed to the QwaQwa water crisis. The philosophical underpinning for a pragmatic worldview is mixed methods studies that are based on problem-solving, consequences to actions, real-world oriented practices and pluralism (Creswell 2014:6). According to Creswell (2014:11) and Morgan (2007:49), it provides a philosophical basis for research through the following eight factors:

- Pragmatism is fluid and cannot be committed to one system of philosophy only; hence, its applicability to mixed methods research. Through pragmatism, the study allowed for fluidity by allowing qualitative and quantitative data to inform the findings of the study.
- A researcher is free to choose techniques, procedures, and methods of the research that meet its purposes and needs. The study employed multiple sampling techniques, procedures, and methods, respectively, for both qualitative and quantitative data collection.
- Pragmatism does not view the world as an absolute unity because mixed methods allow the researcher to collect and analyse data in multiple ways. Qualitative data was analysed using discourse data analysis, and for quantitative data inferential data analysis was used.
- The truth can only be told about what works at the time and mixed methods offer the best understanding of a situation. Through data collected from participants using a mixed methods approach, the truth about factors that contributed to the QwaQwa water crisis was explored.
- A pragmatic researcher looks at how and what research is based on the intended consequences, and what there is to gain from it. The intended consequences of the study were to explore how water services were being planned and accessed effectively in post-apartheid South Africa.

- Pragmatism acknowledges that research occurs in historical, social, political and other contexts that require mixed methods research to be undertaken. The study conducted an archival document analysis and interviews to document the history of the water crisis in QwaQwa. Social and political views were explored through documenting the lived experiences of the community and the interventions that were in place to access water in QwaQwa during the water crisis.
- Pragmatism involves believing that the external world is independent, while also being dependent on how the mind views it. The study acknowledged that multiple possible factors could have contributed to the water crisis in QwaQwa which data was collected through the mixed method approach.
- Lastly, pragmatism opens doors for mixed methods research to different world-views, multiple methods, different ways of collecting and analysing data, and different assumptions. Pragmatism allowed the study to develop a method of conducting data collection throughout a large area of QwaQwa and from different stakeholders such as municipal officials, political leaders, traditional leaders, households, heads of institutions as well as business managers and owners.

However, there are two challenges with pragmatism, and the first, according to Lovejoy (2005:159), is that pragmatism falls short in that what is being investigated has more than one interpretation of facts which could misrepresent the reality. To counter the possibility of misrepresentation of facts during the study of the QwaQwa water crisis, data collected from participants had to be presented as truth and interpreted through their lived experiences. The second challenge of pragmatism mentioned by Hilary Putnam (1992:17), is that an exaggeration of facts are often presented. Exaggeration of facts was dealt with by ensuring that data on the QwaQwa water crisis was presented in the most simplistic way to limit bias.

Figure 4.1 is a diagrammatic representation of the pragmatic worldview that formed an outline for the study.



Adapted from Creswell (2014:5)

Figure 4.1: Summarised outline of the research design and methodology

4.2.2 Research design

The research design provides a direction for the research of the study. The study was a mixed-method study, which means it was based on qualitative and quantitative data. The exploratory sequential mixed method design was used according to Creswell (2014:49): First, the qualitative component should have open-ended questions conducted through interviews and observations. The qualitative data is used to develop the quantitative phase of the study. Second, the quantitative data is collected through close-ended questions administered through questionnaires. The qualitative aspect is used to build an instrument that best fits the sample and can be followed up,

while the quantitative data specifies variables that need to be followed up (Creswell 2002:181). Third, multiple methods of analysis are employed in the qualitative and quantitative data.

Following the exploratory sequential mixed methods design, a qualitative pilot study was employed from August 2016 to determine the factors of the QwaQwa water crisis such as how communities were affected, how they were accessing water and how long they had been experiencing adequate water access challenges. The pilot study informed the development of the mixed methods data collection tools, determining the sample procedures and size, and methods of analysis. For qualitative data, primary data was collected using interview schedules, observations and informal encounters with participants that were identified in QwaQwa regarding the water crisis. Secondary data was collected using analysis of official government documents and policies, journal articles, and books. For quantitative data, primary data was collected using questionnaires with participants that were identified in QwaQwa and mapping the extent of the areas chosen in QwaQwa for participation. Secondary data was used from Geographic Information Systems (GIS) shapefiles of features such as rivers, land area and geographic location of areas in which the study was conducted in QwaQwa. The method of data analysis of the qualitative data was discourse data analysis and the quantitative data used inferential data analysis to produce findings for the study.

4.3 Data Collection Procedures and Methods

The data collection procedures and methods section discusses the evaluation and justification of methodological choices; qualitative data collection procedures, sampling procedures, sample sizes, and methods of analysis; quantitative data collection procedures, sampling procedures, sample sizes, and methods of analysis; and a summary of mixed methods procedures, sampling, and analysis. The data collection period of the study was from 1 January 2016 to 30 January 2020.

4.3.1 Evaluation and justification of methodological choices

The exploratory sequential mixed methods approach assisted the researcher to explore the factors at play with the QwaQwa water crisis because not much was known about how it relates to planning. In the initial stages of the research, qualitative data

collection was done through a pilot study and informal encounters with people affected by the water crisis in QwaQwa. The informal encounters probed for what people thought was the cause of the crisis, how they accessed water during the crisis, the frequency of water access and any cost implications of accessing water during the crisis. This then allowed themes to be developed for the quantitative data collection tools according to recurring themes from informal encounters, media articles, and previous research done on related issues. Data for the study was triangulated to increase validity. Creswell (2014:341) indicated that the triangulation of data was when multiple sources of data collection such as observations, interviews, questionnaires, and document analysis are employed.

4.3.2 Qualitative data procedures, methods and analysis

The qualitative data procedures, sampling procedure, sample size, and method of analysis in this section indicate the choices of data collection procedure, how samples were determined and how findings were analysed.

4.3.2.1 Data collection procedures

Qualitative data collection procedures that were used for the study are interview schedules, participant observations, and document analysis.

4.3.2.1.1 Interview schedules

Twenty-nine interview schedules (Appendix 4) were administered over a total of 811 minutes of recording at an average of 26 minutes per interview (see Table 4-1). The first group of key informants was municipal employees, political leaders, and traditional leaders because they were exposed to municipal functions and water-related issues within MAP. Nine semi-structured interview schedules (Appendix 4.1) were administered with the representatives, namely two town planners, one municipal mayoral committee member of the ANC, two municipal mayoral committee members of the opposition party, one executive manager of operations and one communications officer of MAP water, and three traditional leaders.

Table 4-1: Number of interview schedules administered

Type of participants groups	Number of participants	Interview length (min)	Average time (min)
Key informants, municipal officials, and political leaders	7	161	23
Households	3	165	55
Institutions	7	168	24
Businesses	9	243	27
Total	26	737	26

Source: Author (2019)

The participation of households in interview schedules (Appendix 4.2) was to address the research objectives namely 1) To explore the history of water policies in South Africa and the water crisis in QwaQwa; 2) to document the lived experiences of the affected QwaQwa communities such as: households pre-1974, from 1974 – 1994 and post-1994; 3) to identify interventions by various actors during the QwaQwa water crisis; and 4) to explore the implications of the QwaQwa water crisis for effective planning in post-apartheid South Africa. Three interview schedules (see Table 4-1) were administered with households as follows: one participant that had lived in QwaQwa before 1974; one participant that had been living in QwaQwa from 1974 to 1990; one participant that had been living in QwaQwa after 1990, and informal encounters. The reason household participants were chosen according to the respective epochs was that QwaQwa was in existence before 1974 and even before it became a homeland, and by 1990, the development functions of the QwaQwa government were stopped until 1994 when it was reintegrated into South Africa.

Institutions are a broad definition, but for the purpose of this study, institutions were social facilities such as health care, educational, religious, welfare and correctional institutions that rely on a constant supply of water from MAP Water to render services. The participation of the institutions in the interview schedules (Appendix 4.4) was to contribute to the research objectives namely 1) to document the lived experiences of the affected institutions in QwaQwa during the water crisis; 2) to identify interventions by various actors during the QwaQwa water crisis; and 3) to explore the implications of the QwaQwa water crisis for effective planning in post-apartheid South Africa. Seven interview schedules (see Table 4-1) were administered with three educational

institutions, one primary health care institution, one religious representative, one welfare shelter and one correctional service institution.

Businesses were the group of key informants that were interviewed regarding the QwaQwa water crisis. The participation of the businesses in interview schedules (Appendix 4.3) was to contribute to the research objectives, namely 1) to document the lived experiences of the affected businesses in QwaQwa during the water crisis; 2) to identify interventions by various actors during the QwaQwa water crisis; and 3) to explore the implications of the QwaQwa water crisis for effective planning in post-apartheid South Africa. The businesses chosen were primarily reliant on MAP Water to render water supply services. Nine interview schedules (see Table 4-1) were administered with businesses and consisted of one of each of the following: carwash, bakery, salon, factory, medium business, subsistence farming, drycleaner, guesthouse, and dentist, that were reliant on constant access to water to render their services to the community of QwaQwa.

4.3.2.1.2 Participant observation

Participant observation of the study began on 2 January 2016 when the author noticed that there was unavailability of tap water in Phuthaditjhaba–H (Riverside), QwaQwa, at the author's home. Because the QwaQwa water crisis affected a major part of the town there was no resistance by community members and businesses to participate in the study. A pilot study was conducted through informal encounters with people that were either waiting for a water tanker or carrying a water container to access water. The pilot study validated a need for the study to further explore the QwaQwa water crisis.

Participant observation is a qualitative research method through which the study observes how participants engage with their environment, not only from a distance but by also engaging in activities of the group by confirmation (Kawulich 2005). The participant observation was conducted for a period of 41 months (from August 2016 to 30 January 2020) to establish how the impact of the water crisis changed through different periods. A field observation involves observing a natural setting of the study (Zuo & Jones 2010:73). Field observation was done by visiting the three dams, and

observation of water infrastructure in QwaQwa. Audio recordings, videos and notes were taken to serve as supporting evidence for the study.

Observation data techniques such as photography, video recordings, audio recordings, and note writing were done. The observation data served as evidence of the data presented in the findings of the study. Observations particularly focused on the community's access to water, water infrastructure conditions and dam levels, and water delivery trucks as part of the interventions of accessing water during the water crisis in QwaQwa.

4.3.2.1.3 Document analysis

Document analysis was conducted as secondary data from journals, policy and legislation, books, newspapers, reports and old official government documents. The documents were accessed from the library at the University of the Free State for books and journals; online journals, report and book repositories; Free State Archives of official government documents; and the Internet. The MAP LM Integrated Development Plan (2016a) was first consulted because it is the commitment of MAP LM to service implementation over the period before and during the QwaQwa water crisis.

First, a document analysis of archival data was done to respond to the research objective of the history of policy and water crisis in QwaQwa by looking at water governance from pre-colonial South Africa. The purpose for doing this document analysis was because the timeline of water governance influenced the access of water by homelands thereafter. The second document analysis was done from newspapers and online sources on articles about the QwaQwa water crisis and the lived experiences of the community. Newspapers and online articles were also used for interventions by various actors to provide water in QwaQwa during the crisis.

4.3.2.2 Sampling procedure and sample sizes

Purposive sampling is the most common sampling procedure through which a study focuses on predetermined participants during data collection (Mack 2005:5). The sample size of qualitative data collection, according to Creswell (1998), is 5–25 interviews, whereas Morse (1994) indicated that a minimum of six interviews is

sufficient. Through purposively sampling key participants such as municipal officials, traditional leaders and political leaders, households, institutions and businesses were chosen to participate in interview schedules. Twenty-nine participants were chosen to participate in the interview schedules. Justification of participants of interview schedules has already been discussed in section 4.3.2.1.1.

4.3.2.3 Method of analysis

A method of analysis is important to determine the validity and reliability of data. Validity deals with the researcher checking the accuracy of the findings and reliability checks for consistency of data across different projects and researchers (Gibbs 2007).

4.3.2.3.1 Thematic analysis

Thematic analysis is a qualitative research analysis method that emphasises analysing and identifies and interprets patterns of meaning (Braun & Clarke 2006). Thematic analysis is accommodative of a variety of approaches (Guest, MacQueen & Namey 2011). Thematic analysis has three main approaches, namely coding reliability approaches, codebook approaches, and reflexive approaches. Coding reliability approaches entail two or more independent codes of information based on the content of interest as one code (Boyatzis 1998). A codebook approach describes the structure, contents, and layout of data collection that explains each variable (Gale, Heath, Cameron, Rashid & Redwood 2013). A reflexive approach reveals the dominant version of reality and suppresses alternative versions that analyse ways that guide readers to the responses (Langdridge 2004). The study employed a coding reliability approach for the thematic analysis because it considered multiple results from the data and grouped them into themes based on their commonalities. The themes were determined through the analysis and represented according to theories that are related to the study for the exploration of the QwaQwa water crisis.

4.3.2.3.2 Discourse analysis

Discourse analysis was used to analyse qualitative data. Discourse analysis is an analysis of vocal, written or sign language that has been collected for a study (Keller 2011:43). The type of discourse analysis was inductive content analysis, which is a qualitative method of developing theory and identifying themes through the analysis

of recordings, visual material, and documents (Schamber 2000:734). The study applied discourse analysis on archival documents and newspaper articles, interview schedules, images, audiovisuals, and observations. Archival documents and newspaper articles were treated as secondary data when being analysed. Interview schedules were written and recorded, following a verbatim transcription in Microsoft Word that excluded filler words responding to all the questions asked before organising the data according to themes. Images and audiovisuals were analysed and used to support the qualitative and quantitative data produced by the study.

4.3.3 Quantitative data procedures, methods, and analysis

The quantitative data procedures, sampling procedures, sample size, and analysis in this section indicate the data collection procedure choices, how samples were determined and how findings were analysed.

4.3.3.1 Data collection procedure

Questionnaires and mapping were used as quantitative data collection procedures for the study.

4.3.3.1.1 Questionnaires

The study collected 571 household questionnaires (Appendix 5) in 11 areas in QwaQwa through the Survey Solutions mobile application. Survey Solutions is a Computer-Assisted Personal Interview software that was developed by the World Bank to assist statistical offices, governments, and non-governmental organisations to conduct complex surveys using mobile devices (World Bank Group 2019). The household questionnaire was tailor-made for collecting quantitative data for the study. Survey Solutions had a cloud-based server that enabled the household questionnaire to be programmed for central accessibility by multiple Android-enabled mobile devices. The author administered training of nine fieldworkers to make use of Survey Solutions based on his experience of fieldwork data collection from the University of the Free State as well as private work and advanced computer proficiency gathered from a BSc Information Technology degree. The nine fieldworkers assisted in collecting the household questionnaires using their mobile devices.

The benefits of using Survey Solutions for the household questionnaire were first that Survey Solutions was freely accessible for a period of six months. Second, it lessened the data collection time by 50%, compared to that of a paper-based method. Third, questionnaires were programmable to be sequentially accessible and it could indicate to the end-user if a questionnaire was not completed. Fourth, data was sent to a central database that was analysed from a cloud database and downloaded in an SPSS data format for quantitative data analysis. Fifth, it produced coordinates of all questionnaires collected that were used for mapping, confirmation that fieldworkers went to the households, and ensuring even distribution data collection across all settlements. Lastly, questionnaires that were incorrect, incomplete or not understood were sent back to fieldworkers for clarity and/or resubmission.

There were, however, disadvantages with Survey Solutions. First, requires end-user mobile device proficiency for collecting, navigating questionnaire options and surveying household coordinates. Training was offered to fieldworkers to minimise challenges in administering the household questionnaires. Second, mobile devices were dependent on batteries that restricted fieldworkers to their capacity if a power bank was not available. Thirdly, mobile data was required to transfer data to the cloud-based server, which presented an additional cost to fieldworkers. Lastly, Survey Solutions was only available for six months, and if data was not downloaded or the questionnaire had not completed the data on the server was deleted.

4.3.3.1.2 Mapping

Mapping was done for surveying the extent of the study area and boundaries of exploring the QwaQwa water crisis. Data used to determine the extent of QwaQwa was accessed from Google Maps (2019), the Department of Rural Development and Land Reform (South Africa 2019) and Stats SA (2011). Google Earth and GIS were used for the orientation of the study areas, the relation of settlements to water sources and general proximity. The Department of Rural Development and Land Reform has a web-based GIS called Spatial Information Systems (SPISYS) that is linked with surveyor-general data for the Free State province. SPISYS also assisted in calculating distances between settlements, paths, and extent of the study area. Stats SA provided area settlement specific data for QwaQwa which was used to determine the level of service provision (current water supply), number of households and population. The

mapping exercise for the study involved analysing maps of the history of rainfall in the QwaQwa region and analysing data for developing maps of the different settlements.

4.3.3.2 Sampling procedures and sample sizes

The research employed a multistage sampling (MSS) technique for qualitative data to determine the representative sample size of participants for household data collection in QwaQwa. According to Kothari (2004:65), MSS is also referred to as a multistage cluster sampling which is a complex sampling procedure that is done in two or more stages for a sample selection. The purpose of MSS is to be able to divide a large population into smaller clusters into different stages to ensure more manageability of data collection. The advantage of MSS was that it is not time-consuming and overly expensive, but is presented with criticism that it does not affect true random sampling requirements. The MSS, according to Kuno (1976:39), is the process of sampling when it is uneasy to estimate densities by simple sampling. Battaglia (2011:493) described MSS as sampling that is done sequentially across two or more hierarchical levels. Table 4-2 presents the five MSS levels as follows: The first level focuses on the entire population; the second level focuses on the census track; the third level focuses on the block level; the fourth level focuses on the household level; and the last level within the household.

Data from Stats SA (2016) was available, but that of 2011 was used because it gave detailed information of the 11 areas that were sampled in QwaQwa. Stats SA data from 2006 was compared to 2011 data to determine the population growth and dynamics in QwaQwa. To reduce the negative impact of using Stats SA data that was not recent, an attrition of 25.6% was added to the total sample size to increase the validity and reliability of data, which is above the 5.6% increase from 2011 to 2016 in the MAP LM, according to the Local Government Handbook: South Africa (2018). Therefore, the total population of QwaQwa in 2011 was 284 729 people, constituting 85 524 households in total according to Stats SA (2011: online). Five stages were employed for MSS procedures and sizes of the number of questionnaires to be administered to households in the 11 areas of QwaQwa.

Table 4-2: Multistage sampling technique

Multistage sampling level	Applicability of level to the study	Purpose	Stages of the study
1. Entire population	The entire population of QwaQwa	Determining the total sample size	Stage 1: Determining the sample size
2. Census track	Determining settlements to sample in QwaQwa	Purposive sampling of 11 areas in QwaQwa settlements using pre-defined criteria	Stage 2: Random sampling for determining study areas
3. Block level	Determining proportionate sample size per settlement	A stratified proportionate sampling of the number of households to be sampled per settlement from the total sample size	Stage 3: Proportionate stratified sampling
4. Household level	Purposive sampling of households	Determining the frequency of households per settlement	Stage 4: Purposive sampling of households
5. Within the household	Determining participants per household	Selecting household members that are older than 18 years, with the first preference for household heads	Stage 5: Purposive sampling of household participants

4.3.3.2.1 Stage 1: Determining the sample size

To determine the total sample size, the standard unit of measurement was households. Census data from 2011 indicated that there were 85 524 households in QwaQwa, which was the total sample that was used to determine the sample size of households to whom questionnaires were administered to. Slovin's formula was employed to determine the appropriate sample size from a large population. According to Ryan (2013:19), Slovin's formula is suitable when sampling a large population but requires applying additional sampling techniques to increase the reliability of the sample size. For the reliability of the sample, a 95% confidence level was used to result in the sample size as illustrated in Eqn 1.

$$n = \frac{N}{1+Ne^2}$$

n = Sample size; N = Total households; e = Margin of error

$$= \frac{85\,524}{1+(85\,524 * (0.05)^2)} \qquad e = 0.05$$

= 398.14 households

≈ 398 households

Eqn 1: Slovin's formula

However, for purposes of increasing the validity of the data, the household sample size was increased to 500 households through attrition of 25.6% for the purpose of this study as shown in Eqn 2.

$$n = sample\ size * attrition$$

= 398 * 1.256

= 499.49 households

≈ 500 households

Eqn 2: Reliability sampling

4.3.3.2.2 Stage 2: Random sampling for determining study areas

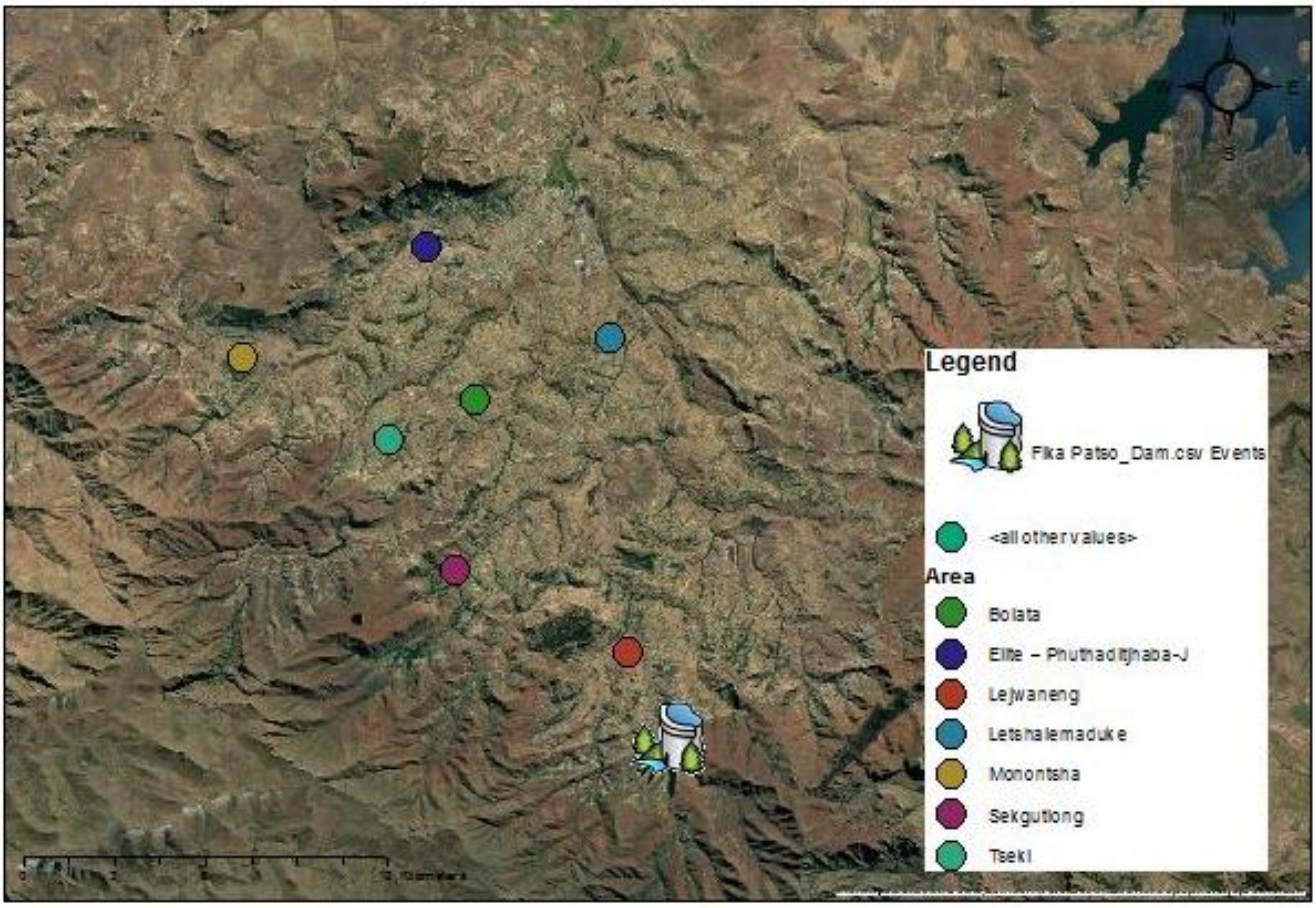
Random sampling from a total population refers to a sampling selection method that gives each possible sample grouping an equal probability of being chosen and having an equal chance of being part of the sample (Dattalo 2010:4). There are 13 township areas and 99 villages in QwaQwa, adding up to 112 areas according to a count done by Stats SA (2011: online). Eleven areas were chosen in QwaQwa for the study. Cox (2008:872) defined systematic sampling as a random sampling method that applies a constant interval of choosing the sample from a sample frame. On the other hand, Adwok (2015:95) indicated that probability sampling specifies that each segment of the population will be represented. Systematic probability sampling, which is a combination of systematic and probability sampling, was used to determine the sample settlements. Criteria (see Table 2-5) was developed by the researcher to sample areas according to distance from the water scheme; economic profiling (low, middle and/or higher income); type of governance (traditional leadership or municipal area); and distances from the three dams, which included settlements nearest, in between and furthest to the three dams. The areas chosen were grouped according to the dams they accessed water from.

Table 4-3 and Figure 4.2 depict the areas that were sampled that access water from the Fika Patso Dam.

Table 4-3: Areas that access water from the Fika Patso Dam

Nr.	Name	Area type	Distance from the dam	Economic profiling
1.	Bolata	Village	12.5 km	Low & middle class
2.	Tseki	Village	12.8 km	Low & middle class
3.	Monontsha	Village	18.0 km	Low & middle class
4.	Sekgutlong	Village	8.0 km	Low & middle class
5.	Lejwaneng	Village	3.0 km	Low & middle class
6.	Letshalemaduke	Village	13.2 km	Low & middle class
7.	Elite (Phuthaditjhaba–J)	Township	17.5 km	Middle & high class

Source: Author (2019)



Source: Author (2019)

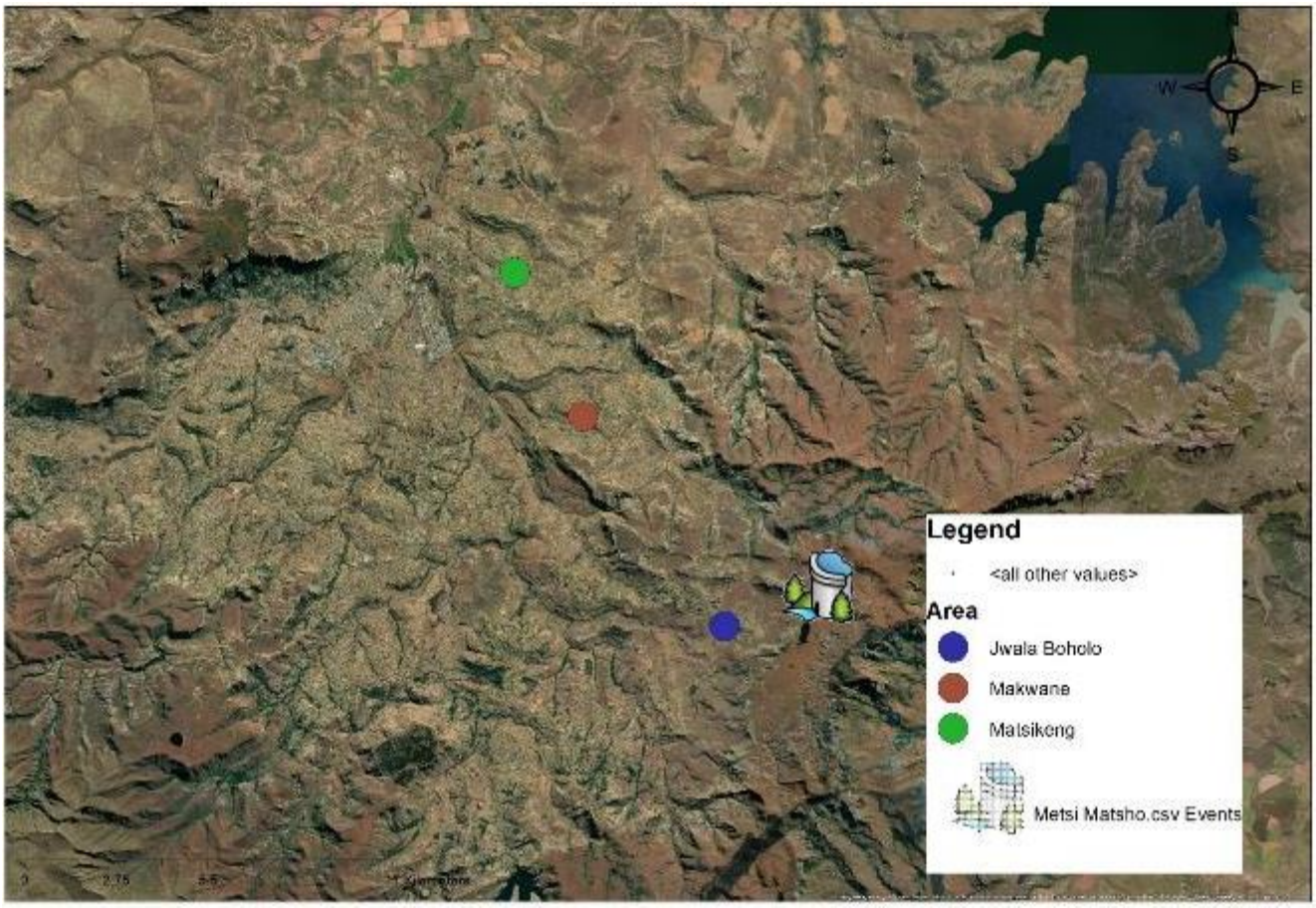
Figure 4.2: Areas that access water from the Fika Patso Dam

Table 4-4 and Figure 4.3 depict the areas that were sampled that access water from the Metsi Matsho Dam.

Table 4-4: Areas that access water from the Metsi Matsho Dam

Nr.	Name	Area type	Distance from the dam	Economic profiling
8.	Makwane	Village	8.2 km	Low & middle class
9.	Jwala Boholo	Village	2.0 km	Low & middle class
10.	Matsikeng	Village	12.5 km	Low & middle class

Source: Author (2019)



Source: Author (2019)

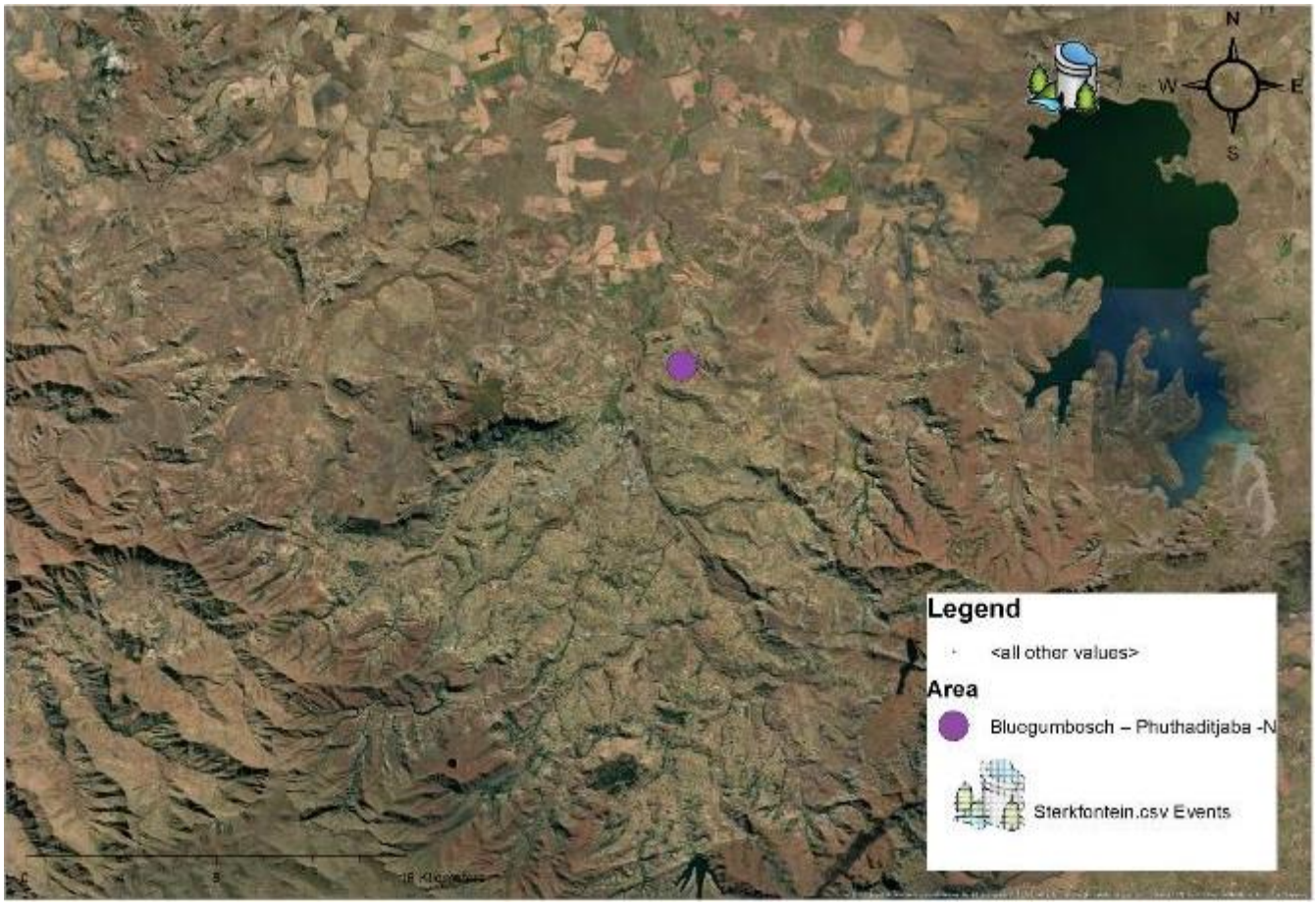
Figure 4.3: Areas that access water from the Metsi Matsho Dam

Table 4-5 and Figure 4.4 depict the areas that were sampled that access water from the Sterkfontein Dam.

Table 4-5: Areas that access water from the Sterkfontein Dam

Nr.	Name	Area type	Distance from the dam	Economic profiling
11.	Bluegumbosch (Phuthaditjhaba –N)	Township	12.2 km	Middle class

Source: Author (2019)



Source: Author (2019)

Figure 4.4: Areas that access water from the Sterkfontein Dam

4.3.3.2.3 Stage 3: Proportionate stratified sampling

Stage 3 employed a proportionate stratified sampling procedure. According to Daniel (2012:131), stratified sampling is probability sampling through which a target population is separated into homogeneous segments (strata), mutually exclusive, and then selecting a simple random sample from each segment (stratum). The proportionate aspect of the procedure represents each settlement having a sample that is equally weighted to other settlements of the study area.

Table 2-6 represents each stratum per settlement of the study area. Eqn 3 was used to determine the sample sizes from each of the areas.

$$n = \frac{Township\ or\ Village\ Households}{N} x\ 500$$ n = Sample size; N = Total selected households

For example:

$$n\ (Bolata) = \frac{4\ 359}{20\ 482} \times\ 500$$

$$= 106.4$$

$$\approx 106\ households$$

Eqn 3: Proportionate stratified sampling of study areas

Table 4-6: Household sample size per area

Nr.	Name	N	n
1.	Bolata	4 359	106
2.	Matsikeng	1 639	40
3.	Tseki	2 338	57
4.	Monontsha	1 550	38
5.	Sekgutlong	187	5
6.	Makwane	5 577	136
7.	Jwala Boholo	135	3
8.	Lejwaneng	438	11
9.	Letshalemaduke	2 530	62
10.	Bluegumbosch (Phuthaditjhaba–N)	1 327	32
11.	Elite (Phuthaditjhaba–J)	402	10
Total		20 482	500

4.3.3.2.4 Stage 4: Purposive sampling of households

Purposive sampling is a technique that is used to determine who is precisely going to be chosen to participate in the data collection. Palys (2008:697) indicated that before a purposive sampling procedure is used, it should be determined whom, where, and how the research is going to be done. This, by implication, means that purposive sampling determines a sample that is tied to the objective(s) of the research, and secondly, that the context of the study will determine how it is employed. Eqn 4 performed a calculation of which households to administer the household questionnaires to. Based on the calculations performed, every 41st house for all of the areas will have to be interviewed.

$$n = \frac{Total\ households}{sample\ size\ of\ households}$$

For example:

n (Bolata) $= \frac{4\,359}{106}$ n = Frequency of households sampled

$= 41^{st}$ house

Eqn 4: Frequency of household sampled for questionnaires

4.3.3.2.5 Stage 5: Purposive sampling of household participants

The fifth stage used purposive sampling to determine who in the household could participate in the study. As per the agreement of the ethical clearance, only persons over the ages of 18 were interviewed, with the priority of administering questionnaires with household heads. Upon arrival, if minors were the only prospective participants an appointment would be scheduled with an adult or using the immediately neighbouring house for participation.

4.3.3.3 Methods of analysis

A description of the methods of analysis was done for both qualitative and quantitative data. The description of the methods of analysis serves the purpose of discussing the validity and reliability of the data. Validity deals with the researcher checking the accuracy of the findings and reliability checks for consistency of data across different projects and researchers (Gibbs 2007).

Datasets that were created through Survey Solutions and were then downloaded into SPSS and Excel formats to analyse the data. Incomplete questionnaires were not included in the dataset because they were outliers. Inferential statistics were used to analyse the quantitative data. Inferential statistics is a deductive process (bottom-up) of properties that underlie probability distribution (Sternberg 2009). Inferential statistics derive estimates of an observed dataset that is sampled from a large population (Asadoorian & Kantarelis 2005:3). Three considerations were noted for inferential statistics (Tremblay, Chu & Mureika,1995; Weiner 1995):

- A sample is a good representative of the entire population because it chooses participants from the study area.

- There is always uncertainty of how a sample is represented. A sample will never be 100% representative of the population, hence a sampling error.
- The way sampling occurs matters. This has to do with ensuring that the entire population had an equal probability of being part of the sample.

4.3.3.3.1 Descriptive statistics

Descriptive statistics is a statistical summary that quantitatively describes a collection of information into groups in the process of analysing and using those statistics (Trochim 2006). Generally, descriptive statistics are not based on probability theory and are nonparametric statistics (Nick 2007). The descriptive statistics for the study determined the frequency, percentage, mean and standard deviation of the results. Descriptive statistics analysed household demographics, household socio-economic data, water access before and during the crisis, contributing factors and possible solutions to the water crisis.

4.3.3.3.2 Inferential statistics

Inferential statistics is a process of data analysis to generate variable properties for probability distribution (Upton & Cook 2008). Through inferential statistical analysis, variables of a population are inferred for the statistical significance of data from a larger population (Evans & Rosenthal 2004). Inferential statistical analysis determined the statistical significance of water per capita of the QwaQwa water crisis. A student t-test was used to analyse the statistical significance of the quantity of water accessible, distance to access water, time in minutes to access water and cost of accessing water before and during the QwaQwa water crisis.

4.3.4 Summary of mixed methods procedures, sampling, and analysis

Table 4-7 is a research design matrix that summarises the research objectives to data collection procedures, sampling techniques and sample sizes, and methods of analysis of the exploratory sequential mixed methods research.

Table 4-7: Research design matrix

Research objectives	Data sources	Data collection procedures	Sampling procedure and sample size	Method of analysis
To explore the history of the water crises and policies in QwaQwa: • Local • Provincial • National • International contexts	Primary data: • Traditional leaders • Ward committees • Local communities • MAP Water • MAP LM Secondary data: • Newspaper articles • Audiovisual material • Archival data • Literature	• Interview schedules • Questionnaires • Document analysis	Qualitative (29) interview schedules: • 9 interview schedules with key informants • 3 households Quantitative (571) household questionnaires	• Discourse data analysis • Inferential data analysis
To document the lived experiences of the affected QwaQwa communities such as: • Households of Bolata, Matsikeng, Tseki, Monontsha, Sekgutlong, Makwane, Jwala Boholo, Lejwaneng, Letshalemaduke, Bluegumbosch (Phuthaditjaba–N) and Elite (Phuthaditjhaba–J) • Businesses • Institutions	Primary data: • Community • The local community, businesses, and institutions • MAP Water • MAP LM Secondary data: • Newspaper articles • Audiovisual material • Mapping	• Interview schedules • Participant and field observations • Questionnaires • Document analysis • Mapping	Qualitative (29) interview schedules: • 9 interview schedules with key informants • 3 households • 9 institutions • 8 businesses Quantitative (571) household questionnaires	• Discourse data analysis • Inferential data analysis
To identify interventions by various actors for the QwaQwa water crisis: • Residents • Non-governmental organisations • MAP Water and LM Public and private sector institutions	Primary data: • The local community, businesses, and institutions • MAP Water • MAP LM Secondary data: • Newspaper articles • Audiovisual material • Mapping	• Interview schedules • Participant and field observations • Questionnaires • Document analysis • Mapping	Qualitative (29) interview schedules: • 9 interview schedules with key informants • 3 households • 9 institutions • 8 businesses Quantitative (571) household questionnaires	• Discourse data analysis • Inferential data analysis

Table 4-7 (Continued)

Research objectives	Data sources	Data collection procedures	Sampling procedure and sample size	Method of analysis
To explore the implications of the QwaQwa water crisis for effective planning: • Researcher's analysis and recommendations • Participant responses • Local government and the water scheme • The provincial and national government • Global policies for developing and developed countries	Primary data: • The local community, businesses, and institutions • MAP Water • MAP LM Secondary data: • Literature	Data analysis Synthesis of findings	Qualitative (29) interview schedules: • 9 interview schedules with key informants • 3 households • 9 institutions • 8 businesses Quantitative (571) household questionnaires	• Discourse data analysis • Inferential data analysis

4.4 Ethical conduct

The section discusses how the consideration of ethics was used for entry to the study area and ethical considerations that were followed.

4.4.1 Entry to the study area

The researcher was born and bred in QwaQwa, which was an advantage. Not having been in QwaQwa on a full-time basis resulted in reduced exposure to some issues and more especially events leading up to the water crisis.

There were different points of entry to the study area because different types of participants were involved such as the municipality, opposition parties, households, businesses, and institutions. The common documentation that was used when briefing participants was an informed consent and consent form. The informed consent (Appendix 2) and consent forms (Appendix 3) was written in terms of an ethical clearance approval (Appendix 1) granted by the University of the Free State on 27 November 2017. It is also worth mentioning that the informed consent was issued in Sesotho and participants could choose English as well, based on their proficiency with either language. The informed consent was read to the participants to clarify the intention of the study, address any questions and allow participants to indicate their willingness to participate because it was done with consent.

To gain entry to the municipality and MAP Water, line managers were given consent for participation by officials. Members of the opposition parties that participated in the study were consulted through political ward branches. For households, ward committees were made aware of the study and its purpose. Businesses and institutions were not hesitant to participate because they were also affected by the water crisis.

Participation by municipal officials, political leaders, and traditional leaders presented a great challenge because the QwaQwa water crisis was a highly politicised issue and national elections were approaching. Gaining entry into institutions that offered social facilities, at times presented equal challenges as municipal officials, political leaders, and traditional leaders because the issue was highly politicised. There was an incident with the Free State Department of Health, where the Thabo Mofutsanyana District refused clinics in QwaQwa to participate because the manager of clinics in the district suspected that the author was from a newspaper tabloid. The manager indicated that the author would have to get consent from the Free State Department of Health before participation could take place with clinics in QwaQwa.

There were informal encounters with people in QwaQwa that expressed how they were being affected by the water crisis. Informal encounters occurred in instances when engagement of about the QwaQwa water crisis was not pre-planned but contributes meaningfully to the objectives of the study. The informal encounters were with different groups of participants of the study and their results were discussed with qualitative and quantitative response.

4.4.2 Ethical considerations

Ethical considerations were important before engaging with participants because any participation had the potential of putting them in harm if not undertaken well. All of the interview schedules, observations, document analysis, and mapping was done by the researcher. Questionnaires were collected by nine fieldworkers that received training. The training was offered to all fieldworkers over two weeks by first informing them about the objectives and significance of the study. During the first week of training the researcher used a formal presentation and videos to teach fieldworkers how to administer questionnaires through Survey Solutions. Upon satisfactory completion of

the first week of training, each fieldworker was required to collect 10 questionnaires independently for the trial data collection for a week. Fieldworkers were appointed based on academic qualification of at least a Matric qualification and knowledge of the area. Due to safety concerns of females being at the risk of being attacked, only two females agreed to participate and formed part of the nine fieldworkers.

All participants of the study were issued with informed consent in both English and Sesotho. Participants were required to indicate if they were able to read and if not, the fieldworker then read the informed consent for them. An opportunity for clarity was offered to address any concerns participants had. Participants that chose to participate in the research completed a consent form stating that they understood the conditions of participation such as audio recordings, videos, notes, and photographs.

All the data collected from participants were kept confidential to avoid any risk of harm for participating in the study because the researcher considered the study to be exploring high politicised issues. Participation in the study was voluntary and no compensation was made. Participants were assured that the research was not for a profit-making venture and that it sought not to harm them. Before administering the interview schedules and questionnaires, both the researcher and fieldworkers only requested to communicate with adults, with the first preference to household heads or managers because they would have had a better understanding of the factors at play with the QwaQwa water crisis.

4.5 Conclusion

The methodological approach of the research paved a framework on how to structure the study to explore which factors contributed to the QwaQwa water crisis. Data collection procedures and methods dealt with data collection procedures, sampling procedures and sample sizes, methods of analysis for the qualitative and quantitative data, and summary of the mixed methods procedures, sampling, and analysis. The consideration of ethics was discussed because interaction with participants was done according to protocol and to minimise any potential harm to the researcher and participants.

Part 2
Discussion of the Empirical Evidence of the QwaQwa Water Crisis

Part 1 discussed the framing of the context of the study by introducing the study, review current knowledge about water governance in former homelands, as well as the legislative and policy framework related to water and planning in South Africa.

Part 2 focuses on the discussion of the empirical evidence of the QwaQwa water crisis in four chapters. Chapter 5 focuses on unrevealing the history of water policies in South Africa and the water crisis in QwaQwa by discussing the history of water governance in South Africa; the rapid urbanisation of QwaQwa resulting in a water crisis; climate change; and lack of maintenance of waste treatment plants infrastructure. Chapter 6 documents the lived experiences of the community in QwaQwa during the water crisis by discussing interview responses from traditional leaders, households, institutions and businesses; and quantitative results from households about their experience of the water crisis. Chapter 7 identifies the various actors that were present in providing water in QwaQwa during the water crisis by discussing interview responses from traditional leaders, households, institutions and businesses; and quantitative results from households about how they access water during a crisis. The last chapter discusses the implications of the QwaQwa water crisis on urban and regional planning by summarising the findings of the study; implications of the QwaQwa water crisis for planning; providing recommendations and areas for further research.

Chapter 5
Water Policies in South Africa and QwaQwa Water Crisis

5.1 Introduction

Chapters 1 to 4 have framed the context of the QwaQwa water crisis. The context was framed by describing the study, discussing current knowledge of urban and regional planning, state and power, and water, presenting the legislative and policy framework of water access and planning in South Africa, and provided methodological considerations adopted by the study.

This chapter is guided by the first research objective: **To explore the history of water policies in South Africa and the water crisis in QwaQwa** that are divided into two main sections. This introduction is followed by a presentation of the water governance trajectory before 1652 in South Africa. The section argues that water, although sometimes governed by traditional leaders, was considered a commons of the Bantu people in Southern Africa. The section also articulates issues of primitive accumulation of water by colonialists from 1652 to 1805. It shows that from 1806 to 1947 a racial link between land and access to water in South Africa was forged by the colonisers. The section also discusses the apartheid water regime beginning from 1948 to 1993, which promulgated racially separate development of South Africans and prioritised and entrenched white minority's access to water. The section lastly presents post-apartheid laws promulgated to address the injustices of colonial and apartheid South Africa from 1993 to 2020.

The third section, based on empirical evidence, presents the history of the QwaQwa water crisis. It does this by situating the crises within the holistic social engineering, a structural control exercised to create former homelands in South Africa that resulted in negative planning which led to the water crisis in QwaQwa in this post-apartheid era. It presents and discusses findings on developments that took place in QwaQwa from 1968 to 2020 that led to the water crisis. The section also discusses and presents the primary functions of the three dams as primary sources of bulk water supply and what their current functions are. This is followed by a conclusion of the chapter.

5.2 The history of water governance in South Africa

To adequately explore the QwaQwa water crisis, water governance was central because it determined how people in South Africa accessed water over time through customary, colonial, apartheid and post-apartheid legislation and policies. Water governance is discussed pre-1652 to 2020 to demonstrate how water was accessed, who was meant to benefit from water access and promoters of water governance through various epochs.

5.2.1 Pre-1652: Customary water governance trajectory in South Africa

During the pre-colonial period in South Africa, water governance was administered through African customary water laws. Tewari (2009:694) indicated that water rights were common knowledge, without conflict among members of the community and conflict only arose if a tribe felt that another tribe was encroaching into its resources. Pienaar and Van der Schyff (2007:188) referred to customary laws in general as civil law tradition; however, the study used customary water laws as a definition for pre-colonial water laws.

The Bantu people of Southern Africa (as there were no 'formal borders' yet) lived subsistence lifestyles based on gathering food and hunting. Water, like land, was free to communities and land tenure was controlled by chiefs without permissible private ownership (Juuti, Katko & Vuorinen 2007; Tewari 2009:694). Customary water laws, therefore, treated water as a common good (2.4.1) that was not privatised and was meant to be accessed by all communities for free within their area of residence. Customary water laws were disrupted by colonialism and this signified the commencement of primitive accumulation of water, which the study argued was the source of water crises in South Africa that later affected QwaQwa.

5.2.2 From 1652 to 1805: Primitive accumulation of water in colonial South Africa by the Dutch

The history of colonialism in South Africa is documented upon the arrival of the Dutch. The Dutch East India Company (VOC), led by Dutchman Jan Van Riebeeck, arrived in the Cape in 1652 with the primary purpose of establishing a refreshment and trade post (Ross 1999:23). Before his arrival, there were Khoisan people that lived in the

area and were utilising indigenous methods under customary water laws to access water (Funke, Nortje, Findlater, Burns, Turton, Weaver & Hattingh 2007:12; Guelke & Shell 1992:803). Through the leadership of the VOC, two new forms of water law known as *placcaets* were established that enforced strict control to access water and land (Findlater, Funke, Adler, Turton 2007:8; Funke et al. 2008:314). The VOC began granting land ownership to the Dutch through illegitimate means.

The first was the water law imposed in 1661 on individuals in the Cape Colony to limit irrigation hours so that workers could continue working their full hours in corn mills (Gildenhuys 1970). The second was the colonially imposed government of the Cape Colony through the entitlement of shared water streams and conflict resolution among the Dutch (Thompson 2006:34). The two water laws were based on Roman–Dutch law that indicated that water was common to all, even though the colonial government had the final say regarding the manner in which it was used (Hall & Burger 1957:2). Under Roman–Dutch law, even though the water was common to all, those who had the greater possession of land, economy and political power had more rights and access to water than the black majority that were poor and landless(Jacobs 1996:251).

According to Burman (1973:412), the VOC introduced two water laws through a dual system of land ownership and water rights that affected the Khoisan. Those that owned land according to the Dutch system of governance had rights over water that flowed through it. Primitive accumulation signifies a period that began to undermine customary water laws in South Africa. According to Van Koppen and Schreiner (2014:59), colonial powers undermined ownership of water resources and customary water law, which had the most impact on the poor. Water crisis and limited access to the poor in South Africa had a cumulative effect of colonial masters undermining customary water laws (Alden Wily 2011; Funke et al. 2007; Guelke & Shell 1992; Tewari 2009:694). The traces of the two water laws by the Dutch are still evident in post-apartheid South Africa because those without land ownership still faced minimal or limited access to water such as the community of QwaQwa. The water governance that occurred after Dutch colonialism can be linked to primitive accumulation (2.3.4) because access to water began to be linked to land ownership, despite such land ownership by the Dutch being questionable and illegitimate.

5.2.3 From 1806 to 1947: South African water governance trajectory

In 1806, the British took over the colonial project of the Dutch after they defeated them and taking up their territorial claims leading to the Great Trek. The British introduced four new laws that influenced water provision and planning in South Africa (Hall 1939:28). The first law allowed for land ownership along rivers and the right of landowners to have exclusive rights to access water from that river (Duly 1965:361). Over time, this became advantageous to the white landowners more than to the landless black people. The second law, the Native Land Act, Act 27 of 1913, created a racial link between ownership of land and access to water because it formalised the Native Reserve system that only allocated approximately 13% of land to the black population (Beinart 2014:667). The third influence of law under British rule was to increase the importance of agriculture and irrigation, which led to the promulgation of the Union of Irrigation and Conservation of Water Act of 1912 (Funke et al. 2007:15). Last, the discovery of gold in 1886 in Johannesburg brought massive migration to the mining town that was located on the watershed of the Witwatersrand. This led to the outflow of water from Johannesburg. The loss of water led to the establishment of the Rand Water Board in 1903 to satisfy the water and sanitation demand of the Witwatersrand area (Haarhoff & Tempelhoff 2007:96). During the same period of the establishment of the Rand Water Board, mining activity was granted priority over other land uses (Turton, Schultz, Buckle, Kgomongoe, Malungani & Drackner 2006). This process led to the beginning of the neglect of rural people (Funke et al. 2008:315). The promotion of the British interests through the four laws they introduced was a continuation of primitive accumulation that began with the Dutch.

5.2.4 From 1948 to 1993: Apartheid accumulation by dispossession of water: The water governance trajectory in South Africa

After the white population voted the National Party into power in 1948, apartheid was introduced as a governing policy that favoured white people (Clark & Worger 2013). Many acts were introduced such as the promulgation of the separate development of races. The first that is relevant to the study was the Group Areas Act of 1950 as discussed in 3.2.2 (Pirie 1984). The promulgation of the GAA led to deteriorating living conditions of the majority black population, especially in millions of blacks in disenfranchised homelands (Breckenridge 2014:225). Water governance was

promulgated by the Water Act, Act 54 of 1956, that led to the change of the Department of Irrigation to the Department of Water Affairs in 1956 (Thompson 2006). The primary function was provisioning water for agricultural purposes. Later the Department of Water Affairs shifted from irrigation to focus more on industrial water uses in the country (Tempelhoff 2017:190). The apartheid government focused on agriculture and industrialisation as a means of providing employment to black people in order to prevent them from urbanising and overpopulating white-dominated urban areas (Cousins & Newell 2015).

Apartheid intensified when South Africa declared itself independent from the British in 1961 and this increased the control of water by the Department of Water Affairs in homelands (Funke et al. 2008:317). Over periods of development, as the industrial sector started booming in homelands, access to water was prioritised for industrial activity and not human settlements, which is one of the reasons why South Africa remained in the poor situation regarding water and sanitation (Ruiters 2005). To try and manage South Africa's inconsistent water supply, the apartheid government then started controlling river water flows and developing water basins transfer schemes and large impoundments (McDonald & Ruiters 2012). These moves negatively affected natural environmental flows and led to a loss of several ecosystem services and goods that were produced by using water from South African rivers (Funke et al. 2007). The development of the water basins transfer scheme was the commencement of accumulation by dispossession (2.3.5) because areas such as QwaQwa were dispossessed of water that was used to supply the Vaal water system and benefit the white minority to the disadvantage of the majority of Africans.

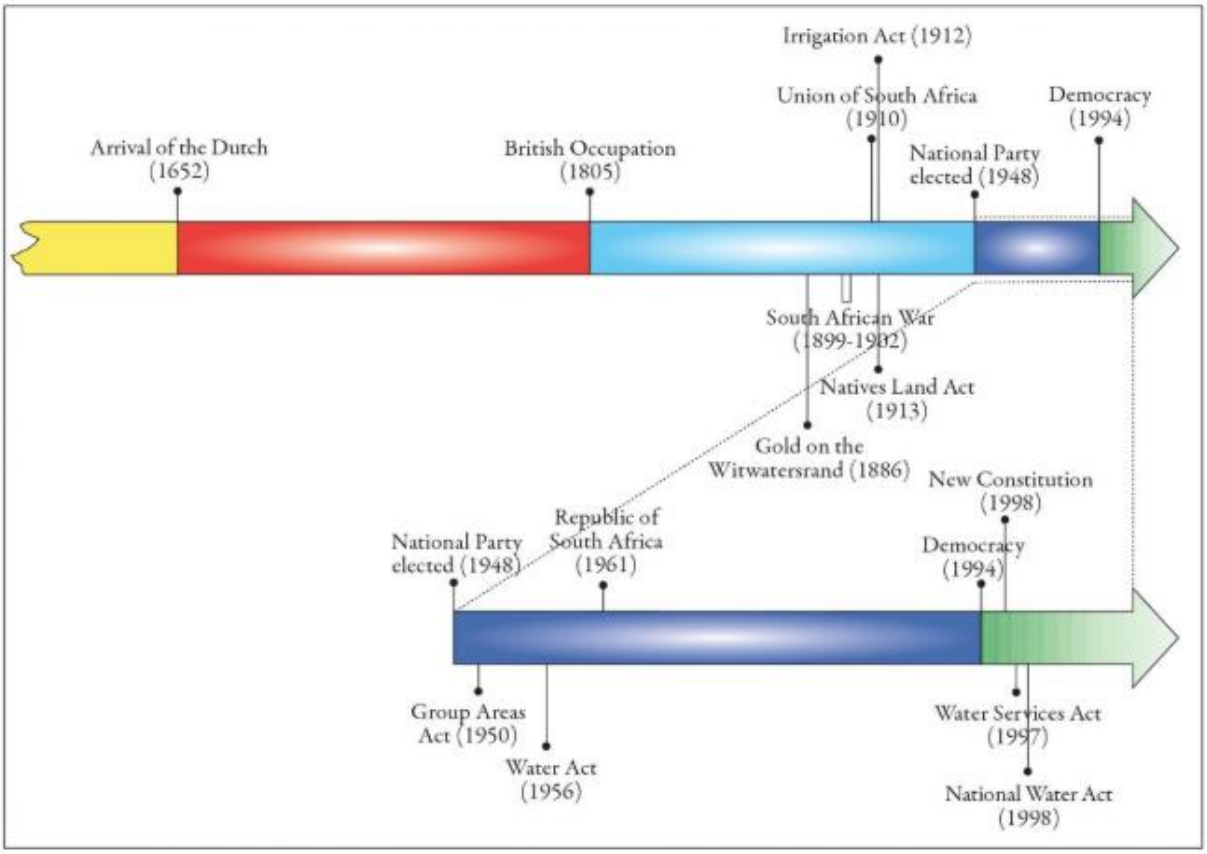
5.2.5 From 1994 to 2020: Neoliberal approach to redress colonial and apartheid water governance in South Africa

In 1994, after the first democratic election, all colonial and apartheid discriminatory and racially segregating laws were supposed to be repealed. However, evidence shows that how people are classified according to the GAA, influences the level of service provision for different races and conditions under which black people continue to be placed. New laws were introduced to redress the injustices of colonial and apartheid South Africa. The WSA of 1997 (3.4.3) and the National Water Act of 1998 (3.4.6) were two laws on water, as already discussed in the Legislative and Policy

Framework of Chapter 3, which the study considered to guide water access and the role of planning for effective planning in QwaQwa. The intention of the WSA to form water schemes that provide water in South Africa can be seen as neoliberal (2.3.6) because it commodifies water access in South Africa through the imposition of a cost to access it, leaving those in poverty disadvantaged.

5.2.6 Summary of water governance in South Africa

Figure 5.1 is an illustration of the evolution of water governance through the epochs of pre-colonial, Dutch, British colonial, apartheid, and post-apartheid. Table 5-1 further summarises the water policies in South Africa by representing the epochs, policy thrust, policy theoretical inclinations, social conditions based on beneficiaries of the epochs, as well as the advantages and disadvantages of the epochs.



Source: Funke et al. (2008:316)

Figure 5.1: Timeline depicting evolution of water governance in South Africa

Table 5-1: Summary of water policies in South Africa from pre-1652 to 2019

Policy	Year	Policy thrust	Policy theoretical inclinations	Social conditions and promoters	Advantages	Disadvantages
Pre-colonial South Africa: Customary Law	Pre-1652	Equality of access to water by Africans	Commons	Collective consciousness, chiefs, and household heads, moral economy	Granted access to water a common to all that need it with consideration of others through customary law that is centrally administered by chiefs on behalf of communities.	Customary laws were not resilient to the disruption by colonialism.
Dutch rule: *Placcaets*	1652–1805	Conquest and control of land and water from Africans	Primitive accumulations	Colonialism Dutch rule, German and French influence, disruption of customary law	Jan van Riebeeck successfully took command of the Dutch to initially establish a refreshment stop at the Cape of Good Hope, then later control of the Cape Colony.	Africans losing control over land and water in the Cape Colony. Less water accessible to Africans.
British rule: Ownership of water passing through the land, Land Act 1913, Union of Irrigation and Conservation of Water Act of 1912, and Rand Water Board in 1903	1806–1947	Control over Africans and with joint ruling with Afrikaners towards the end of colonialism	Primitive accumulations	Colonialism British rule, Afrikaner Great Trek, and Africans losing territory	The British took over the Cape Colony forcing the Afrikaners to start the Great Trek looking for new territory to occupy. Formal laws introduced that dis-advantaged Africans.	The Dutch are driven out of the Cape Colony and Africans are formally excluded from owning more than 13% of land and accessing water equivalent to white people.
Apartheid: Group Areas Act of 1950, the Bantu Education Act of 1953 and the Water Act of 1956	1948–1993	Afrikaner National Party governs South Africa and introduces apartheid	Accumulation by dispossession and holistic social engineering	Racial segregation pro-white laws, exclusion of Africans from meaningful participation in the economy	Social, economic and spatial segregation of South Africa to the advantage of white people. Access to land ownership and water prioritised for white people.	Using Africans as labour in the economic production of South Africa without an equitable share of natural resources. Access to land and water not availed to Africans as counterpart white people. Economic sanctions of South Africa.
Post-apartheid: WSA of 1997 and the National Water Act of 1998	1994–2020	Redressing unequal access to resources in South Africa across races	Neoliberalism, socialism, piecemeal social engineering	Democratic elections, colonial and apartheid redress, and empower-ment of previously disadvantaged communities	All South Africans promised equitable share to social, economic and development participation. Basic access to services increased to the number of formally disadvantaged communities.	The systems of colonialism and apartheid being deeply entrenched and being perpetuated during decision-making and delivery.

Adapted from: Funke et al. (2008:316)

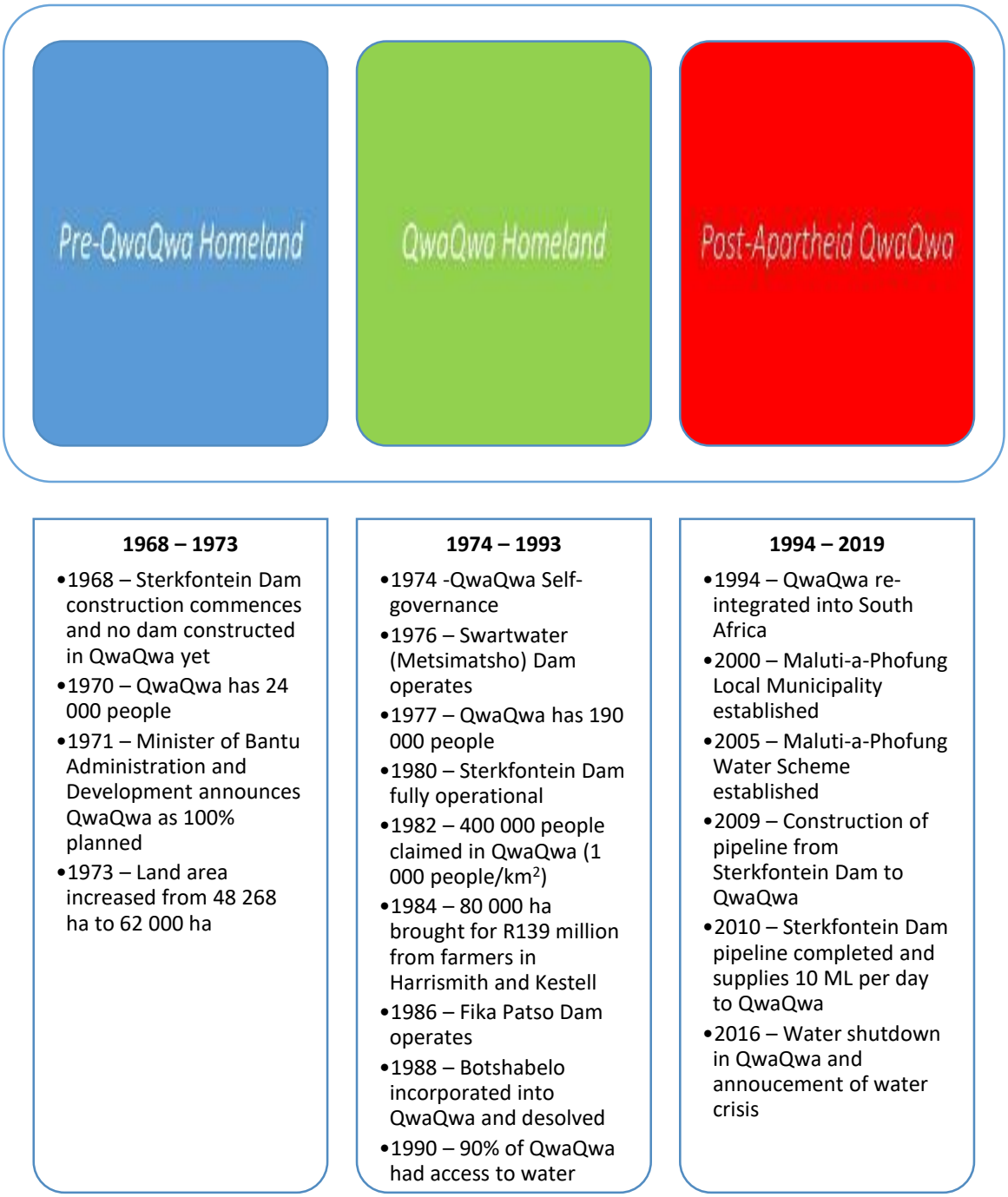
5.3 History of the water crisis in QwaQwa

The history of the water crisis in QwaQwa is presented and discussed after the history of water governance in South Africa to make a chronological connection of the two sections. This section presents and discusses how the history of water governance in South Africa has had a direct implication on the QwaQwa water crisis in five sections through critical findings.

5.3.1 Forced settlement of people in QwaQwa resulting in a water crisis from archival evidence

This section presents and discusses results from archival content analysis and interview schedules on how forced removals of Basotho people from towns and farms around the Free State and beyond resulted in the water crisis that the study has explored in QwaQwa. The results of this section are first presented using archival data that discusses the development of QwaQwa and the water crisis from 1968 to 2020. Lastly, interview schedule responses are presented based on household participants' lived experiences in QwaQwa before 1974, between 1974 and 1994, and after 1994.

Even though QwaQwa officially became a self-governing homeland on 1 November 1974, there was already a water crisis because people that were forcefully moved to QwaQwa could only access water from rivers, water tankers and springs as will be discussed in this section. The history of the water crisis in QwaQwa is therefore discussed in relation to events that took place before 1974. The results are presented and discussed in three epochs, namely pre-homeland QwaQwa, the QwaQwa homeland, and post-apartheid QwaQwa, as illustrated in Figure 5.2. The main sources of data used were from the IRR, the DBSA, official documents from the QwaQwa homeland government, academic literature and related media reports. The DBSA is an institution that played a primary role in developing infrastructure in South Africa and the African continent at large (DBSA 2020).



Source: Author (2019)

Figure 5.2: Timeline of history, policies and development of QwaQwa regarding access to water

5.3.1.1 Planning of the QwaQwa homeland

QwaQwa had been called the Witsieshoek Native Reserve since 1907 under the administration of the Harrismith district. In 1971, it was identified as one of the 10 homelands that were to be developed using the Promotion of Bantu Self-governance

Act of 1959, the Bantu Homeland Citizen Act of 1970 and the Black Affairs Administration Act of 1971 (Barnard, Stemmet & Semela 2005:184; Sharp 1994:71). QwaQwa finally became self-governing on 1 November 1974 under the terms of Proclamation 112 of 25 October 1974.

QwaQwa was described by De Villiers (1975:2) as a place facing sheer mountain drops into Lesotho and Natal. By implication, this meant that QwaQwa was established with the poorest prospects for agricultural potential, while industrialisation was non-existent. De Villiers (1975:5) and Slater (2002:603) also indicated that when QwaQwa became a homeland, infrastructure development was paramount and, in fact, that infrastructure should be specifically for industrial developments because manpower had already been forcefully settled in QwaQwa. This strongly suggests that industrial developments were seen as more important than the livelihoods of the people of QwaQwa.

Originally the smallest homeland out of the ten, and meant for the Basotho people, QwaQwa was the first of the ten to be 100% planned (IRR 1973). In 1973, adjacent land was purchased using Homeland Reserve Funds and increased QwaQwa from 48 234 ha to 62 000 ha (IRR 1976). Despite having been fully planned by 1971, the provision of water, as a basic human right, was not provided until 1976 when the Metsi Matsho Dam started being operational as will be discussed (see 5.3.2.2). This was the spate of social engineering of QwaQwa as a homeland intended to have a black labour reserve in conditions where they did not have equal rights to the white minority of South Africa.

This social engineering and its consequences of forced resettlement to QwaQwa can be demonstrated by the case of more than 2 000 families placed in Tseki, a village in QwaQwa, on 8 October 1974. The majority of them had come from the Tswana homeland of Thaba Nchu after being told by the regulatory authority to leave because they were Sotho. Others had been moved from farms around the Free State and other provinces. Upon arrival, they found there were no social facilities and housing, so they had no choice other than to erect rough shelters, mostly from corrugated iron, and to dig their own pit latrines. The only possible water access was from streams that could have been polluted by the people and animals that have used them. To make matters worse, there were no schools, and no employment opportunities or clinics (IRR 1975).

The events of forcefully settling Basotho people in QwaQwa with inadequate provision of water and other services was the creation of the water crisis as it was experienced by responses from the research participants.

In May 1975, Mr Kenneth Mopeli was elected and succeeded Chief Mota as Chief Minister of QwaQwa. Also, in 1975, approximately 40 000 Sotho-speaking persons in the homelands of other groups, such as Bophuthatswana, Ciskei, Transkei, and Kwazulu, requested to be included in the QwaQwa jurisdiction (IRR 1976). In order to be able to provide infrastructure in the homeland, the Bantu Investment Corporation, through the Bantu Investment Corporation Act of 1959, was established by the end of May 1975 and provided QwaQwa in the following manner (IRR 1976):

- Water scheme – R55 170.
- Electrical supply – R29 256.
- Industrial townships – R221 730.

Mr Mopeli denied the independence of QwaQwa as a state because he did not agree with Mr PW Botha's reformist policies and further stated that South Africa belonged to the blacks and he would forever be part of it. The denial of independence meant more dependence on the central government for the allocation of revenue. This could have been to the disadvantage of black people in QwaQwa because government legislation was developed specifically with the intention of benefiting white people (IRR 1978).

The population in QwaQwa had risen from 24 000 to 190 000 people (a 792% increase) from 1970 to 1977 (IRR 1978). Similar to other homelands, QwaQwa was managed by its government service that consisted of a Chief Minister and a cabinet of ministers across six departments (De Villiers 1975:2). For planning and development, QwaQwa had a multilateral framework in its territory to ensure that recommendations of specialised institutions were coordinated through four components. The first component was the Cabinet, which was responsible for adopting final development programmes and policies as proposed. The second was the Advisory Council that consisted of persons from the public and private sectors who were appointed by the cabinet based on their respective specialisations, knowledge, and interest in development. The third was the Directorate of Planning that consisted of a director, professional and technical staff whose functions were to cover planning throughout the territory. The Directorate of Planning further had four specialised planning

sections, namely urban, rural, regional and economic planning. The Directorate of Planning also served as a secretariat of the Advisory Council and the Regional Development Advisory Committee. The last component was the Tribal Councils that consisted of traditional leaders that were responsible for determining the needs of the communities at a local level. Cabinet government departments and three prominent specialised development institutions that approved development proposals, namely QwaQwa Agricultural Corporation; QwaQwa Development Corporation and the Board for Nature Conservation and Tourism (DBSA 1987:15).

The then Minister of Cooperation and Development, Dr P Koornhof, indicated in 1980 that there would be no more forced removals of black people at the national assembly and that the settlement of people should be for nation-building and allowing people to better themselves. He further indicated that proper sanitation, water supply, and adequate housing would be provided, as well as social amenities and employment opportunities. Despite Koornhof's statement in the assembly, there was a report from his department that between April 1979 to March 1980, approximately 42 974 people were forcefully removed from white areas in the Orange Free State to QwaQwa and Onverwacht (Botshabelo) which increased the demand for water and other basic services to these areas (IRR 1981).

The IRR (1984) reported that from 1980 to 1983, the population of QwaQwa had increased from 156 480 to 169 500 people. This was, however, contradictory to the figure of 190 000 people in QwaQwa by 1977 that could create inconsistency when budgeting and implementing services in QwaQwa for water access. During 1983/84, R139 million was spent on purchasing a total of 80 000 ha from farmers of Kestell and Harrismith. The R139 million is an indication that the South African government was more interested in increasing QwaQwa by purchasing land whose ownership was questionable due to historic dispossession, without equally matching its commitment to water provision in QwaQwa.

From 1 January to 31 December 1983, South Africa had experienced drought in 116 areas, and by February 1984, R165 million had been spent on supporting farmers. It is not known if QwaQwa was also affected by drought during this period, but the point is that with the expansion of QwaQwa more funds could have been availed for further developing water infrastructure. From 1970 to 1982, QwaQwa's population had risen

from 24 000 to 400 000 people in another contradictory report of population statistics, which meant there was a 2 000% rise and increasing the population density to 1 000 people per square kilometer (IRR 1986). However, the IRR (1987) publication indicated that there were 182 629 people in QwaQwa by 1985, and there was no suggestion of population decrease during this time. This inconsistency in population figures could have led to a miscalculation of needs and, more specifically, the demand for water. In 1987, the population in QwaQwa was 191 200 according to the IRR report of 1988, which dispelled the growth figure of 24 000 to 400 000 people from 1970 to 1982. The inconsistent figures on the QwaQwa population could have been as a result of the incorporation of Botshabelo (some 330 km away) into QwaQwa on 2 December 1988. The incorporation into QwaQwa was according to Proclamation R169, which gave administrative and executive control. The incorporation was short-lived as there were protests from the Botshabelo community and a court action by Mr Gauta Lawrence Lefuo, a teacher in Botshabelo, challenged the validity of the incorporation into QwaQwa at the Orange Free State Provincial Division of the Supreme Court in Bloemfontein on 26 August 1988 and the outcome was that the incorporation was invalid.

The DBSA was a crucial institution to source information about some of the developments that took place in QwaQwa because the apartheid government had tasked it to fund and monitor infrastructure development in homelands, and QwaQwa in particular. In 1986, the Fika Patso Dam was completed with the aim of supplying more water to QwaQwa. Furthermore, in 1986, QwaQwa obtained its water from three sources, namely boreholes, dams and rivers. Having to also rely on rivers to access water, was also an indicator of the crisis because such water could not be consumed without being treated like water provided by the municipality. There were three boreholes that were drilled in Bolata, Thibella and Namahadi for drinking purposes. However, since there was no provision for large-scale irrigation these boreholes were used, even though the water was only intended for drinking purposes. Until 1987, the water network consisted of the Swartwater Dam and its filter unit, the Phuthaditjhaba Purification Plant and the Fika Patso Dam that were only intended for domestic use. With the existence and expectation of increasing industrial activities, there had not been any indication of where water for such purposes would be accessed. It is newsworthy to note that the Phuthaditjhaba Purification Plant and Fika Patso Dam

relied on the Namahadi Dam, which was an unreliable source of water during the drought. Based on population influx figures the demand for water in both urban and rural areas was already increasing. The new university, hospital and residential developments already necessitated new sources of water. Even though the Fika Patso Dam brought relief, there was still a need for other water sources to supplement the supply of water to QwaQwa (DBSA 1987).

Due to the beneficial geographical features and water availability in QwaQwa there were already at least seven possible dam areas identified within QwaQwa (DBSA 1987). Even with these seven possible dam areas, the Cabinet of the Planning and Advisory Board in QwaQwa indicated that the cost implications were quite high and that groundwater options should have to be explored (DBSA 1987:54). According to a survey done by in 1991 (IRR 1992), QwaQwa had a population of 453 100 people, but the study was still not convinced that the figures were accurate because the reported figures have not corresponded since QwaQwa became a homeland and were a source of ineffective planning.

In a report released by the Council for Scientific and Industrial Research (1991:5), QwaQwa was indicated as having a total of 366 949 people in 1986, but it contained an inconsistency of population figures with other sources. However, the report discussed important factors of consideration such as that the provision of water and sanitation in QwaQwa was the responsibility of the Department of Works. QwaQwa had been blessed with perennial streams, springs and rivers. Water and sanitation projects had been available to public places such as schools, hospitals and clinics in rural areas and almost all rural villages had regional water schemes. To list a few other sources of water, there were four protected springs that served approximately 1 045 people; between 1971 and 1975, there were five borehole schemes in undisclosed areas. The protected springs and boreholes had piped reticulation which was partially functional for approximately 4 000 people; in 1972 there were six water tankers dedicated to serving 6 500 people with water but had issues of vehicles that broke down and a lack of funds for repairs. Issues such as a lack of community participation and vandalism were cited for the partially functional operation of water and sanitation infrastructure. The lack of community participation (2.2.5.3) and vandalism signify a lack of buy-in because the community did not receive education about the primary

function of the springs and boreholes (Council for Scientific and Industrial Research 1991:5).

When the above report was written, communities in QwaQwa expected the government to supply them with water without paying. The study believed that the expectation of accessing water without paying was not unreasonable because water is common and was historically freely accessible under customary water laws that governed how Africans accessed it. This was a major issue because there were no guidelines for cost-recovery from the community for water supply costs. Mostly the township (urban) areas and businesses were provided with in-house reticulation and were expected to pay for their water. Those that did not pay for water, fetched it either from water tankers, springs and boreholes. By 1990, at least 90% of the people in QwaQwa had access to safe drinking water and only 20% of rural households had access to improved sanitation facilities (Council for Scientific and Industrial Research 1991).

In 1994, after the first democratic elections in South Africa, the QwaQwa homeland was re-integrated into South Africa. The first trial of a democratic and equal South Africa for all was being tested, because the Sterkfontein Dam proved to still be a reliable source when it helped relieve the drought of affecting the Vaal Dam in 1995 when the water level was below 15% (Muller 2016:260; Van Vuuren 2008). This meant that the Sterkfontein Dam was still primarily performing the intended function to date. The move of the Sterkfontein Dam to continue functioning as a primary source for the Vaal River system post-apartheid signifies neoliberalism (2.3.6) because the water was being commodified. Through recommendations based on the fact that the Fika Patso Dam was going to have inconsistent dam levels, effective planning (2.2.3) should have commenced ensuring that the water crisis in QwaQwa was addressed.

5.3.1.2 Post-apartheid establishment of the water body in QwaQwa

On 5 December 2001, MAP was established through the Provincial Gazette No. 14 of 28 February 2000 that was issued in terms of the Local Government Notice and Municipal Demarcation Act, Act 27 of 1998 (Stats SA 2011). MAP Water was later registered as a fully municipal-owned entity that was established in 2005 in terms of the Municipal Finance and Management Act, Act 56 of 2003, the Municipal System

Act, Act 32 of 2000, and the WSA of 1997. MAP Water was established with the following ten functions bestowed to it (MAP Water 2014):

- Sustainability and maintenance of water and sanitation infrastructure of the municipality.
- Optimising water and sanitation provision.
- Achieving blue and green drop scores on water and sanitation schemes.
- Implementing safety plans for all plants.
- Compliance to all water and sanitation legislation and standards.
- Assisting the community with private water, septic tanks, and sanitation systems.
- Striving to obtain a five-star NOSA rating.
- Supervision of the municipal infrastructure grants project and smaller projects for water and sanitation.
- Identification of water and sanitation projects for the IDP.
- Assisting and advising MAP Water with water and sanitation issues that needed to be addressed.

The study, however, has found that MAP Water has not complied with its primary functions because, first, there's been a lack of maintenance of infrastructure (5.5); second, water and sanitation has not been optimised because the current infrastructure does not meet the demand of the community; third, there has not been compliance of the Water Service Act and National Water Act that make it mandatory for the community to have clean and consistent supply of water; fourth, there is no support for the community-led projects for accessing water and sanitation in QwaQwa because dependence on supply remains with them; and the IDP does not sufficiently discuss planning effectively for water, despite QwaQwa being in crisis.

As shown in Table 5-2, the dams contribute to water supply in QwaQwa through the following ways: The Fika Patso Dam supplies 85% of the water, while the Metsi Matsho Dam and Sterkfontein Dam supplies the remaining 15% of the water in QwaQwa. The Fika Patso Dam, after 1994, became responsible for supplying some water to Kestell which previously only relied on groundwater. The total capacity of treatment plants in

QwaQwa is 56.5 ML per day. There were 24 water pump stations and 32 wastewater pump stations. MAP Water had four water treatment plants as compiled in Table 5-2.

Table 5-2: Maluti-a-Phofung Water Scheme treatment plants in QwaQwa

Treatment plant name	Daily quantity (litre)	Percentage
Makwane Plant (Metsi-Matso Dam)	6 500 000	11.5%
Fika Patso Plant	40 000 000	70.8%
Sterkfontein Plant First Phase (serves only Bluegumbosch in QwaQwa)	10 000 000	17.7%

Source: Compiled from MAP Water (2014)

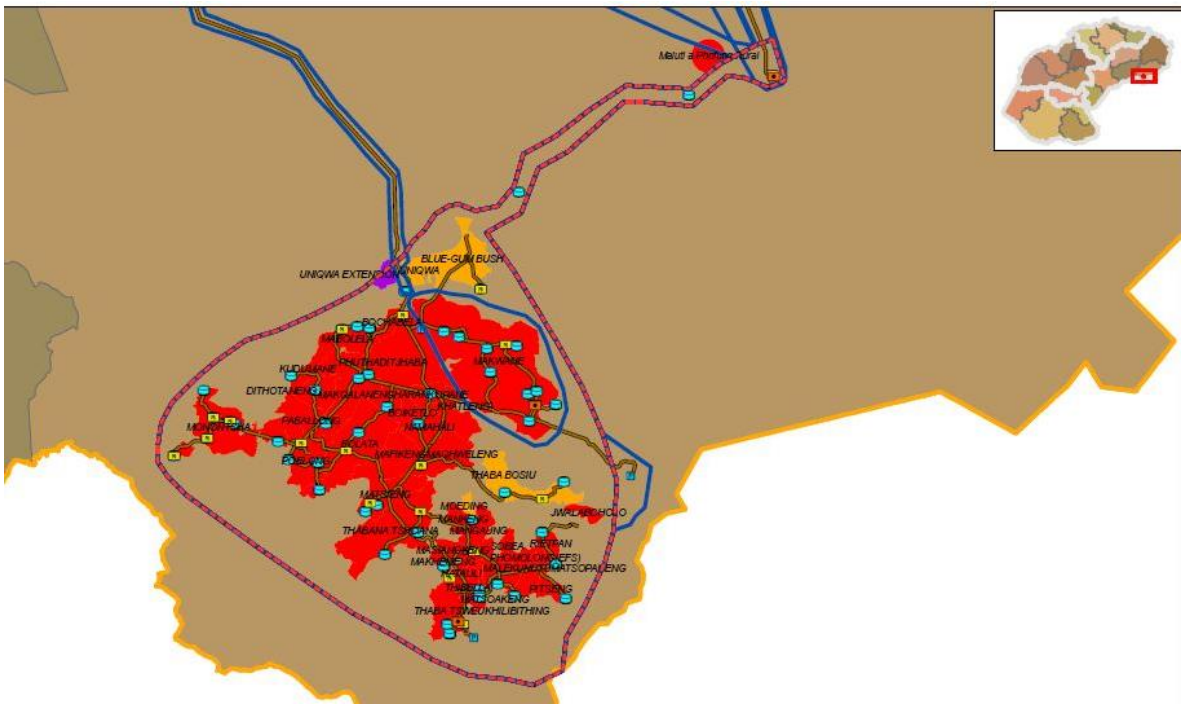
The most recent report of water infrastructure in MAP that the study found indicated that in 2010 the municipality had 64 reservoirs ranging from 0.5 ML to 10 ML, with a total of 105 ML for all reservoirs. There were 888 240 km of water pipelines in QwaQwa and 190 547 km in Harrismith (PCI Africa 2010).

In 2006, a resource management plan for abstracting water from the Sterkfontein Dam to the QwaQwa region was conducted by the Free State Department of Water and Sanitation titled: “Project 2006-303 Resource Management Plan For Fika Patso and Metsi Matsho Dam, Report 4: Resource Management Plan - February 2008” (South Africa, DAFF 2008a). The study recommended the construction of a new water treatment facility at the Sterkfontein Dam that would supply water to QwaQwa through a new pipeline. The feasibility study suggested the water reticulation and access from the Sterkfontein Dam. Subsequently, the construction of the first phase of the Sterkfontein Dam pipeline to QwaQwa began in February 2009 and was intended to be completed in four phases by 31 March 2018 at a total cost of R605 million. It is worth noting that the budget was intended to also supply water to Harrismith, Tshiame, and Kestell (Free State Department of Water and Sanitation 2015). There does not seem to have been a completion of this four-phased project because only one of the four phases with a capacity of 10 ML per day was completed and provides water in QwaQwa as shown in Figure 5.3. The water is further reticulated only to Phuthaditjhaba–N and Phuthaditjhaba–L.

Source: Author (2019)

Figure 5.3: Water access point from the Sterkfontein Treatment Plant on 7 February 2019

Phase 1 had an allocation of R75.3 million that was dedicated to constructing a water pipeline from the Sterkfontein Dam to QwaQwa and provides 10 ML per day (Department of Water and Sanitation 2012). The Sterkfontein–QwaQwa Bulk Water Supply Scheme was completed in January 2010 to supply 10 ML per day (PCI Africa 2010). Figure 5.4 depicts all the water reservoirs that reticulate water in QwaQwa shown in light blue and yellow.



Source: Free State Department of Water and Sanitation (2015)

Figure 5.4: Water reservoirs (in light blue and yellow) that distribute water in QwaQwa

5.3.1.3 Reported water crisis in QwaQwa, January 2016

On 5 January 2016, MAP LM (2016: online) issued a media notice on Facebook on behalf of the Executive Mayor, Vusi Tshabalala, that the municipality was experiencing water shortages and that QwaQwa was the hardest-hit area. The media notice emphasised that there was no deliberate switching off of water by MAP Water supplied to greater parts of QwaQwa, despite suspicion from some community members that it would have been the case. The source of the water shortage was indicated by Tshabalala as low dam levels of the Fika Patso Dam that supplied 85% of the water in QwaQwa. Water tankers were a resolution of providing water during this period, even though it had its challenges because the community had to set aside an unknown amount of time towards collecting water. As a short-term solution, MAP and the Free State Department of Water and Sanitation formed a partnership for appointing approximately 40 water tanker service providers. Tshabalala believed at the time that the long-term solution was going to be good rainfall in QwaAwa because South Africa had been hit by a severe drought.

On 12 January 2016, Shoprite Holdings (2016) responded to the need for water in QwaQwa by donating 49 280 ℓ of bottled water to the community of QwaQwa. QwaQwa was just one of six towns that received water from a total of 300 000 ℓ donated (see Figure 5.5).

Source: Shoprite Holdings (2016)

Figure 5.5: Shoprite Holdings getting ready to give water to a community in QwaQwa that was waiting for a water tanker

On 14 and 15 January 2016, the Al-Imdaad Foundation (2016) was one of the critical actors that came to offering assistance to QwaQwa where some areas had already been up to six months relying on water tankers. This initiative was part of their nation-wide drought relief initiative because their understanding was that record high temperatures had dried out the Fika Patso Dam and that had resulted in the remaining amount of water not being able to be pumped. Pure water was distributed to 10 villages such as Monontsha, Naledi, Tsheseng, Hlatseng, Phomolong, Theosane, Thaba Bosiu, Bolata, Dithotaneng, and a misspelled area. The water was distributed in water vessels ranging from 5 ℓ to 20 ℓ at a total quantity of approximately 100 000 ℓ.

In a newspaper article published by Public Eye News (2016), it was indicated that the former Executive Mayor of MAP, Vusi Tshabalala, indicated that Qwaqwa needed R1.6 billion for drought relief through the construction of a 14 km pipeline from the Sterkfontein Dam to the Fika Patso Dam. During this period, the water crisis that the research focused on, had already begun and most of the water was being released to the Vaal Dam (200 km from the Sterkfontein Dam). The level of the Vaal was at 25% because of the effects of drought. Tshabalala indicated concern that even though 10 ML of water per day was being sent to QwaQwa, the pipeline was still too small to meet the demand for water. A proposal was submitted to the former Minister of Water and Sanitation, Nomvula Mokonyane, for funding the pipeline at R1.6 billion over three years to provide adequate water to QwaQwa. The South African Communist Party's provincial secretary, Bheki Stofile, expressed unhappiness that 200 million cubic meters (200 000 ML of water) were released to the Vaal Dam to the neglect of the residents of QwaQwa. During this time, QwaQwa had already been suffering chronic water shortages for 10 months. The water from the Sterkfontein Dam to the Vaal Dam would take 54 days. According to Van Wyngaardt (2016: online), the dam level at the Vaal Dam was at 26.6%, and that of the Sterkfontein Dam was at 91.6%. The release of the water from the Sterkfontein Dam only decreased the dam level by 7% (84.6%) and it retained the highest water level during the drought.

In the Bloem Water annual report of 2015/2016, the chairperson, Mr Chauke, indicated that as a water board they were prepared to assist QwaQwa to sought 130 boreholes and support it with its service delivery mandate (Chauke, 2017). During data collection, there was, however, no evidence that Bloem Water contributed as a promise to assist during the QwaQwa water crisis.

Minister Zokwana of the Department of Agricultural, Forestry and Fisheries issued a media statement on 16 October 2017 about their initiative to fight inequality, poverty, and unemployment in partnership with the Free State Department of Agriculture and Rural Development, the Food and Agriculture Organization for the United Nations and the MAP LM, on World Food Day in Phuthaditjhaba, QwaQwa. Issues noted by Zokwana that were relevant to QwaQwa were that there was a severe water crisis and that a contribution were made for 170 2 500 ℓ water tanks, 100 garden tools, 150 watercans on wheelbarrows and 1 000 fruit trees. These were distributed to indigent households and subsistence producers. Because the water crisis implied food security, there was an intention of donating food parcels from various sponsors valued at R1.4 million and drilling 50 boreholes that were to be contributed to the Free State Province; however, this could not be confirmed by the researcher.

On 8 February 2018, the South African Broadcasting Corporation (SABC) News (2018: online) published an article about protests in QwaQwa against Tshabalala to step down as mayor because of water and electricity outage issues. The article further indicated that a 22-year-old man was shot dead by the South African Police Service, but they refused to respond to the shooting and indicated that the matter had been handed over to the Independent Police Investigative Directorate for investigation. Other issues that took place during the protests were the burning of tyres and looting of shops. All shops, banks, and government offices were closed during this period because residents deliberately wanted to shut the central business district down as an attempt to get the mayor to step down.

Sobuwa (2018: online) covered a story of two high school pupils, Reatlehile Sekaja and Mookgo Mofokeng, from QwaQwa that came up with an innovation of extracting water from cow dung and won a gold medal at the Eskom Expo in 2018. Reatlehile and Mookgo indicated that through research they found that it took an average of 13 mℓ of water to breed one cow through its lifespan. Therefore, it was important for them to come up with a way of extracting as much water from the cow dung as possible. Reatlehile and Mookgo indicated that:

> We designed a dewatering [removing water from waste material] machine to extract water from cow dung. We used pipes, a tap, a tin and a blade as a shaft and a wire for [our] pulling system.

The process involves pouring the cow dung into the dewatering machine and stirring it for approximately 30 minutes using the machine shown in Figure 4.6. The dewatering machine was able to extract approximately 800 mℓ of water per kilogram of cow dung. Without treating the water, it served the purpose of watering and fertilising crops and plants but can be taken further for purification.

Source: Sobuwa (2018)

Figure 5.6: Reatlehile Sekaja and Mookgo Mofokeng who won a gold medal at the Eskom Expo with their dung dewatering machine

Manyatso Mahlatsi (2018: online), Free State provincial secretary of the Congress of South African Trade Unions, indicated concerns that the number of trucks that delivered water in QwaQwa had decreased to once a week or once every two weeks at times. It could have been possible because the municipality could not afford to service contracts for the delivery of water. Mahlatsi further indicated that a call had been made to the South African National Defence Force to be deployed in assisting with the water issue. Furthermore, the intervention by the National Defence Force would be more cost-effective than private service providers. Lastly, Mahlatsi maintained that the water crisis in QwaQwa was man-made and that it should have been resolved a long time ago so that people would not be so much affected as they currently are.

5.3.1.4 Oral history of the water crises in QwaQwa

Interview schedules were conducted with traditional leaders and households because they have an institutional memory of how they have accessed water in QwaQwa through the colonial, apartheid and post-apartheid periods. The names of participants were codes as traditional leaders (TL1 to TL2) and household participants (HP1 to HP3).

5.3.1.4.1 Responses from the key respondents (Traditional leaders)

The participation of traditional leaders in the study by responding to the history of the water crisis in QwaQwa added value regarding how their respective communities accessed water since their villages were established. The first question was about how water was accessed in their villages over time in QwaQwa.

The first response was from the traditional leader (TL1) from the Mabolela village that indicated that when QwaQwa became a homeland, water was accessible from rivers, water tankers and a few boreholes installed by the QwaQwa government. The situation of water access was a challenge, but the QwaQwa government then made an effort to build the Metsi Matsho Dam that mostly provided water to the community of Makwane and some communal taps in this village. The QwaQwa government did not charge monthly service fees for the provision of services in general but had a taxation system call *sethabathaba* which was a once-off payable tax towards all services paid by household heads. *Sethabathaba* was a R10 flat rate payment made by the household head who got a receipt as a proof of payment. The receipt needed to be produced when accessing social amenities such as health care and educational institutions as well as for job applications at government, but failure to produce the receipt when lost meant that the R10 payment would have to be made again. As recollected by TL1, *sethabathaba* was only paid from the late 1970s until the end of the 1980s. In closing, TL1 had the following to say:

> The community in this way becomes involved in the building of such resources so that they can become jealous of them and look after them well.

Based on TL1's response, this means that the community of QwaQwa felt involved in the development process and had a sense of ownership that encouraged them to take care of their infrastructure because they were bound to pay to access it. Because

QwaQwa is regarded as a rural town due to the majority of the population (81% as reported in 1.6) residing in villages without water meter readings, have not been able to contribute to the provision of water by MAP water. Currently, the MAP accesses an indigent grant from the CoGTA (2019) towards free basic services such as water, energy, sanitation and refuse removal to poor households in need. The process of identifying indigent households is done by the municipality and the criteria include South African citizenship or proof of refugee status; a maximum qualifying household income as set by the municipal indigent by-law; proof of non-affordability to pay rates and services; and child-headed households qualify automatically. It was not possible to locate the MAP's indigent by-law to determine which criteria were used to register indigents in QwaQwa; however, in the *Maluti-A-Phofung Local Municipality: Resolution levying rates for the financial year 01 July 2018 to 30 June 2019* (Free State Provincial Gazette 2018:5), the stipulated free quantity of water per month to indigents is 6 000 ℓ per month. With villages that do not have water meters and high poverty rates, it would be difficult to determine if households were not passing the 6 000 ℓ per month free access to water limit.

The second response was from TL2 and TL3 because they contested the legitimacy of being traditional leaders of the Monontsha village. TL2 indicated that they were supposed to have been inaugurated as chiefs in 1978, but TL3 and the tribal council of Monontsha nullified TL2's chieftaincy. TL3 indicated that he was only inaugurated into chieftaincy in 2008. Both responses were considered because they offered valuable insight regarding the history of water access in Monontsha. When TL2 was asked to respond to the history of the water crisis in QwaQwa, he first indicated that access to water was not an issue in the 1970s and 1980s because there were traditional praise methods that were used to call for water during times of need. TL2 further indicated that the traditional praise methods were disrupted by taverns opening in villages and increased alcohol consumption that made God punish the people of QwaQwa by reducing the amount of water available. TL2's second response was that Africans have failed to take care of their children, hence the emergence of homelessness that has caused further anger to God. TL2 further iterated that in the African culture they have not made enough effort to house homeless children because a child belongs to the community and not just to their parents. Lastly, TL2 indicated

that teenage pregnancy, abortions, and females eating eggs have also contributed to breaking the traditional cord that satisfied God's wishes for his people.

TL3 was not able to provide detailed information about the history of the water crisis in QwaQwa because he was too young to recall events that took place then. TL3 indicated that his grandfather, Chief Oetsi, has led 1 450 people that he settled with in Monontsha in the 1800s and that he has been living there for over a century, initially accessing water from rivers and streams. The contested chieftaincy in the Monontsha village was an indication of how leadership can be compromised by not having multiple voices representing a community without a common mission and vision.

5.3.1.4.2 Responses from household participants

Due to an extensive sample size of 500 household questionnaires, only three interview schedules were conducted in order to get in-depth responses regarding the history of the water crisis in QwaQwa. The three interview schedules were distributed according to how long the participant had been living in QwaQwa and were already adults at the time. Household participant (HP1) had been living in QwaQwa since 1972, HP2 had been in QwaQwa since 1986, and HP3 had been in QwaQwa since 1990. All three household participants were required to give their recollection of water access in QwaQwa by responding to the question: What is your recollection of how you and people in your community used to access water?

HP1 indicated that when he moved to QwaQwa in 1972, accessing water was a challenge while living in the Makgaleneng village. HP1 further responded that:

> When I got to QwaQwa, we collected water from rivers and springs, which took time to access. Later in the ’70s QwaQwa had one dam, Metsi-matsho, which had a limited water supply at times. Later there was a white suburb, De Bult, and it had access to water through a tap a little closer. I was employed by the water supply department of QwaQwa and experienced the construction of a water reservoir in Tseki that allowed people to access water from the taps in their yards. However, through the current water crisis, I have relived water access challenges because I can only access it from a truck.

The response from HP1 is an indication that QwaQwa has had a water crisis for longer than what has been reported.

The second response was from HP2 who moved to QwaQwa in 1986. HP2 indicated that when she moved to QwaQwa there were only minor water issues such as dirty

water from the taps and no supply of water for two days at most for water purification purposes. HP2 is quoted as responding that

> I only started experiencing major water issues in the 2000s because the water became unavailable for long periods.

HP2's response indicates that water access challenges worsened for her with time and has now reached a point that prolongs unavailability.

The last response was from HP3 that moved to Monontsha, QwaQwa, in 1990. From the 1990s till the early 2000s, HP3 indicated that he had not experienced and water issues. In direct response he indicated:

> In the 1990s when I arrived up till the early 2000s, I didn't experience any water issues because I feel that infrastructure was developed well under the leadership of Mr Mopeli during QwaQwa's time as a homeland.

HP3's response indicates that for him there had not been a water crisis until the early 2000s because of aging and limited water infrastructure in QwaQwa that has led to the crisis.

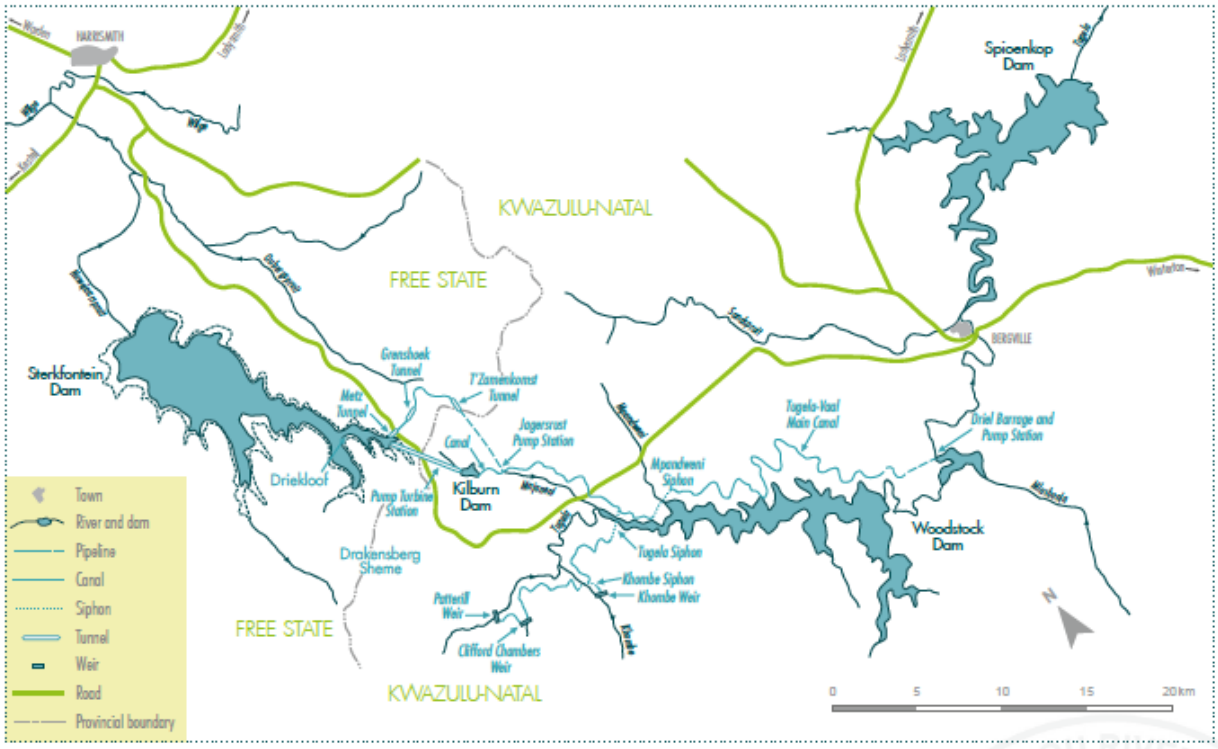
5.3.2 Functioning of the three dams in QwaQwa

The study aimed to explore the QwaQwa water crisis for effective planning in post-apartheid South Africa by discussing the tale of the three dams. The three dams are the Sterkfontein Dam, the Metsi Matsho Dam and the Fika Patso Dam, as discussed in 1.6. This section briefly describes when the dams were established and the primary purpose they aimed to address.

5.3.2.1 Sterkfontein Dam

The Sterkfontein Dam, which is the largest out of the three dams, is situated 25 km from QwaQwa. It was constructed due to the growing pressure and drought conditions in the Pretoria–Witwatersrand–Vereeniging complex. During the 1960s, the Vaal River system had been under pressure to accommodate for the water demand and a solution was sought. The Thukela (Tugela)–Vaal Transfer Scheme (TVTS) was then established as a reserve storage dam and its first phase commenced in 1968 (Van Vuuren 2008:16). The TVTS (see Figure 5.7) was developed 370 km from the Vaal Dam and includes a series of dam basins such as the Spioenkop Dam, Woodstock

Dam, Driel Barrage, Kilburn Dam and Driekloof Dam which are collectively referred to as the Sterkfontein Dam. The TVTS also consisted of a serious of pipelines, pump stations, tunnels and canals (Haasbroek 2013).



Source: Haasbroek (2013)

Figure 5.7: Thukela–Vaal Transfer Scheme

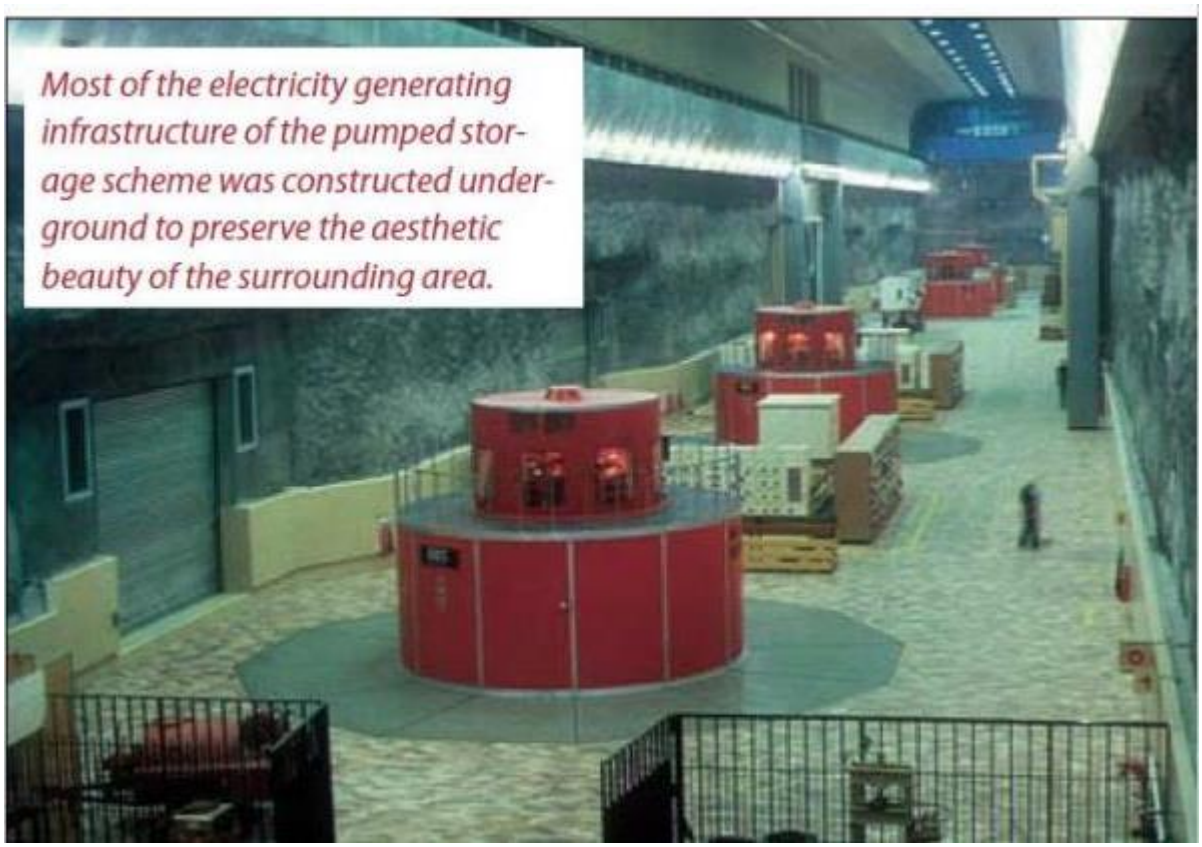
The Spioenkop Dam was developed in 1968 and was supposed to be part of the Java Dam, which later had to be replanned because it was going to flood the planned National State of QwaQwa which is an indication of its geographic capability to reserve water and the availability thereof. A new site was then found at the Sterkfontein farm that had the Nuwejaarspruit, a tributary of the Wilge River. In June 1970, the first phase of the Sterkfontein Dam was approved by Fanie Botha, the then Minister of Water Affairs (Van Robbroeck 2007:11; Van Vuuren 2008). The construction of the Sterkfontein Dam started in 1971 which was the largest earth-fill embankment dam built in South Africa (Elges 1982:375). Due to the geographic locality of the Sterkfontein Dam, it only had a 10% evaporation loss compared to the Vaal Dam and could, therefore, retain water longer (Elges 1982:381; Van Vuuren 2008:17).

Growth in the Pretoria–Witwatersrand–Vereeniging complex continued to increase, and in 1974, the Department of Water Affairs had approved the second phase of the

TVTS to 11 000 ℓ/s and 950 ML per day. The TVTS has the advantage of having an infrastructure that had the capacity of delivering the quantity of water required by the Pretoria–Witwatersrand–Vereeniging complex (Van Vuuren 2008). The Sterkfontein Dam started supplying water to the Vaal Dam in 1974 for the socio-economic benefit of the apartheid state intended to benefit the white minority (Water Institute of South Africa 2019).

In 1977, the first phase of the Sterkfontein Dam was completed and was the only dam to have been included in the International Commission on Large Dams. The construction of the first phase was completed at R41.7 million. The construction of the second phase of the Sterkfontein Dam started in 1979, but before it started, investigations were underway for a pumped-storage hydroelectric scheme that would allow pumped water to be returned for electricity generation (see Figure 5.8). The construction of the Drakensberg Pumped Storage Scheme was a joint project between Eskom and the Department of Water Affairs. During the second phase, the Sterkfontein Dam's wall height was also raised and the construction was completed in 1979 (Van Vuuren 2008:18). The Sterkfontein Dam began full operation in 1980 to the water retention capacity it currently has. In 1980, the TVTS won an award for the Most Outstanding Civil Engineering Achievement from the South African Institute of Civil Engineering (Van Vuuren 2008).

The Sterkfontein Dam currently still performs the primary function it was intended for during apartheid. There are multiple media reports of the water shortage in 2015 and 2016 in the Vaal Dam that showed that the Sterkfontein Dam's water reserves were used to keep its dam levels at 25% (Free State Department of Water and Sanitation 2016; Henderson 2016; Van Wyngaardt 2016). These media reports indicate that the apartheid intended purpose of the Sterkfontein Dam has been maintained, with minimal consideration of the people of QwaQwa accessing all the water through effective planning means that MAP Water and various stakeholders could commit to for upholding the human rights as prescribed in the Constitution.

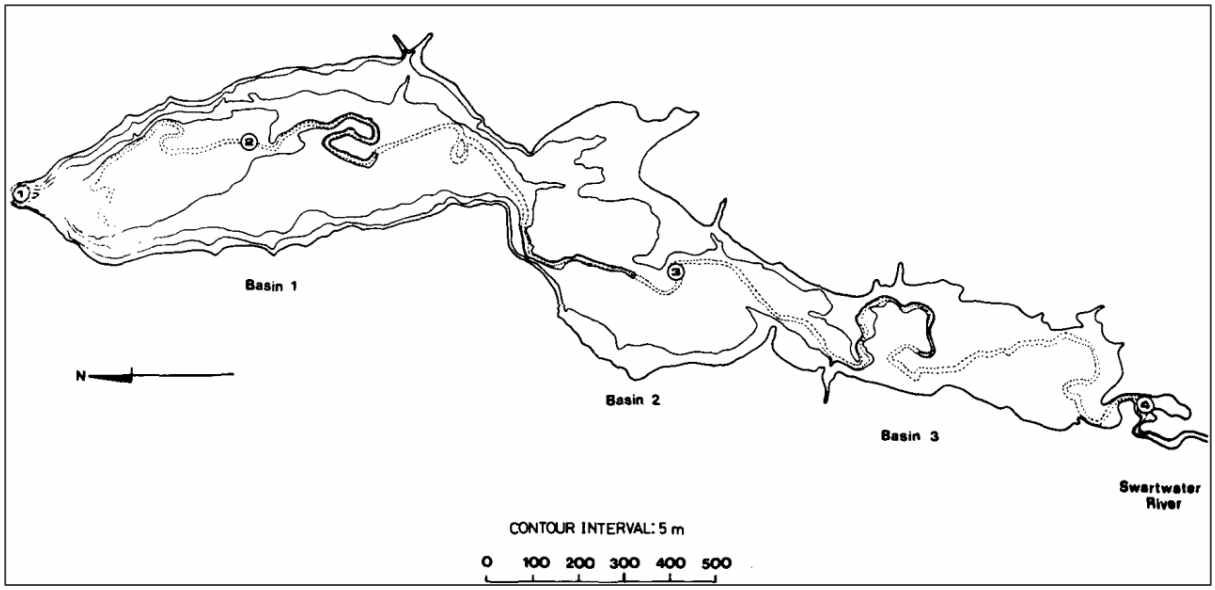


Source: Van Vuuren (2008)

Figure 5.8: Drakensberg Pumped Storage Scheme

5.3.2.2 Metsi Matsho Dam

In 1973, the construction of the Swartwater Dam, now known as the Metsi Matsho Dam (see Figure 5.9) was completed by 1976 (Stegmann, Pieterse, Toerien, Seaman, & Van der Waal 1981:16). The Metsi Matsho Dam was constructed for domestic and industrial use but is also used by the local community for drinking water for livestock and fishing (South Africa, DAFF 2008a:6). The construction of the dam had brought out some positivity by providing water and prospective hydroelectricity for future industrial development and domestic use in QwaQwa (Twala & Barnard 2006). It should be noted that the hydroelectrical generation capability of the dam was never developed. The Metsi Matsho Dam is the smallest out of the three and was the single largest supplier of water to the community of QwaQwa for domestic and industrial use until 1986. The Metsi Matsho Dam was then assigned to supply water to only 15% of QwaQwa after the Fika Patso Dam became operational.



Source: Stegmann et al. (1981)

Figure 5.9: Metsi Matsho Dam (previously known as Swartwater Dam)

5.3.2.3 Fika Patso Dam

The Fika Patso Dam is located in QwaQwa and was an additional dam built with a larger capacity than the Metsi Matsho Dam to supply water to the community of QwaQwa. The construction of the Fika Patso Dam began in 1983 and was completed in 1986 (Moffett 2008:213). The primary purpose of the Fika Patso Dam was to supply domestic and industrial water supplies to the community of QwaQwa (South Africa, DAFF 2008a). The Fika Patso Dam is a combined rock-fill / earth-fill dam located on the Namahadi River that is the upper section of the Elands River, a tributary to the Wilge River. The Fika Patso Dam wall has a dimension of 60 m height and 300 m width, with a capacity of 28 000 ML (Mackintosh, De Souza & Delport 2002).

Source: Author (2018)

Figure 5.10: View of Fika Patso Dam view from the Sentinel Peak in QwaQwa on 12 May 2018

By 1986, the three dams as listed in Figure 5.11, had been completely developed with a total capacity of 2 648 500 ML of water, which include surface water and all water reservoirs linked to the three dams. The Sterkfontein Dam is approximately 98.77% larger than the capacity of the Fika Patso and Metsi Matsho dams combined. Based on the demand of 40 ML of water per day, the total capacity of 2 648 500 ML would be able to supply QwaQwa for 66 213 days without being refilled and in a condition where no water was lost to evaporation and leakages. This capacity demonstrates that there is sufficient water supply that requires strategic planning (2.2.2) for effective planning to occur and the QwaQwa water crisis to be resolved.

Table 5-3: Dam capacities after completion in 1986

Name of dam	Areas of supply	Capacity (ml)	%
Fika Patso	QwaQwa	28 000.00	1.06
Metsi Matsho	QwaQwa	4 500.00	0.17
Sterkfontein	Vaal River System and QwaQwa	2 616 000.00	98.77
Total		**2 648 500.00**	**100.00**

Source: Author (2019)

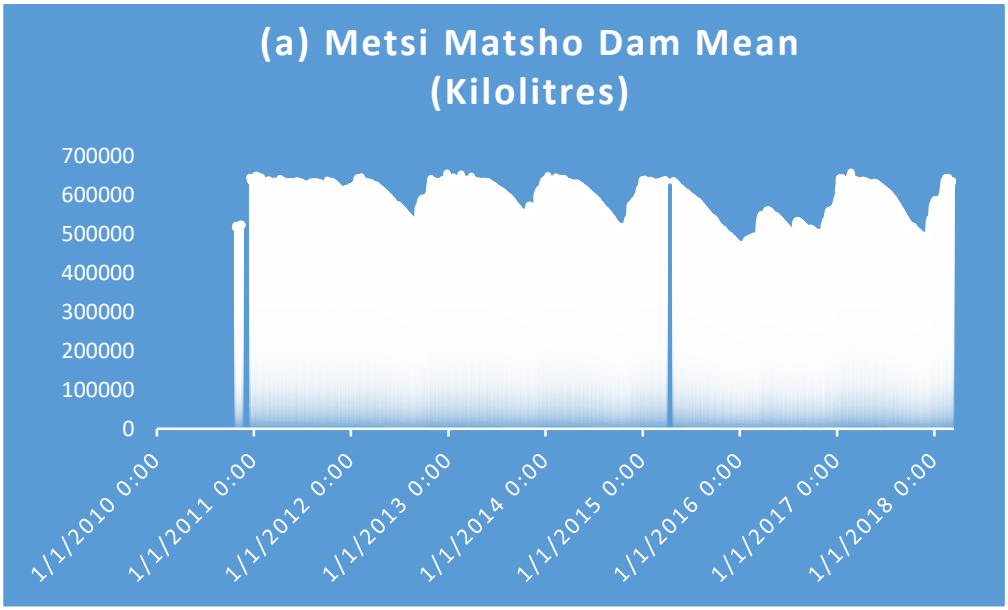
5.3.3 Fabrication of climate change causing drought in QwaQwa

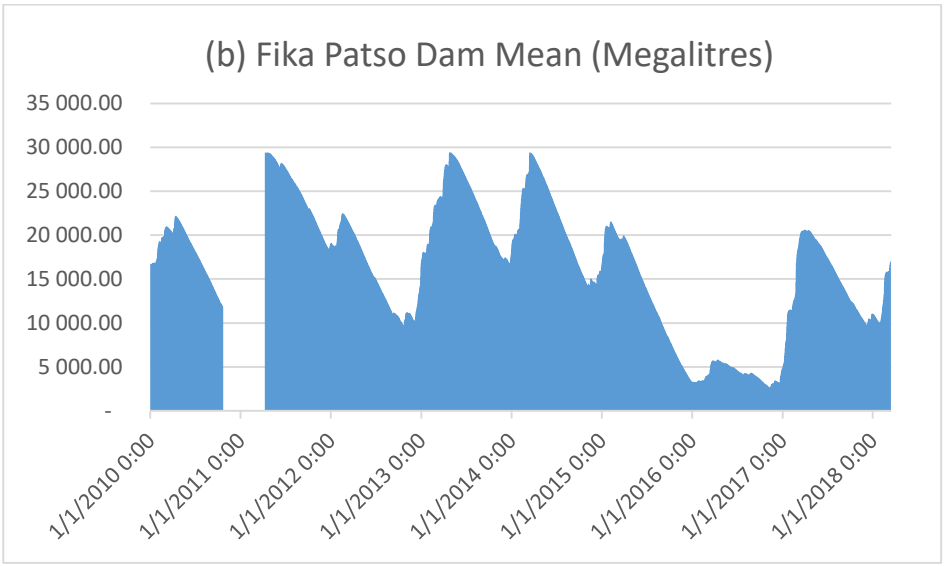
Climate change was the main factor that was cited by MAP Water for a lack of adequate water supply in QwaQwa, but due to the author's curiosity, the study was then explored in order to determine if this was a fact. The study confirmed that this was partial and not entirely the contributing factor for the QwaQwa water crisis as will

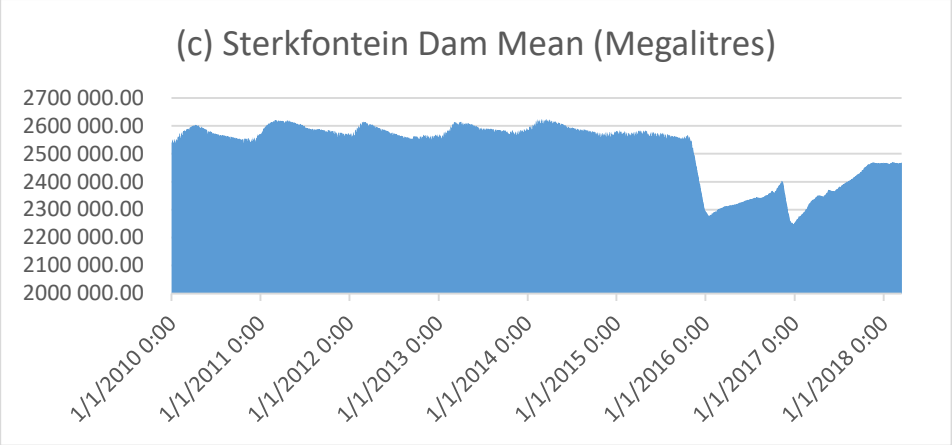
be discussed in this section. The study, therefore, conducted observations of the dams with regard to their dam levels over the same period from the field survey and statistical data from the Department of Water and Sanitation.

5.3.3.1 Dam level statistics

Figure 5.12a, b and c illustrates the variation of the dam levels from 2010 to 2018 when the Sterkfontein Dam pipeline to QwaQwa was completed. The key periods of interest of the study were 2016 when the water shutdown occurred in QwaQwa.







Source: Author (2019)

Figure 5.11: Levels of the three dams from 2010 to 2018

The three graphs in Figure 5.12 illustrate that between 2015 and 2017 there was an unusual decline for the Sterkfontein Dam, and a sharp and prolonged decline for the Fika Patso Dam, while the Metsi Matsho Dam remained significantly unaffected. As had already been indicated by the DBSA (1987), the Fika Patso Dam was already known in 1986 not to be able to provide a consistent supply of water because the Namahadi River provided an inconsistent annual flow of water. In an article by Henderson (2016), she indicated that in 2016 the Sterkfontein Dam was a critical lifeline for retaining the Vaal Dam at 25%, which was the cause of the unusual decline of the dam level. The Metsi Matsho Dam has been consistent in dam water levels but the communities it supplied were still affected by water cuts because the infrastructure available was functioning at maximum and limited capacity.

5.3.3.2 Field observation of dam levels

Field observation of the three dams was done by visiting the dams and taking pictures at a one-year interval to determine whether water availability had changed and if there was a direct link to availability of the water to the community in QwaQwa during a crisis. Dam levels were observed on March 2017 and March 2018 to confirm if media reports and MAP Water notices were correct to indicate that climate change had an impact on dam levels. Figure 5.13 shows images of the three dams with the observation of the dam level and availability of water.

Dam levels in 2017	Dam levels in 2018

Metsi Matsho Dam


Fika Patso Dam


Sterkfontein Dam


Figure 5.12: Images of the three dams levels in February 2017 and 2018

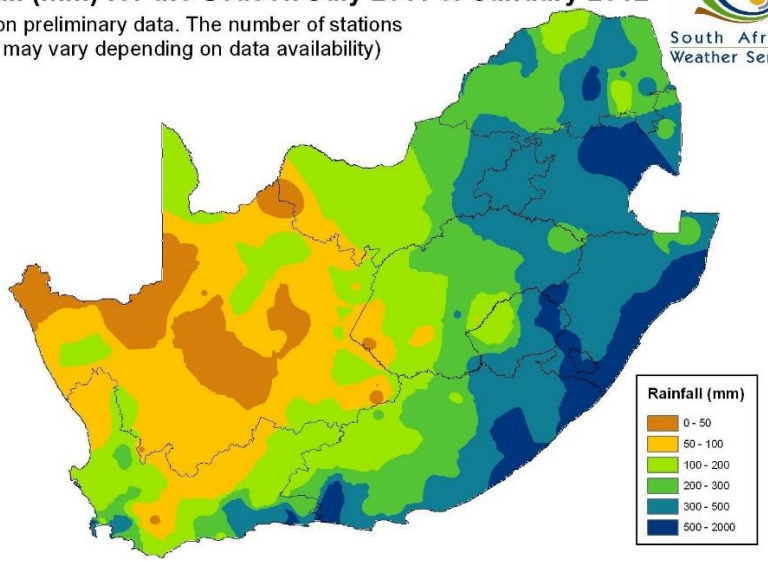
The water level of the Metsi Matsho Dam was at its highest as the water was overflowing on both occasions, meaning that the areas it was supplying were not supposed to be affected regarding water demand. The water level of the Fika Patso Dam was slightly higher in 2018 than in 2017, but unfortunately, there were still severe shortages of water because 2018 was when formal data collection for interview schedules and questionnaires commenced. The Sterkfontein Dam showed some impact of the dam's water level going down because water had been released to the Vaal Dam water system in 2017, but by 2018 the water level had recovered slightly.

5.3.3.3 Rainfall water levels

The rainfall levels as shown in Figure 5.14, depict rainfall maps of water in South Africa from the South African Weather Services (2020), but particular attention was paid to QwaQwa as marked in red.

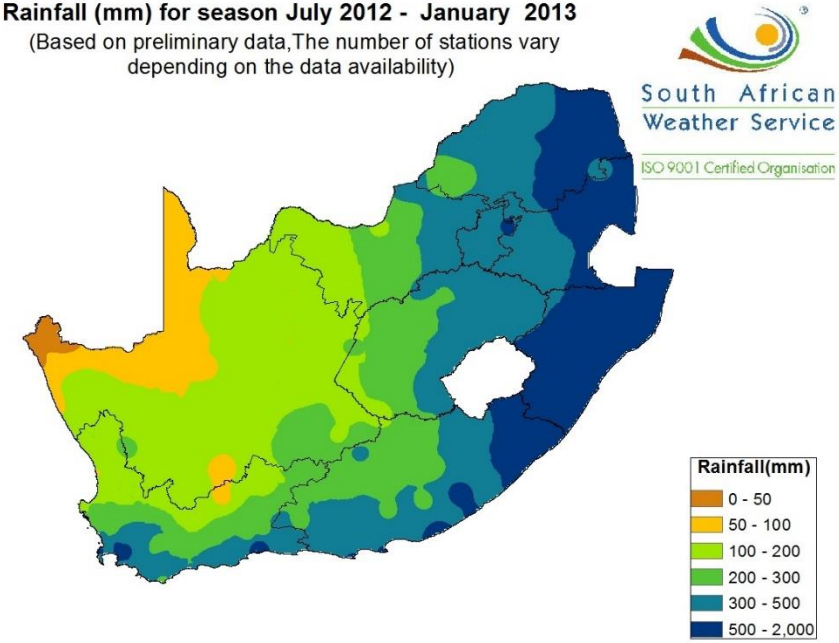
Rainfall (mm) for the Season July 2011 to January 2012

(based on preliminary data. The number of stations used may vary depending on data availability)



Rainfall (mm) for season July 2012 - January 2013

(Based on preliminary data,The number of stations vary depending on the data availability)

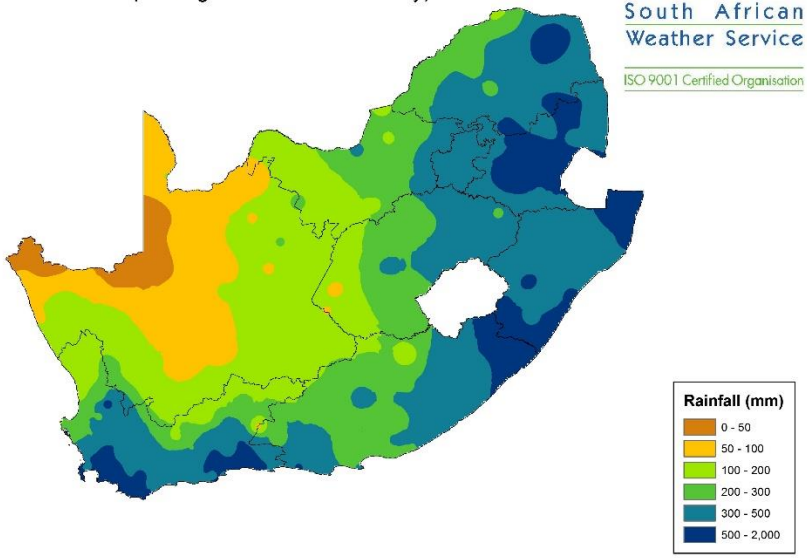


Rainfall (mm) for season July 2013 - January 2014

(Based on preliminary data,The number of stations vary depending on the data availability)

South African Weather Service

ISO 9001 Certified Organisation

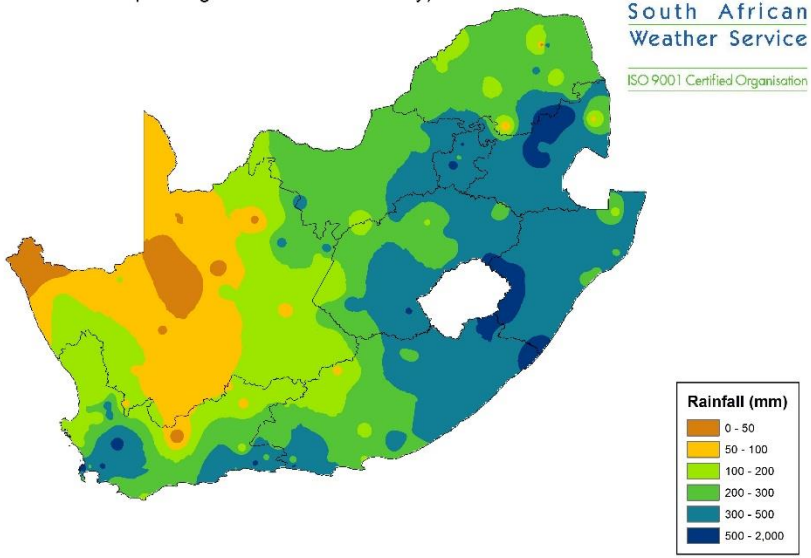


Rainfall (mm) for season July 2014 - January 2015

(Based on preliminary data,The number of stations vary depending on the data availability)

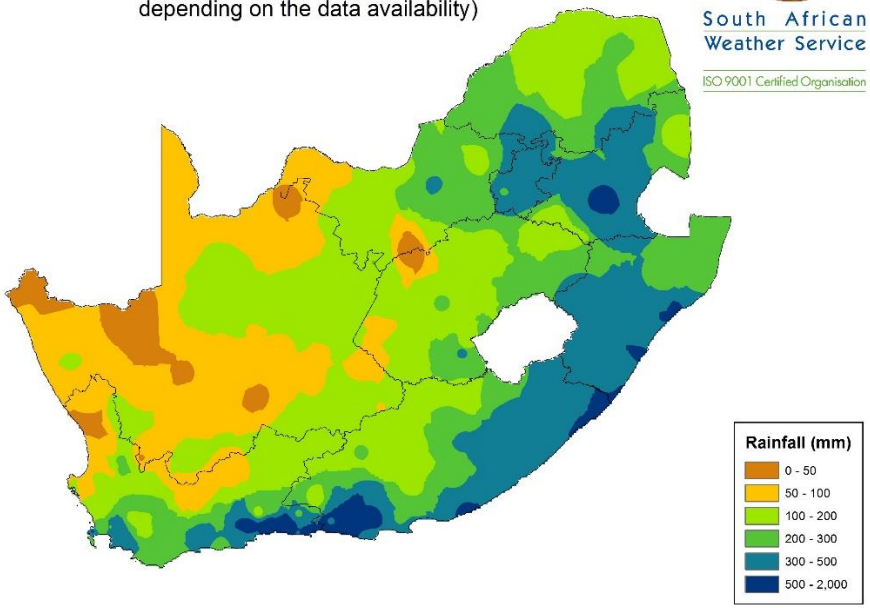
South African Weather Service

ISO 9001 Certified Organisation



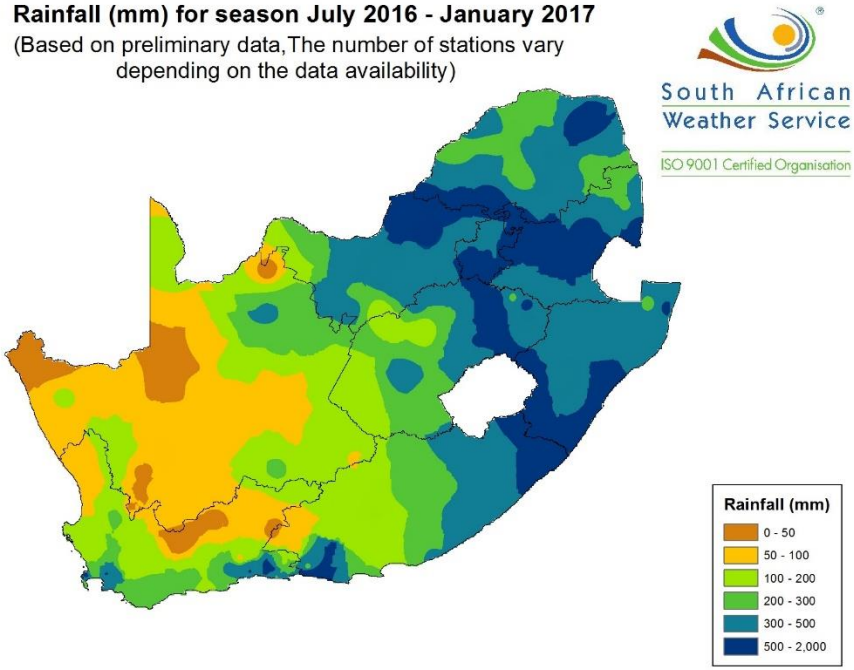
Rainfall (mm) for season July 2015 - January 2016

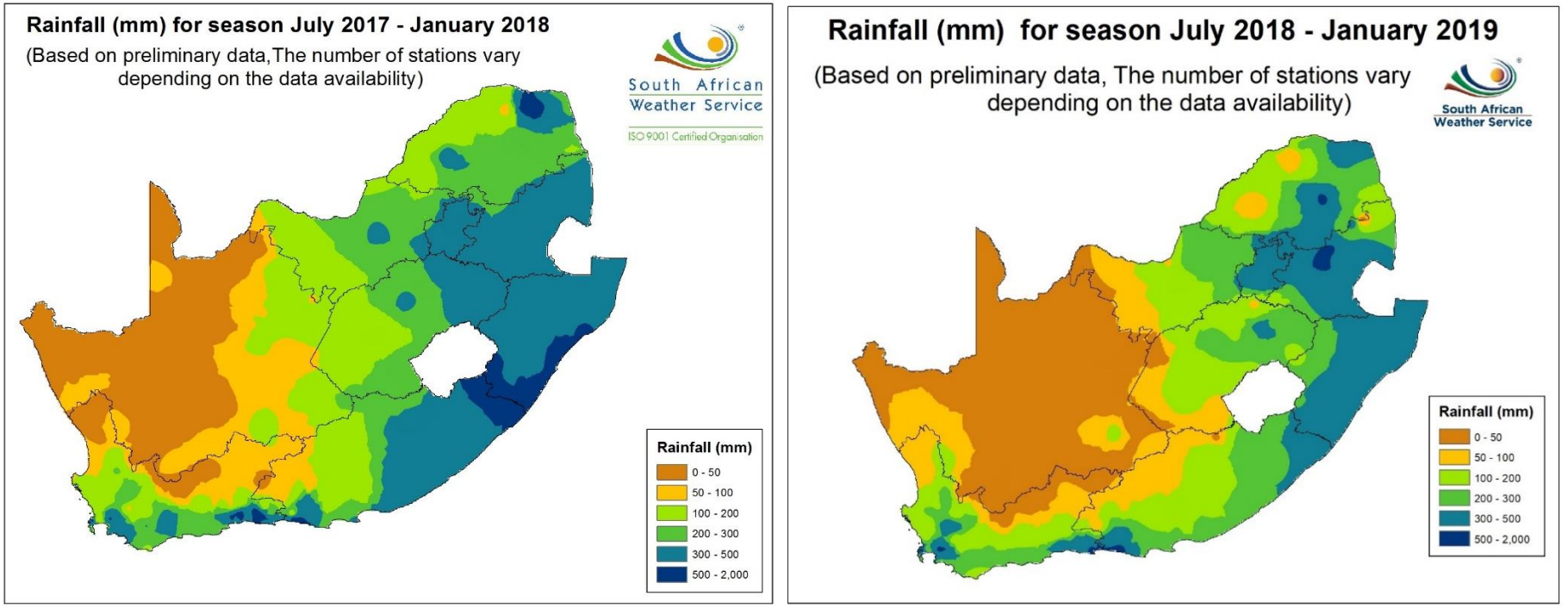
(Based on preliminary data,The number of stations vary depending on the data availability)



Rainfall (mm) for season July 2016 - January 2017

(Based on preliminary data,The number of stations vary depending on the data availability)





Source: South African Weather Service (2020)

Figure 5.13: Rainfall history of the QwaQwa (red dot) from 2011 to 2019

From the period of July 2011 to January 2019. QwaQwa seems not to have had significant rainfall levels drops, besides July 2015 to January 2016 and July 2018 to January 2019. When comparing the rainfall levels to the dam levels as discussed in 5.4.1, there is evidence that the Metsi Matsho and Sterkfontein dams still maintained a normal dam level variation, irrespective of rainfall levels from July 2015 to January 2016. It should again be noted that the significant drop of the Sterkfontein Dam was due to the release of water to the Vaal water system because of the reported water shortages from 2016 to 2017, which the Sterkfontein Dam was constructed to address. Generally, the rainfall levels of the QwaQwa region have been performing above average compared to the rest of South Africa, which was the reason the study confirmed that the QwaQwa water crisis was not caused by drought. As already discussed in 5.3.1, the DBSA had already indicated in 1986 that the Fika Patso Dam would be an unreliable source of water due to inconsistent annual river flows that contribute significantly to water availability apart from rainfall.

5.3.4 Lack of maintenance of water infrastructure contributed to QwaQwa water crisis

A lack of water infrastructure also had adverse effects on water availability, which led to the study conducting an observation of the condition of water infrastructure in QwaQwa.

5.3.4.1 Waste treatment plants

Wastewater treatment includes a network of sewage pipelines and a waste treatment plant where the water is separated from the waste, purified and fed back into the water supply system. MAP Water had seven wastewater treatment plants, as shown in Table 5-4, and are presented with their names and daily quantities. The aim of the waste-water treatment plants was to purify the waterborne sewage and stormwater to be supplied for consumption by the community in QwaQwa. However, as specified in Table 5-4, upon field visits to all the waste treatment plants in QwaQwa, they were found not be functional. All four waste treatment plants in QwaQwa were found not to be operational and had the effect of not feeding back 19 ML of water per day to QwaQwa.

Table 5-4: Maluti-a-Phofung Water Scheme wastewater treatment plants in QwaQwa

Waste treatment plant name	Daily quantity (liters)	Percentage
Makwane Plant	750 000	3.8%
Moeding Treatment Plant	750 000	3.8%
Phuthadithjaba Plant	16 000 000	82.1%
Elands River Plant	2 000 000	10.3%

Source: PCI Africa (2010)

The field observation that indicated that the waste treatment plants in QwaQwa were not functional and could have contributed to the shortage of water. The non-functioning of these waste treatment plants increased the demand for water from the three dams and that wastewater could have been dumped or mishandled due to non-functional infrastructure and leakages. After attempts to get a response to how the non-functioning of waste treatment plants affected water availability in QwaQwa, the researcher was left to his own devices to conclude as there was no response. All four of the waste treatment plants in QwaQwa were visited for field observations, namely the Makwane, Moeding, Phuthaditjhaba and Elands waste treatment plants.

5.3.4.1.1 Makwane Treatment Plant

The Makwane Treatment Plant, located in the Makwane village of QwaQwa, is shown in Figure 5.15. The Makwane Treatment Plant, as shown in Table 5-4, has a capacity of treating 750 000 L (3.8%) of wastewater daily in QwaQwa. The purpose of this treatment plant is to treat the waste of areas supplied by the Metsi Matsho Dam that is based in the Makwane village. The treatment of this waste is essential for re-circulating water within the water supply system and decreases the demand for water from dams.

Source: Google Earth (2019)

Figure 5.14: Makwane Treatment Plant

However, upon a visit to the Makwane Treatment Plant on 24 April 2019, it was obvious that the plant was non-functional, had grown weed, and the treatment baths were not maintained as shown in Figure 5.16.

Source: Author (2019)

Figure 5.15: Condition of the Makwane Treatment Plant on 24 April 2019

5.3.4.1.2 Moeding Treatment Plant

The Moeding Treatment Plant, located in the Moeding village of QwaQwa, is shown in Figure 5.16. The Moeding Treatment Plant, as shown in Table 5-4, has a capacity of treating 750 000 L (3.8%) of wastewater daily in QwaQwa. The purpose of this treatment plant is to treat the waste of areas supplied by the Fika Patso Dam based in the Lejwaneng village. The treatment of this waste is essential for re-circulating water within the water supply system and decreases the demand for water from dams.

Source: Google Earth (2019)

Figure 5.16: Moeding Treatment Plant

However, upon a visit to the Moeding Treatment Plant on 24 April 2019, it was noted that the plant was non-functional, weed has grown in the treatment baths, cattle were grazing in the baths and the office building was vandalised, as shown in Figure 5.18.

Source: Author (2019)

Figure 5.17: Condition of the Moeding Treatment Plant on 24 April 2019

5.3.4.1.3 Phuthaditjhaba Waste Treatment Plant

The Phuthaditjhaba Treatment Plant, located in Phuthaditjhaba, QwaQwa, is shown in Figure 5.19. The Phuthaditjhaba Treatment Plant, as shown in Table 5-4, has a capacity of treating 16 000 000 L (82.1%) wastewater daily in QwaQwa. The purpose of this treatment plant is to treat the waste of areas supplied by the Fika Patso Dam based in the Lejwaneng village. The treatment of this waste is essential for re-circulating water within the water supply system and decreases the demand for water from dams.

Source: Google Earth (2019)

Figure 5.18: Phuthaditjhaba Waste Treatment Plant

However, upon a visit to the Moeding Treatment Plant on 24 April 2019, it was noted that the plant was non-functional, had grown weed in the treatment baths, cattle were grazing in the area, and the office the building was vandalised, as shown in Figure 5.18.

Source: Author (2019)

Figure 5.19: Condition of the Phuthaditjhaba Waste Treatment Plant on 24 April 2019

5.3.4.1.4 Elands Waste Treatment Plant

The Elands Treatment Plant, located in Phuthaditjhaba, QwaQwa, is shown in Figure 5.21. The Phuthaditjhaba Treatment Plant, as shown in Table 5-4, has a capacity of treating 2 000 000 ℓ (10.3%) wastewater daily in QwaQwa. The purpose of this treatment plant is to treat the waste of areas supplied by the Sterkfontein Dam based in the Sterkfontein Dam Nature Reserve. The treatment of this waste is essential for re-circulating water within the water supply system and decreases the demand for water from dams.

Source: Google Earth (2019)

Figure 5.20: Elands Waste Treatment Plant

However, upon a visit to the Elands Waste Treatment Plant on 24 April 2019, it was clear that the plant was non-functional, and weed had grown weed in the treatment baths, as shown in Figure 5.22.

Source: Author (2019)

Figure 5.21: Elands River waste treatment plant on 24 April 2019

5.3.4.2 Lack of maintenance of water infrastructure

The lack of maintenance of water infrastructure by MAP Water in QwaQwa should also be viewed as a contribution to the water crisis in QwaQwa. This section briefly depicts some of the incidents that led to reduced water availability in QwaQwa and the water crisis as we now know it. Figure 5.23 depicts a water pipeline in the Bolata village in QwaQwa.

IE4 indicated that, despite being reported multiple times over several years, the water leakage had not been attended to. This is just one of the many informal incidents that demonstrate MAP Water's failure to attend to water leakages within QwaQwa.

Source: Author (2019)

Figure 5.22: Water leakage from a MAP Water pipeline in the Bolata village on 7 February 2019

Figure 5.23 also depicts a pump station within a 100 m of Figure 5.25 that was observed to have a water leakage that IE4 also indicated had been happening for years. This clearly indicates how valuable quantities of water are continuously lost due to MAP Water's laid-back approach to addressing water access in QwaQwa. This level of neglect indicates the reckless leadership of MAP Water because they are also failing at preserving the limited amount of water that it has available to the community of Bolata. Bolata is one of the areas through which main water pipelines from the Fika Patso Dam runs to other areas in QwaQwa (Figure 5.24).

Source: Author (2019)

Figure 5.23: Water pipeline manhole in Bolata village on 7 February 2019

The same respondent also mentioned a local pumping station (Figure 5.25) that was observed to have suffered from a long-term water leakage which had been ignored by MAP Water. This clearly indicates that valuable quantities of water are continuously lost due to MAP Water's failure to maintain water infrastructure in QwaQwa.

Source: Author (2019)

Figure 5.24: Water leakage behind the MAP Water pump station in Bolata village, QwaQwa on 7 February 2019

5.3.5 Summary of the history of the water crisis in QwaQwa

Table 5-5 is a summary of the history of the water crisis in QwaQwa post-apartheid by presenting three critical findings, their theoretical inclinations, social conditions and promoters, and the impact they had.

Table 5-5: Summary of the history of the water crisis in QwaQwa

Critical findings	Theoretical inclination	Social conditions & promoters	Impact
Forced settlement people in QwaQwa resulting	• Apartheid spatial planning • Power relations • Holistic social engineering	Apartheid government	Basotho people were forcefully removed from farms and towns around the Free State and settled in the QwaQwa homeland without adequate provision of water. The QwaQwa homeland was founded under apartheid planning and social engineering conditions of a black labour force for industrial development in South Africa. The power conditions of the establishment of QwaQwa were to benefit the white minority in South Africa. The study thus asserted that the QwaQwa water crisis commenced when it was founded as a homeland and is thus man-made through social engineering.
The functioning of the three dams	• Apartheid spatial planning • Power relations • Holistic social engineering • Accumulation by dispossession	Apartheid government	The Sterkfontein Dam was established to gather water from the Tugela River that originates from QwaQwa and to benefit the Vaal River system. The Metsi Matsho Dam was primarily established for industrial purposes and domestic purposes as secondary in QwaQwa. The Fika Patso Dam was developed to address the domestic and industrial demand in QwaQwa. The prioritisation of the Vaal River system post-apartheid has exacerbated the QwaQwa water crisis because the prioritisation of water has been minimally considered for the community of QwaQwa.
Fabrication of climate change impacts resulting in a drought	• Climate change discourse and ecological insufficiency • Ecology • Power relations • Strategic planning	Post-apartheid political elites, corruption, and commodification of the QwaQwa water crisis	Drought as the primary cause for the water crisis proved to be minimally significant in QwaQwa because rainfall levels did not change significantly, dam water level statistics did not vary significantly of an eight-year period and dam level observations that were a bit higher from 2017 than in 2018 did not represent a change in access to water. The failure of strategic planning for water access in QwaQwa has led to ineffective planning which has caused the water crisis.
Lack of maintenance of water infrastructure	• Democracy, reconstruction, and development • Power relations • Piecemeal social engineering	Capitalists of state procurement, political interference and lack of municipal capacity	Inadequate maintenance of water infrastructure contributes to the inefficient functioning of the infrastructure. MAP Water has not attended to maintain water infrastructures such as waste treatment plants that are not operational and leakage of current water infrastructure. A lack of maintenance of infrastructure is a man-made water crisis indicator in itself because it increased the risk of water access in QwaQwa. Piecemeal social engineering has been carried out by trying to address the long-term consequences of the water crisis that have manifested itself post-apartheid by appointing water tankers to perform functions of water infrastructure in QwaQwa.

5.4 Conclusion

The chapter has shown that climate change is not the main driver of the QwaQwa water crises as the government officials claimed in 2016. The social engineering of South Africa, beginning from 1652 to 1993, has been identified as the root cause of the water crises in QwaQwa. Social engineering in the form of forced settlement of people in QwaQwa was done under poor planning conditions. It thus resulted in and laid the foundation for the perpetual water crisis in QwaQwa. This view contradicts the official claim of the reported water crisis of 2016. The study, hence, rejected the government's narratives foregrounding climate change effects such as drought as the primary cause of the water crisis. This is because rainfall map levels demonstrated that there has not been an abnormal and abrupt disturbance of water available for catchment by the three dams. Lack of infrastructure maintenance was also verified as a contributing factor to the QwaQwa water crisis.

Chapter 6
Experiences of the Communities Affected by the QwaQwa Water Crisis

6.1 Introduction

As highlighted in Chapter 4, the findings were generated from both qualitative and quantitative responses. Qualitative responses included nine key participants, three households, six institutions, and eight businesses. Chapter 6 presents the findings of the second research objective:

To document the lived experiences of the affected QwaQwa communities such as:

- **households of Bolata, Matsikeng, Tseki, Monontsha, Sekgutlong, Makwane, Jwala Boholo, Lejwaneng, Letshalemaduke, Bluegumbosch (Phuthaditjaba–N) and Elite (Phuthaditjhaba–J);**
- **businesses; and**
- **institutions by the QwaQwa water crisis.**

The results presented and discussed in this chapter are based on the reported QwaQwa water crisis of 1 January 2016. The quantitative responses were the only responses documented on household level because it is the basic unit of society and people from businesses and institutions were also situated here. The first section is a qualitative narration of how people experienced and still experience the ongoing water crisis. The experiences have been grouped into five groups based on categories of informants (see Appendix 6), namely traditional leaders (TLs), household participants (HPs), institutional participants (IPs) and private sector participants (PSPs). There were some informal encounters (IEs) that occurred while conducting the study and the experiences of those involved in the encounters formed another group.

The second section is divided into six sections that present and discuss quantitative results from 571 household participants regarding their lived experiences and responses of how they were affected by the QwaQwa water crisis. First, the

demographic profile of household participants is discussed to demonstrate their background as the communities of QwaQwa. Second, the socio-economic profile of household participants is presented and discussed because it has a direct bearing on the economic and infrastructure resources that these households have access to in QwaQwa. Third, the results are presented and discussed on water access before and during the water crisis in terms of quantity of water, distance, time and cost. Fourth, the results concerning water-related emotions are presented and discussed to demonstrate how household participants were affected in QwaQwa. Fifth, results of household participants' contributing factors that caused the QwaQwa water crisis are presented. Lastly, a synthesis of the results from preceding five sections are discussed.

The last section is divided into five subsections and discusses and presents an event of the manifestation of the QwaQwa water crisis into a protest from 20–23 January 2020. First, the cause of the protested is presented. Second, the reaction to the protest by MAP is presented on how the community was engaged in the protest. Third, the effects of the protest on the community of QwaQwa are presented. Fourth, the proposed short-term and long-term solutions to the water crisis by government are presented, and finally, a discussion on the manifestation of the QwaQwa water crisis into a protest is created to demonstrate how it relates to the study.

6.2 Oral narrative of the struggles from the dispossessed during the QwaQwa water crisis

This section is a qualitative narration of the lived experiences and responses from three households, three traditional leaders, seven institutions, nine businesses and two informal encounters.

6.2.1 Responses from key participants (households)

The participation of the households drew on experiences and responses to the QwaQwa water crisis. From an in-depth constituency memory point-of-view, the participation by households also presented their interesting experiences and responses to the QwaQwa water crisis. All three household participants indicated that water is important for eating, drinking, hygiene and domestic chores. Household

participants indicated their recollection of the history of water crisis in different ways, as discussed below.

HP1 indicated how the current water crisis brought back memories of challenges experienced when accessing water in the 1970s before QwaQwa became a homeland. Directly quoted, HP1 stated:

> When I was a young boy growing up in QwaQwa during the ’70s, we used to access water from streams, rivers and water tankers as we are now.

This is a clear indication that the water crisis was not a recent event of 2016 as reported by MAP Water and the media. HP2 who has lived in QwaQwa since the 1980s, was quoted saying:

> The current water crisis effect had been a cumulative effect from the early 2000s and manifested to the situation we are currently in.

HP3 expressed a prolonged experience of water crisis in QwaQwa by stating that:

> Since 2012, my challenge of accessing water has become a normalised struggle. I am concerned about how the elderly without children, younger family members and money are expected to collect water during the water crisis.

Beyond the responses from household participants, informal encounters also played a key role in expressing their experiences of the QwaQwa water crisis. For instance, IE2 indicated as follows:

> We have been struggling to access water in my community since 2015 and the challenges have been many. The first challenge is that I recall a time when an elderly woman went to collect water with a wheelbarrow and had to push is up a steep slope resulting in her broking a leg after she slipped and fell. Deprivation of access to water has resulted in us having to travel, spend money and dedicate time to access water for domestic use in QwaQwa.

IE3 expressed dissatisfaction about the challenge of accessing water in QwaQwa since 2016 because it also had a financial implication:

> I had to pay for water to be delivered to my house for R500 per delivery because I have a 5 000 ℓ water tank. However, I am aware that people that don’t have the water tank that I have make use of water containers and need to pay R250 per load for delivery of which some of the water gets spilled on the way.

The responses to the QwaQwa water crisis at household level were also documented through an informal encounter in the Bolata village where a group of women and children were collecting tap water (see Figure 6.1). IE7 expressed their frustrations with the QwaQwa water crisis:

> We are only accessing water for the first time from a tap in over six months. As you can see the water comes out of the tap with a brown colouring, but it is better than no water at all.

Source: Author (2019)

Figure 6.1: Neighbours pouring water from a tap after six months of no water in the Bolata village, QwaQwa on 11 March 2017

The quality of the water that was delivered to the Bolata community had a brown colour as can be seen in Figure 6.2.

Source: Author (2019)

Figure 6.2: Children from the Bolata Village carrying dirty water during the QwaQwa water crisis on 11 March 2017

Figure 6.3 shows the struggle of a mother where she has to balance collecting water and also carrying her son in the wheelbarrow on a hot day, which can have negative health effects.

Source: Author (2019)

Figure 6.3: Mother taking a break from carrying her child and water containers in a wheelbarrow in the Bolata village during the QwaQwa water crisis on 11 March 2017

6.2.2 Responses from key participants (traditional leaders)

The participation of the traditional leaders was to draw experiences and responses to the QwaQwa water crisis. From an in-depth institutional memory point of view, the participation of traditional leaders presented interesting experiences and responses to the QwaQwa water crisis. The experiences also revealed that traditional leaders are conscious of the importance of water.

TL1:

> Water is an important natural resource that QwaQwa has plenty of, but the people have no access to it.

Simply put, TL2 said it well:

> Water is life.

For instance, TL3 responded by saying:

> Water is a source of life and therefore an important resource for communal life. It plays a significant role to the peoples' communal life by feeding and quenching the community's thirst, keeping people and their clothes clean, animal welfare and for the irrigation of his subject's plots for healthy organic farming and ensuring food security.

The traditional leaders responded to their experience of the QwaQwa water crisis through their own opinions of what caused the water crisis. TL2 responded by saying:

> Rain no longer falls for mountains to have rainwater and have it harvested in dams like Fika Patso, Metsi Matso, and other water catchment areas are not being exploited like Maseleng.

TL3 indicated:

> My heart is shuttered by the people having to struggle to access water with water being sourced from QwaQwa to Gauteng.

The three traditional leaders also had an opportunity to express responses and ideas on how the QwaQwa water crisis could be resolved. In the case of TL1, he indicated that:

> During the 1970s and 80s when we had water challenges of accessing water, the QwaQwa introduced an annual R10 tax called *Sethabathaba*, which was used to develop water infrastructure such as dams and drill boreholes in communities.

On the other hand, TL2 indicated:

> If we are to address this problem, we need to come together. A Sesotho saying says "Mollo o tjhesa hlaha", meaning a matchstick lights a conflagration. This, by implication, means that a small group of people can do a lot to address current problems, and water scarcity is no different. That village has mountain ranges that can be sources for the third dam in QwaQwa to meet the demands for water by a growing population.

Lastly, TL3 expressed that:

> We have to come up with ways in which our own people can access water to as the people from Gauteng are. This requires government intervention and collective action from the community.

6.2.3 Responses from key participants (institutions)

The participation of the institutions' key respondents was to draw experiences and responses to the QwaQwa water crisis. The institutions discussed in this section play a social role in society and are reliant on access to water for them to render their respective services. The institutions contributed critically to the study by expressing their experiences and responses to the QwaQwa water crisis. The seven institutions that participated in the study are discussed in the following subsections.

6.2.3.1 Thekolohelong Welfare Centre

The first institutional participant, indicated as IP1, is an old-age welfare centre that is situated in Phuthaditjhaba, QwaQwa, with a capacity of up to 60 elderly patients that need medical attention and shelter. When briefed about the study and asked for participation, their first response was:

> Water is very important because it is part of our daily functions when administering care to elderly patients. We have had water problems in 2015 but it worsened in 2016. We need approximately 10 000 ℓ of water daily for drinking, cooking, washing, hygiene and cleaning for 60 persons. Additionally, water is needed for the boilers that warm-up rooms in the centre during the autumn and winter seasons but have unfortunately not been operational since 2015. We have had to resort to using electricity operated heating solutions that are more expensive.

When asked to respond about how they accessed water during the crisis, they had the following to say:

> The centre has been using plenty of fuel to collect water and needs staff to dedicate more than two operational hours a day. It is not easy, even though the centre has a letter giving them priority to collect water from the water collection point of the Sterkfontein Dam water pipeline in Bluegumbosch. Water was collected three to four times a day by staff members. A lack of water led to negative hygiene that affected clients and workers during the water crisis.

Based on the responses from IP1, it is clear that the water access challenge affected the ability to render services significantly by requiring staff members to dedicate time to collect water, increased spending on electricity for heating up and increased health implications due to a decrease in hygienic practices that need water. Even under care, the aging population was still struggling to access adequate water in this crisis.

6.2.3.2 Mofumahadi Manapo District Hospital

The second institutional response, indicated as IP2, was from a district hospital in the central business district of QwaQwa that plays a critical role in providing primary health care to the community of QwaQwa and the Thabo Mofutsanyana District Municipality of the Free State. IP2 started experiencing water access challenges in 2016 and the hospital lost all its supplies. The representative participant from the hospital indicated the following:

> Water is needed by the hospital to render its health care services. Further to this, we use water to wash our laundry, in labour and theatre and the kitchen.

When asked to respond to the current water crisis, IP2 had the following to say:

> After the water crisis was declared a disaster, a local disaster committee for government institutions, businesses, MAP Water and Fire Station was established for water to be accessed from Bluegumbosch and delivered to communities. The chairperson of the committee was the chief fire officer who reported to the mayor. The impact it had on the hospital is that theatre didn't have a water tank and sanitation also became an issue. Further to this was an increase in diseases and the theatre was the most affected. Staff mainly relied on alcohol rubs and sanitisers for disease control. Therefore, the water crisis affected laundry, labour, theatre, and kitchen which led to an increase of flies that spread infections because the ventilation was not good enough.

The primary function of IP2 was affected considerably because of a lack of access to the capacity of water they needed which compromised the health of both staff members and their patients. IP2 furthermore indicated that:

> Water pipes burst at the hospital when water came back due to high pressure, therefore making it an infrastructure issue too. The steriliser department was affected because it requires water. To resolve sterilisation were taken to Bethlehem (140 km to and from) and Harrismith (80 km to and from) up to three times a day. Heating at the hospital was an issue because it uses boilers that require water. However, air-conditioning systems were bought. Some patients had to be taken out of the hospital to neighbouring towns which impacted families due to distances that needed to be travelled.

It is clear that a lack of water access for IP2 also resulted in the hospital having to commit funds for sterilising their instruments, transporting patients to smaller hospitals and possibly increasing pressure on them, and increasing the cost of families of patients that were mainly from QwaQwa, to visit hospitals in other towns. The QwaQwa water crisis resulted in primary health care being compromised and limiting the hospital to perform its functions.

6.2.3.3 University of the Free State, QwaQwa Campus

The third institution, indicated as IP3, is a university that was founded in QwaQwa during 1982 as the University of the North, but is still referred to as Uniqwa. In 2003, after a merger with the University of the Free State, it became known as the University of the Free State, QwaQwa Campus. IP3 consisted of the campus maintenance officer and member of the Student Representative Council. The campus maintenance officer firstly indicated the importance of water in the following way:

> Beyond the 7 000 students and 300 staff members of the university, the campus accommodates 1 200 students in its residences that deserve water as a basic human right.

The campus maintenance officer also indicated that water was needed in facilities such as the central dining hall, kitchen and other food services:

> We have departments such as chemistry and physics that possess equipment that requires water. Our increased enrolment of 7 000 students and 300 staff members in 2018, not forgetting private functions that are held on campus, were greatly affected by the water crisis.

The Student Representative Council member had the following to say about the QwaQwa water crisis:

> This is a huge challenge among students. They cannot wash themselves and their clothes, cook, and usage for ablutions are affected. Since some students, if not most, come from far, they were not prepared for the crisis by bringing along big 20-liter buckets of water to draw water from water trucks when they are on campus. We rely on using 5-liter plastic bottles which are not enough.

In the context of IP3, the primary offering of education was negatively affected in the following ways: Water and food consumption, hygiene and domestic duties were negatively affected at the university, resulting in reduced vitality of students and staff members to focus on their studies and work, while not forgetting possible health implications of an unclean environment.

6.2.3.4 Riverside Crèche

The fourth institutional response, indicated as IP4, is a crèche (nursery) situated in Phuthaditjhaba−H, QwaQwa, and first opened its doors in January 1993. In 2018, the crèche had approximately 80 children and four staff members to take care of the children. The crèche acknowledged the importance of water, most especially for the fundamental growth and development of the children. IP4 stated:

> We are experiencing a water challenge at the crèche and we don't have enough water for drinking, cooking, sanitation and cleaning of our premises.

They were asked to respond to how the crèche responded to the water crisis, to which they indicated as follows:

> The water crisis has increased our financial burden because we now have to use money to get water delivered to us. As things stand, we are underfunded by the Department of Social Development, parents of the children are unemployed and can't afford to pay fees. The financial burden has resulted in staff members not being paid full salaries, if any at all.

The water crisis exacerbates the financial situation of the crèche and reduces the quality of education of the crèche due to reduced water to drink, cook, and clean. Staff members have resorted to not working on all weekdays because of non-payment which increased the burden on the crèche and reduced its ability to hire staff qualified for early childhood development.

6.2.3.5 Methodist Church of Southern Africa, QwaQwa

The fifth institutional response, indicated as IP5, is a church based in Phuthaditjhaba−A, QwaQwa, which have opened its doors in 1972. The church had grown from 1972 to 2018 to have 25 societies (branches) in QwaQwa. When asked to respond to the importance of water for the church, they expressed that:

> the church views water as a basic resource used for drinking, cooking, sanitation, and cleaning.

The QwaQwa water crisis also had an impact on the church and they indicated that the impact was as follows:

> The church needs water for the mission on the church premises, sermons, revival meetings and workshops. We have elderly congregants that need water for medication. Presently there are a lot of inconveniences caused by water scarcity, especially in our toilets for our congregants during mass church services where a lot of people converge to serve the Lord. When there is no water running in our taps, we have to make means to have water at extra costs when the church has limited resources and financial challenges that dig deep into church coffers. We cannot cook without water. We cannot bath without water and to quench our thirst we need water and its related municipal services. When there is no water, we have to cut our services short for the convenience of our congregants and some meetings have to be set aside or at least postponed to later dates when water is available.

The water crisis has negatively affected the right of congregants of IP5 to practice their religion at their convenience and comfort.

6.2.3.6 Thabo Mofutsanyana Secure Centre

The sixth institutional response, indicated as IP6, is a juvenile correctional facility in Phuthaditjhaba–A. IP6 was established with the intention of reducing the number of child offenders so that they would not continue practicing crime as adults, but lack of accessing water reduces their ability to efficiently and effectively render their offenders with the service they need. IP6 has a multidisciplinary team that consisted of social workers, magistrates, a prosecutor and lawyers who were assigned specifically with the under-18s that committed crimes. When asked to respond to the importance of water, they had the following to say:

> Water is very important for the facility to be able to perform its functions.

When asked to respond on the experience of the QwaQwa water crisis, IP6 stated that:

> Children who offend society come in quite a state of neglect. Their clothes are worn out and dirty and they do not wash themselves and their worn-out clothes. The state is under compulsion to release their workers early from their core business since there is no drinking water and water for flushing toilets after use, and their health is compromised because bathrooms are not clean. The children are also compromised in their rooms but very little can be done because they have to keep under lock and key so that they do not go and re-offend at their homes and society.

IP6 expressed that government should do more in terms of infrastructure provisions to ensure that there is always access to water in QwaQwa to that their institution does not get affected.

6.2.3.7 Maluti Technical Vocational Education and Training College, main campus, QwaQwa

The last institutional response, indicated as IP7, is a technical and vocational education and training college that has a main campus in Phuthaditjhaba–A, with four other campuses in QwaQwa. When asked to respond to the importance of water, IP7 indicated that:

> Water is a very important resource and is the lifeblood of all living creatures, plants and all of God's creations require water as sustenance of life and Maluti staff and students are no exceptions for this basic life requirement. Water is a basic human need according to Maslow's Hierarchy of Needs. Water is important for drinking and more especially since some of the students live in residents for cooking, washing, laundry and toilets.

IP7 expressed their experiences of the QwaQwa water crisis in the following manner:

> The years 2016/17 proved to be the most challenging years for the college. Within the large student population, some students' conditions are not friendly to hot dry conditions and the college experienced situations where some students collapsed and had to be rushed to the nearest hospitals. The absence of water as the municipality closed water pipes at certain critical times worsened the situation. Hygiene was tremendously threatened as absolution facilities were without water.

IP7 also emphasised how their staff and students were affected negatively by not having access to water during the crisis. Similar to the University of the Free State, QwaQwa Campus, IP7 has students that come from outside of QwaQwa with the hope

of accessing education for better opportunities but are faced with water access challenges that they previously might have not been exposed to.

6.2.4 Responses from key respondents (private sector)

The participation of the private sector as key respondents was to also draw on their experiences and responses to the QwaQwa water crisis. The businesses in this section play a role in providing a socio-economic services and are reliant on access to water for them to render their respective products and services. The businesses contributed critically to the study by expressing their experiences and responses to the QwaQwa water crisis. There were nine businesses that participated in the study which are discussed in the following subsections.

6.2.4.1 Mocwagae Poultry

The first private sector response, indicated as PSP1, is situated in the Matsikeng village of QwaQwa, which is a subsistence farming project with four employees that has been operational since 2010. PSP1 indicated that:

> Water is important for any agricultural activity. In the case of my business I need water because I have both egg layer and broiler hens and also plant spinach on a small scale which all need water.

When PSP1 was asked to respond to the experience of the water crisis, the response was:

> The unavailability of water impacts the profitability of my business negatively. Productivity gets reduced by the hens and the spinach yield, fuel has to be used to collect water using a car that contributes to its wear and tear, and it puts employees' prospects in danger.

The implication of not having access to water thus reduces the opportunity of employment provided by small businesses such as PSP1 and decreases the livelihoods of the intention of subsistence farming. Figure 6.4 demonstrates the unavailability of water from a tap on 10 March 2017.

Source: Author (2019)

Figure 6.4: No water available for PSP1 on 10 March 2017

6.2.4.2 Sasko Bakery

The second private sector response, indicated as PSP2, is a bakery at the QwaQwa Industrial Park 1. When asked to respond about the importance of water, PSP2 indicated the impact due to the QwaQwa water crisis as follows:

> Water is central to our bakery because we need it to mix our dough, for cleaning our premises to comply with health regulations, wash our trucks and for staff members to drink and use in the toilets.

When asked to respond to the experience of the QwaQwa water crisis, PSP2 had the following to say:

> In January 2016 we were not notified by the municipality that there was going to be a water shutdown. We used to produce 35 000 loaves a day till the end of 2015 that supplied areas in the Free State up to Bloemfontein (320 km) and some parts of the KwaZulu Natal province (135 km). As we speak (June 2018), the bakery does not even bake a single loaf of bread. Fortunately, people did not lose jobs, but were placed in other bakeries around South Africa, which had a negative impact on their families. Unfortunately, the price of bread in QwaQwa increased because we have stock bread from Ladysmith that we have to add a mark-up to.

When asked to respond about the responses that were put into place to access water, they confirmed:

> For full productivity we needed 5 000 ℓ and 300 ℓ for washing trucks daily. However, during the water crisis we were only able to source 2 000 ℓ per day from Van Reenen

> (85 km) using a water tanker supplied by our head office. The collection of water negatively impact productivity, profitability and labour of the bakery which is why we stopped production in 2017."

PSP2 is an example of how the water crisis contributed to an increased cost of living in QwaQwa because of the cost of rendering a service that once was rendered for less when water was available.

6.2.4.3 Kamohelo Guesthouse

The third private sector response, indicated as PSP3, is a guesthouse situated in Phuthaditjhaba–A which was established in 2009. The guesthouse provides overnight sleeping facilities and conferences for both private and public sectors. Regarding the importance of water, PSP3 responded as follows:

> Water is important to us because our clients need it to drink and bath before they sleep and when they wake up.

When asked to indicate what PSP3's experience of the water crisis was, they said the following:

> Due to the water crisis we have lost a lot of clients that used to book accommodation in QwaQwa when coming for personal or work obligations. Most of the clients we had resorted to booking in Harrismith (40 km) due to the water problem.

The QwaQwa water crisis has affected PSP3 and other related businesses which have made QwaQwa less attractive for tourism and thus possess an economic threat.

6.2.4.4 Harmony Ed-u-College

The fourth private sector response, indicated as PSP4, is a private primary school situated in Phuthaditjhaba–H. The school operates from the premises of the former Riverside Intermediate School that was closed down due to a low learner enrolment and poor academic performance. PSP4 indicated that water was important for domestic, sanitation and drinking purposes. PSP4 indicated their experience of the water crisis as follows:

> Toilets can't function at the moment and water has to be brought from surrounding towns like Harrismith. Vandalism of infrastructure is generally a problem in QwaQwa and even the tanks that were installed have been vandalised too. The water intended

> for schools is often also accessed by the neighbouring community. The school has staff members that needed 50 ℓ of water per day for drinking and cleaning.

As an idea of what could address the QwaQwa water crisis, PSP4 indicated that:

> The first issue is that there was not that much snow recently to contribute water to the dam. Secondly, the fact that employees strike for so long also contributes to work not being done. Lastly, there is a need for new infrastructure that can contribute to the growth of QwaQwa.

The response from PSP4 gave a clear indication that primary school children and staff members were affected by limited access to sanitation, drinking water and cleaning the school.

6.2.4.5 Bibi Cash and Carry

The fifth private sector response, indicated as PSP5, is a local supermarket in QwaQwa that has won awards for being the biggest fully black-owned supermarket in South Africa since 2010. When requested to respond on the importance of water, they had the following to say:

> Listen, we need a lot of water for our bakery, fruit and vegetables, butchery, deli, toilets, and cleaning. Bibi Cash and Carry is a large business with approximately 1 000 employees over seven outlets.

When asked to respond on their experience about the QwaQwa water crisis, PSP5 indicated:

> The crisis affected us we needed 2 000 ℓ per day per outlet to provide our services. Our busiest time of the year is from mid-September to December and annual trade increases, but the absence of water is a problem because it compromises the quality of the service offering. Fortunately, we have not had to let go off any staff members despite the negative impact that the water crisis has caused.

The situation of the QwaQwa water crisis possesses a threat to businesses such as PSP5 that make a national impact in South Africa through providing employment opportunities and affordable prices of basic food items.

6.2.4.6 Bonono Bottle Store Carwash

The sixth private sector response, indicated as PSP6, is a carwash based in the Makgalaneng village. The owner of PSP6 indicated that he opened the carwash to get

out of unemployment and had been operational for three years. PSP6 first indicated that:

> The car wash business mainly depends on water for business to happen and we're not exposed to non-water car washing materials or products yet.

The carwash experienced a negative impact due to the QwaQwa water crisis because on days without water meant no business and income. PSP 6 stated:

> Without water business was tough because I and my two employees would not make any income."

Lastly, PSP6 indicated the following:

> This carwash was an effort from my side to provide employment for myself and people in the community since the unemployment rate is so high in QwaQwa. However, if I cannot access water, I can't put food on the table.

6.2.4.7 Triple M Dry Clean

The seventh private sector response, indicated as PSP7, is a dry-cleaning business that has been operating in Phuthaditjhaba, QwaQwa, for more than 30 years. The importance of water was stated by PSP7 as follows:

> Water is very important to the business to help chemicals through washing machines.

As other businesses were affected by the QwaQwa water crisis, PSP7 indicated that:

> The water crisis led to increased expenses in acquiring water and reduced capacity for work that could be done. We had to invest some money into collecting water to keep the business running, even though profitability was decreased.

The water crisis led to indirect expenses and had pressure with the available water for businesses to run effectively. The business has had to invest money and time into collecting and accessing water so that their business can continue operating. The water crisis in QwaQwa possesses a threat to this business too that has been offering its services for over 30 years.

6.2.4.8 Sugar's Hair Salon

The eighth private sector response, indicated as PSP8, is a hair salon based in Phuthaditjhaba–H, with another outlet in Phuthaditjhaba–A, QwaQwa. The business

had been in operation for 20 years. The salon mainly caters to people from the area and others that travel from other areas based, on relationships that they had established. For PSP8, the hair salon business is highly dependent on water for washing people's hair and also cleaning tools used during the process.

When asked to express their experience of the QwaQwa water crisis, PSP8 stated that:

> It was tough for users to operate the business because we were not notified that there was going to be a water closure. We had to cut down on business that we did due to a lack of water. The sources of water during the crisis cost time and money.

6.2.4.9 Happy Smiles Dental Clinic

The last private sector response, indicated as PSP9, is a private dental clinic situated in Phuthaditjhaba–A, since the early 2000s. PSP9 indicated that the water crisis affected them because they need water to operate some of their equipment, and for cleaning and cook water for instruments using a distiller. PSP9 stated that they were affected by the QwaQwa crisis and left the following experience:

> Patients were treated with instruments that were compromised and created a risk for infection. Without water, it was a challenge to cleaning the blood. There was also a lack of confidence in patients. The water problem was always there but not as big. Patients that came to the practice came from as far as Villiers (412 km to and fro) and all around the Eastern Free State.

As a solution, PSP9 indicated that:

> The water crisis created a water expense for the practice which were added to the rates and services after delivery. Due to the water crisis, the profitability of the practice decreased by 50%, but fortunately no staff members lost their jobs.

The last response from the PSP9 was that infection control was compromised, but fortunately, the practice had not experienced negative health impacts yet. Much like the other businesses, the QwaQwa water crisis affected PSP9 negatively because the primary functions of the practice were compromised.

6.2.5 Responses of informal encounters in the Maluti-a-Phofung main offices

During the pilot study phase, the author went to MAP on 10 March 2017 to determine who to communicate with regarding the water crisis. Unfortunately, technical staff

members were unavailable because they had only received their salaries on that day. Fortunately, through IE1 there were some administrative personnel from the municipal accounts department who had indicated that they were also affected by the QwaQwa water crisis and also had to dedicate time to collect water from water tanks erected outside the municipality. The personnel were busy washing their dishes in a bucket and further indicated that using the toilet was a problem because they first had to collect water from the water tank. Figure 6.5 indicates personnel having to wash their dishes in buckets which disorganises their office work because they have to share office duties with kitchen functions.

Source: Author (2019)

Figure 6.5: Bucket used by MAP staff members to wash dishes on 10 March 2017

The non-availability of water led to four consequences but were not only limited to these. The first consequence was the delayed execution of office work because personnel has to dedicate time to collect water from a water tank (see Figure 6.6) owned by the municipality and replicating a function in which adequate supply of water through a pipeline would have done.

Source: Author (2019)

Figure 6.6: Office workers collecting water in a white bucket from a tap at the main office building of the Maluti-a-Phofung Local Municipality offices on 10 March 2017

The second consequence is the deprivation of quality of service due to dedicating time and effort that could have been applied to their work duties instead of collecting water. The third consequence is the exposure of people to an unhygienic environment that exposes people to possible disease spread and other health-related adversities due to inadequate access to water.

After engagement with IE1, parking attendants at the MAP main offices, through IE9, indicated that they earned a living from parking cars and washing them if the car owners permitted them to do so. For IE9, the water crisis resulted in days when water would be completely unavailable at the municipality and it reduced the amount of money they took home to their families. In Figure 6.7, parking attendants were observed washing cars during the QwaQwa water crisis with limited water to render their service. Levels of poverty in QwaQwa are concerning (as presented in 1.6) and therefore washing cars in an informal trade activity could better the livelihoods of the two men as observed in Figure 6.7.

Source: Author (2019)

Figure 6.7: Parking attendants washing cars at MAP main offices on 10 March 2017

6.2.6 Summary of oral narrative of the struggles from the dispossessed during the QwaQwa water crisis

Based on the experiences and responses from the traditional leaders, it became evident that all three of them understood the importance of water as a basic human need. Through both responses from traditional leaders and households, the QwaQwa water crisis has demonstrated that planning was not effective during apartheid because it has demonstrated how the process of social engineering has manifested in the QwaQwa water crisis post-apartheid (see Figure 6.8). The struggle for water in QwaQwa is a memory of how the town had water access challenges in the 1970s, which it still has now.

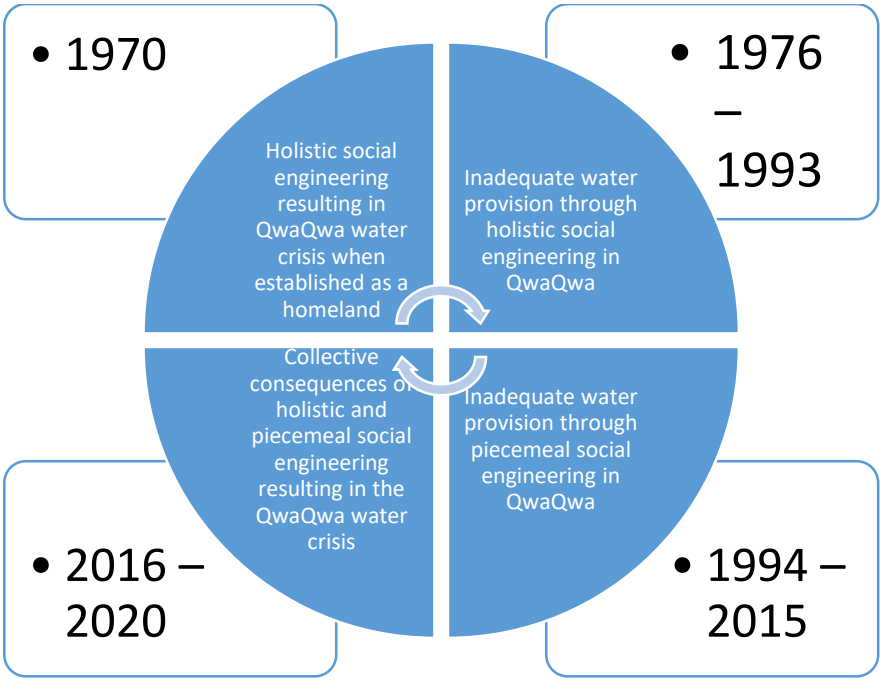


Figure 6.8: Cycle of social engineering resulting in QwaQwa water crisis post-apartheid

Beyond the responses from traditional leaders and households, the institutions and the private sector expressed how they were negatively affected by the QwaQwa water crisis because it reduced their quality of service, affected access to water for drinking, hygiene and domestic purposes, while creating a financial burden and dedicating staff time for collecting water.

The experiences shared through the oral narrative all symbolised two elements of oppression based on Five Faces of Oppression (Young, 2013: 346). The first face of oppression revealed by the study, was powerlessness, because all key respondents indicated that they had no knowledge about the QwaQwa water crisis approaching until it personally affected them. Through reactive means of MAP, the key respondents then had to find means of dedicating time, money and effort to collect water during the QwaQwa water crisis which they could not afford. The second face of oppression revealed by the study, was marginalisation (see 2.3.2.4), because households indicated that they could see water flowing in rivers throughout the year, but they could not have access to it from their taps. The key respondents were marginalised because through apartheid planning, water flowing from QwaQwa was still being collected and prioritised for the Vaal River system in Gauteng.

6.3 Questionnaire documenting the lived experiences of the community during the QwaQwa water crisis

The quantitative results of the lived experiences of the households in QwaQwa are first discussed through demographic profiling to give a background of the households that participated in the study. The socio-economic profiles further give a background on the access to resources and their means of accessing these resources. The water crisis is documented before and after to indicate how households were affected and what their impression was of the water accessible during the crisis.

6.3.1 Demographic profile

The demographic profile results of household participants are presented according to gender, age, ethnic group, marital status, level of education, employment status and years of the household in existence as displayed in Table 6-1. The study's results indicated that households had more females (57.9%) than males. A majority (41.3%) of the participants were in the age bracket of 36–59 years, with an average age of 44 years and a standard deviation lower than the average, indicating that the age of participants was varied from the lowest to the highest. All the participants indicated that they were black. Participants in the majority (39.8%) were married, with a closely tied number of participants that were single (38.6%). High school education was the most common (60.4%) level of education by participants in the study. A higher than the national unemployment level of 67.9% was indicated by the household participants. The majority (28%) of the participants indicated that from 2018 when they participated in the study, their household had been in existence for 21–30 years in QwaQwa. Religious association by the majority of participants (90.3%) was for Christianity.

Table 6-1: Demographic profile

Variables	Frequency	Percentage	Mean	Standard deviation
Gender				
Male	213	42.01%		
Female	294	57.99%		
Total	507	100.00%		
Age				
18–35	182	35.97%		
36–59	210	41.33%		
60+	115	22.70%		
Total	507	100,00%	44.105	16.455
Ethnic group				
Black	507	100.00%		
White	0	0.00%		
Coloured	0	0.00%		
Indian	0	0.00%		
Asian	0	0.00%		
Total	507	100.00%		
Marital status				
Single	196	38.66%		
Married	202	39.84%		
Separated	12	2.37%		
Divorced	13	2.56%		
Widowed	84	16.57%		
Total	507	100.00%		
Education level				
No schooling	25	4.93%		
Primary Schooling	94	18.54%		
High Schooling	306	60.36%		
Higher Education	81	15.98%		
Other	1	0.20%		
Total	507	100.00%		
Employment status				
Unemployed	344	67.85%		
Employed	88	17.36%		
Self-employed	40	7.89%		
Discouraged Job Seeker	2	0.39%		
Not Economically Active	33	6.51%		
Total	507	100.00%		
Existence of the household				
0–10	96	18.93%		
11–20	94	18.54%		
21–30	142	28.01%		
31–40	78	15.38%		
41–50	67	13.21%		
50+	30	5.92%		
Total	507	100,00%	24.014	11.089
Religious association				
Christianity	458	90,34%		
Islam	0	0,00%		
Ancestral worship	29	5,72%		
None	17	3,35%		
Other	3	0,59%		
Total	507	100,00%		

Source: Author (2019)

6.3.2 Socio-economic profile

The socio-economic profile of the study was conducted to determine which resources household participants had at their disposal because these determine the level at which they can curb the adverse negative effects of accessing water.

6.3.2.1 Socio-economic profile and monthly household income

Table 6-2 provides a summary of the socio-economic profiles of the household participants which include housing ownership, number of bedrooms, total monthly income, total monthly expenses, rental and bond costs, monthly water costs, and monthly electricity costs. For housing ownership, the majority (79.7%) indicated that they had full ownership of their houses, but the study noted concerns that some participants did not clearly understand the difference between a full-title hold and permission to occupy because in both instances they paid a predetermined fee to access the erven their houses were built on. Household participants in the majority (38.7%) indicated that they had three-bedroom houses, with an average of 3.5 rooms (≈4 rooms) with a standard deviation below the average that indicates that the number of bedrooms in the study was highly varied. Regarding monthly household income, a majority (59%) of the household participants indicated that they earned between R0 and R3 500, with the average monthly income being R5 181.50 and a standard deviation of more than the average monthly income, meaning that the difference of income from all participants was not that much.

Table 6-2: Socio-economic profile and household income of participants in QwaQwa

Variables	Frequency	Percentage	Mean	Standard deviation
Housing ownership				
Rental	8	1.6%		
Fully-owned	404	79.7%		
Permission to occupy	94	18.5%		
Bond/Loan payment	0	0.0%		
Other	1	0.2%		
Total	507	100.0%		
Bedrooms in household				
None	38	7.5%		
1 bedroom	29	5.7%		
2 bedrooms	196	38.7%		
3 bedrooms	150	29.6%		

Variables	Frequency	Percentage	Mean	Standard deviation
4 bedrooms	58	11.4%		
5 bedrooms +	36	7.1%		
Total	507	100.0%	3.531	1.213
Monthly household income				
R0–R3 500	299	59.0%		
R3 501–R7 500	118	23.3%		
R7 501–R15 000	64	12.6%		
>R15 000	26	5.1%		
Total	507	100.0%	R5 181.509	R6 584.509

Source: Author (2019)

6.3.2.2 Monthly household expenses of household participants

Monthly expenses were also collected to determine how much of the monthly income households committed to their expenses. Table 6-3 summarises the results of household expenses that include rental/bond payments, water, electricity, groceries, municipal rates and services, and other expenses.

Table 6-3: Monthly expenses of household participants

Variables	Frequency	Percentage	Mean	Standard deviation
Rental/Bond expenses				
R0–R1 000	5	71%		
R1 001–R2 000	1	14%		
R2 001–R3 000	0	0%		
R3 001–R4 000	0	0%		
R4 001–R5 000	0	0%		
>R5 000	1	14%		
Total	7	100%	R1 700.00	R2 810.55
Water				
R0–R105	5	25%		
R106–R225	2	10%		
R226–R450	7	35%		
>R450	6	30%		
Total	20	100%	R430.00	R512.00
Electricity				
R0–R250	478	96%		
R251–R500	6	1%		
R501–R750	0	0%		
R751–R1 000	8	2%		
R1000<	6	1%		
Total	498	100%	R237.31	R247.65

Variables	Frequency	Percentage	Mean	Standard deviation
Municipal rates and services				
R0–R250	8	38%		
R251–R500	7	33%		
R501–R750	2	10%		
R751–R1 000	2	10%		
R1000<	2	10%		
Total	21	100%	R430.48	R383.44
Household groceries				
R0–R500	57	13%		
R501–R1 000	147	33%		
R1 001–R1 500	99	22%		
R1 501–R2 000	82	18%		
R2 001–R2 500	20	5%		
>R2 500	39	9%		
Total	444	100%	R1 409.05	R841.68
Other				
R0–R250	72	27%		
R251–R500	96	36%		
R501–R750	8	3%		
R751–R1 000	37	14%		
R1000<	51	19%		
Total	264	100%	R810.39	R943.08

Source: Author (2019)

Only seven participants indicated that they had a rental/bond expense and the majority (71%) of the participants had a rental/bond expense of between R0 and R1 000, with the average monthly rental/bond expense being R1 700 and a standard deviation above the average rental/bond expense that indicates that the difference in expense was not that varied. As far as water expenses before the crisis were concerned, only 20 participants indicated that they paid for water, with the majority (35%) indicating that they spent between R226 and R450 per month, with an average expenditure of R430 per month and a standard deviation above the average that indicates that the monthly water expense was not that varied among the households. A total of 498 participants indicated that they had a monthly electricity expense, most (96%) of which indicated that they spend between R0 and R250 and an average of R237.31 per month and a standard deviation above the average that indicates that households do not have a varied expense for electricity. Only 21 household participants indicated that they paid for their monthly municipal rates and services, with the majority (38%) paying between R0 and R250 per month, with an average of R430.48 and a standard

deviation below the average, meaning that municipal rates and services expenses were broad among the households that participated. Concerning monthly household groceries on a total of 444 participants that responded, most of the participants (33%) indicated that they spent between R501 and R1 000, with an average of R1 409.05 and standard deviation below that average, which means that households substantially had different amounts of money for groceries monthly. Household participants were lastly required to indicate how much other expenses such as clothing accounts, subscriptions and domestic expenses cost them per month. Only 264 of the participants indicated that in the majority (36%) of households, the expenses ranged from R251 to R500, with an average of R810.39 per month and a standard deviation more than the average, which means that the other expenses were not that varied among households.

6.3.2.3 Water provision and infrastructure availability

Water provision and infrastructure availability were important to document to determine how much access to water households had before the crisis in QwaQwa. Table 6-4 summarises the results of how participants indicated that they accessed water. Regarding access to water, household participants were required to indicate whether it was through self-help, government, community-driven projects or the private sector, but all participants indicated they accessed water either through self-help or through the government. Only eleven out of the 407 household participants indicated that they provided their access to water in QwaQwa where equally they reticulated their tap water from communal taps and rivers. As far as government provision is concerned, the majority (96.8%) of the household participants indicated that they accessed tap water. The household participants were given an opportunity to household infrastructure and facilities, with the possibility of choosing more than one, that required water because they had a direct correlation to water consumption in QwaQwa. Household participants indicated in the majority (25.1%) that they had in-yard tap water.

Table 6-4: Water provision and infrastructure availability

Variable	Frequency	Percentage	Mean	Standard deviation
Self-help				
Tap water	4	36.4%		
Borehole	1	9.1%		
River	4	36.4%		
Water tank	0	0.0%		
Spring	1	9.1%		
Bottled water	0	0.0%		
Filtered water	0	0.0%		
Other	1	9.1%		
Total	11	100.0%		
Government				
Tap water	479	96.8%		
Borehole	1	0.2%		
River	0	0.0%		
Water tank	15	3.0%		
Spring	0	0.2%		
Bottled water	0	0.0%		
Filtered water	0	0.2%		
Other	0	0.4%		
Total	496	100.0%		
Household water access infrastructure and facilities				
In yard	486	25.1%		
Communal tap	16	0.8%		
Flushing toilet	136	7.0%		
Shower	21	1.1%		
Bathtub	84	4.3%		
Swimming pool	1	0.1%		
Kitchen sink	135	7.0%		
Bucket toilet	5	0.3%		
Ventilated improved pit toilet	214	11.0%		
Washing bowl (bathing)	410	21.2%		
Washing bowl (dishes)	408	21.1%		
Irrigation system	21	1.1%		
Total	1 937	100.0%		

Source: Author (2019)

6.3.3 Before and during the water crisis

To present the lived experiences of the community of QwaQwa access to water before and during the water crisis. Water per capita is presented according to the prescribed requirements for water access globally according to the United Nations (UN-Water

Decade Programme on Advocacy and Communication and Water Supply and Sanitation Collaborative Council, 2010:5) as discussed in Table 2-3. Water per capita is presented in quantity (litres), distances (kilometres), time (minutes) and cost (rand).

6.3.3.1 Water per capita – Quantity (litres)

The minimum prescribed quantity of water that should be accessible for an adult is a minimum of 50 ℓ (as indicated in 2.4.2) for consumption through drinking, preparing food, personal hygiene, and domestic purposes. Table 6-5 summarises responses of how much water household participants indicated that they had per day before and during the crisis to determine the significance of the water crisis in QwaQwa. Before the water crisis, the largest portion (82.1%) of participants indicated that they accessed more than 50 ℓ of water per day for personal use, compared to the shrinkage (32%) of water access by the household participants. The average quantity of water that was accessible per day by household participants before the crisis was 187.9 ℓ. The average quantity of water that was accessible per day by household participants during the water crisis was 118.2 ℓ.

Table 6-5: Water per capita – Quantity (litres)

Water per capital Quantity (litres)	Before				During			
	Frequency	Percentage	Mean	Standard deviation	Frequency	Percentage	Mean	Standard deviation
0–10	5	1.01%			59	12%		
11–20	10	2.01%			147	29%		
21–30	23	4.63%			53	11%		
31–40	30	5.84%			66	13%		
41–50	22	4.43%			21	4%		
>50	416	82.09%			160	32%		
Total	507	100.00%	187.90	219.209	507	100%	118.196	149.614

Source: Author (2019)

A student t-test was performed at a 95% confidence level to determine the statistical significance of the difference between quantities per capita before and during the water crisis. The results of the test, as shown in Table 6-6, indicated that there was a significant difference in the per capita quantities of water before and during the water crises at $p<0.01$. This means that the QwaQwa water crisis significantly affected the quantity of water that the individual accessed. The significant decline in the per capita

quantity of water is perhaps an infringement on human rights since water is a basic human need.

Table 6-6: Student T-test for significance in water per capita of the quantity of water accessible before and during the water crisis in QwaQwa

One-sample test	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean difference	95% Confidence interval of the difference	
					Lower	Upper
Quantity before crisis	19.314	506	.000	187.83501	168.7276	206.9425
Quantity during crisis	17.806	506	.000	118.19643	105.1549	131.2379

Source: Author (2019)

6.3.3.2 Water per capita – Distance (kilometres)

The maximum distance of accessing water from home is 1 km (as indicated in 2.4.2), and therefore, any distance beyond it is a violation of human rights according to the United Nations (UN-Water Decade Programme on Advocacy and Communication and Water Supply and Sanitation Collaborative Council, 2010:5). Table 6-7 summarises the responses of how far household participants indicated that they travelled per day before and during the crisis to determine the significance of the water crisis in QwaQwa. The distance they travelled to access it was beyond the maximum allowable 1 km.

Table 6-7: Water per capita – Distance (kilometres)

Distance (km)	Before				During			
0–0.2	406	80.12%			44	8.72%		
0.3–0.4	41	8.03%			16	3.19%		
0.5–0.6	26	5.22%			24	4.68%		
0.7–0.8	20	4.02%			6	1.28%		
0.9–1	3	0.60%			248	48.94%		
1<	10	2.01%			168	33.19%		
Total	507	100.00%	0.16	0.27	507	100.00%	2.09	3.93

Source: Author (2019)

Before the water crisis, the largest portion (80.1%) of participants indicated that they travelled between 0 km and 0.2 km daily to access water, compared to an increase (48.9%) in the majority of household participants that had to travel from 0.9 km to

1.0 km daily to access water. The average distance before the water crisis was 0.2 km. However, during the water crisis, the average distance has increased to 2.1 km daily for household participants, which is more than the maximum distance they should be travelling to access water. A student t-test (Table 6-8) was performed at a 95% confidence level to determine the significance of the difference between the distance travelled to access water before and during the water crisis in QwaQwa. The difference was statistically significant at $p<0.01$. This means that the QwaQwa water crisis significantly affected the right to accessing water as a basic human need because

Table 6-8: Student T-test for significance in water per capita of distance to accessing water before and during the water crisis in QwaQwa

One-sample test	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean difference	95% Confidence interval of the difference	
					Lower	Upper
Distance before crisis	13.416	506	.000	0.16238	0.1386	0.1862
Distance during crisis	3.141	506	.002	3.13223	1.1728	5.0917

Source: Author (2019)

6.3.3.3 Water per capita – Time

The maximum time for accessing water should not exceed 30 minutes (as indicated in 2.4.2), and therefore any distance beyond it is a violation of human rights according to the United Nations. Table 6-9 summarised the responses of how long household participants took to access water before and during the water crisis to determine the significance of the water crisis in QwaQwa. Before the water crisis, the largest portion (34.2%) of participants indicated that they took 0–5 minutes daily to access water, compared to an increase (49.9%) in time in the majority of household participants that had to spend 15–20 minutes daily to access water. An average time of 24 minutes was spent daily in accessing water before the crisis. However, during the water crisis, the average time for accessing water increased to 63 minutes per day, which is above the maximum time needed to access water and is thus a human right violation according to the United Nations. A student t-test (Table 6-9) was performed at a 95% confidence level to determine the significance of the difference between the time spent to access water before and during the water crisis in QwaQwa. The results indicated that the difference was statistically significant at $p<0.05$. This means that the QwaQwa

water crisis significantly affected the right to accessing water as a basic human need because the time they spent to access it was beyond the maximum allowable 30 minutes.

Table 6-9: Water per capita – Time (minutes)

Time (minutes)	Before				During			
0–5	173	34.21%			44	8.68%		
6–10	86	16.90%			33	6.51%		
11–15	24	4.83%			9	1.78%		
16–20	32	6.24%			253	49.90%		
21–25	26	5.03%			0	0.00%		
26–30	5	1.01%			1	0.20%		
30<	161	31.79%			167	32.94%		
Total	507	100.00%	23.45	27.97	507	100.00%	62.70	449.58

Source: Author (2019)

Table 6-10: Student T-test for significance in water per capita of time to accessing water before and during the water crisis in QwaQwa

One-sample test	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean difference	95% Confidence interval of the difference	
					Lower	Upper
Time before crisis	18.897	506	.000	23.45425	21.0158	25.8927
Time during crisis	3.144	506	.002	62.71755	23.5286	101.9065

Source: Author (2019)

6.3.3.4 Water per capita – Cost

The maximum allowable cost per household to accessing water should not exceed 3% of the total household income monthly (as indicated in 2.4.2), and any cost beyond it is a human right violation. Table 6-11 summarises the responses of how much household participants indicated that they spent on water every month before and during the water crisis. Before the water crisis, the largest portion (97%) of participants indicated that they spent R0–R105 per month to access water, compared to a not so different (91.9%) cost of R0–R105 per month on accessing water during the crisis. The fact that the cost of accessing water before and during the crisis was similar was because the community could not afford to pay to access water during the crisis and could afford only the quantity of water they accessed, the distance they spent accessing water, increased the time they dedicated to accessing water. The average

cost spent per month before the crisis was R16.96; however, the average cost spent per month during the crisis increased to R40.15.

Table 6-11: Water per capita – Cost (Rands)

Cost (Rand)	Before				During			
0–105	492	97.04%			466	91.91%		
106–225	2	0.39%			19	3.75%		
226–450	7	1.38%			14	2.76%		
450<	6	1.18%			8	1.58%		
Total	507	100.00%	R16.96	R129.86	507	100.00%	R40.15	R117.11

Source: Author (2019)

A student t-test (Table 6-12) was performed at a 95% confidence level to determine the significance of the difference between the cost spent to access water before and during the water crisis in QwaQwa, and the results indicated a statistically significant increase ($p<0.01$) in the cost to access to water during the crisis.

Table 6-12: Student T-test for significance in water per capita of cost accessing water before and during the water crisis in QwaQwa

One-sample test	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean difference	95% Confidence interval of the difference	
					Lower	Upper
Cost before crisis	2.941	506	.003	16.96252	5.6318	28.2933
Cost during crisis	7.719	506	.000	40.14805	29.9296	50.3665

Source: Author (2019)

6.3.4 Water-related emotions

Water-related emotions regarding the QwaQwa water crisis were expressed by household participants by ranking how they felt when the crisis was being elongated from fear, bother, worry and anger. Participants were required to respond to all the emotions and rank the severity of all these forms of emotions as never, rarely, occasionally, often and always. Table 6-13 presents the water-related emotions for all household participants and only the highest severities will be discussed for emotions. For the emotion of fear, extreme and not so many emotions were indicated by 211 participants (42%) as the most common water-related emotion, meaning that while

211 participants were extremely fearful, the other 211 participants were not so fearful initially. However, with the prolonged water crisis, the participants indicated that bother (225; 44%), worry (275; 54%) and anger (238; 47%) became extreme emotions that they always felt due to not being able to access water during the QwaQwa water crisis.

Table 6-13: Water-related emotions of QwaQwa water crisis

Variables	Frequency	Percentage
Fear		
Extreme emotions		
Never	165	33%
Rarely	16	3%
Occasionally	20	4%
Often	95	19%
Always	211	42%
Total	507	100%
High emotions		
Never	160	32%
Rarely	26	5%
Occasionally	35	7%
Often	111	22%
Always	175	35%
Total	507	100%
Moderate emotions		
Never	158	31%
Rarely	27	5%
Occasionally	57	11%
Often	102	20%
Always	163	32%
Total	507	100%
Not so many emotions		
Never	152	30%
Rarely	29	6%
Occasionally	33	7%
Often	82	16%
Always	211	42%
Total	507	100%
No emotions		
Never	159	31%
Rarely	60	12%
Occasionally	98	19%
Often	48	9%
Always	142	28%
Total	507	100%

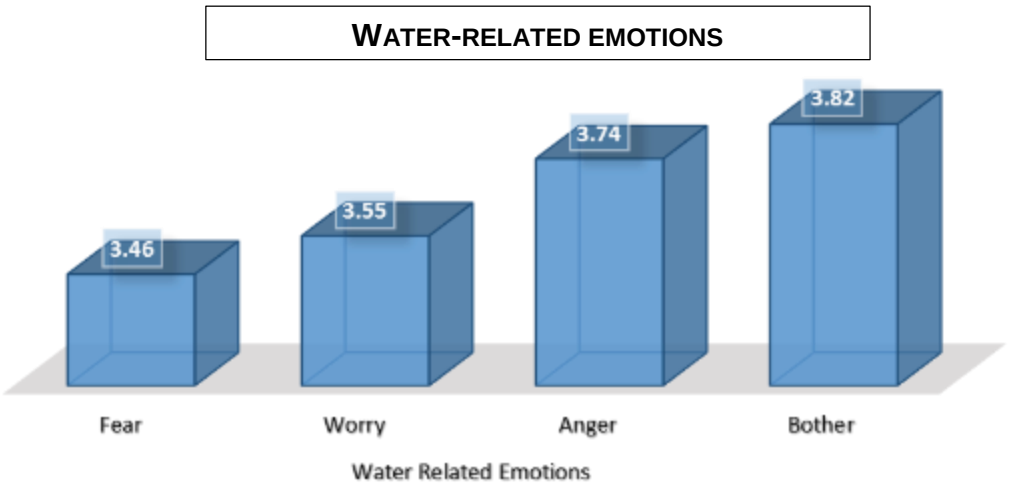
Variables	Frequency	Percentage
Bother		
Extreme emotions		
Never	40	7%
Rarely	33	6%
Occasionally	119	21%
Often	117	22%
Always	225	44%
Total	507	100%
High emotions		
Never	41	8%
Rarely	42	8%
Occasionally	119	23%
Often	123	24%
Always	182	36%
Total	507	100%
Moderate emotions		
Never	30	6%
Rarely	38	7%
Occasionally	150	30%
Often	117	23%
Always	172	34%
Total	507	100%
Not so many emotions		
Never	28	6%
Rarely	34	7%
Occasionally	132	26%
Often	88	17%
Always	225	44%
Total	507	100%
No emotions		
Never	37	7%
Rarely	67	13%
Occasionally	190	37%
Often	65	13%
Always	148	29%
Total	507	100%
Worry		
Extreme emotions		
Never	69	14%
Rarely	24	5%
Occasionally	39	8%
Often	100	20%
Always	275	54%
Total	507	100%
High emotions		

Variables	Frequency	Percentage
Never	70	14%
Rarely	29	6%
Occasionally	48	9%
Often	120	24%
Always	240	47%
Total	507	100%
Moderate emotions		
Never	59	12%
Rarely	31	6%
Occasionally	79	16%
Often	116	23%
Always	222	44%
Total	507	100%
Not so many emotions		
Never	56	11%
Rarely	34	7%
Occasionally	54	11%
Often	90	18%
Always	273	54%
Total	507	100%
No emotions		
Never	68	13%
Rarely	70	14%
Occasionally	116	23%
Often	78	15%
Always	175	35%
Total	507	100%
Anger		
Extreme emotions		
Never	27	5%
Rarely	23	5%
Occasionally	122	22%
Often	117	21%
Always	238	47%
Total	507	100%
High emotions		
Never	23	5%
Rarely	29	6%
Occasionally	129	25%
Often	127	25%
Always	199	39%
Total	507	100%
Moderate emotions		
Never	14	3%

Variables	Frequency	Percentage
Rarely	30	6%
Occasionally	157	31%
Often	113	22%
Always	193	38%
Total	507	100%
Not so many emotions		
Never	13	5%
Rarely	33	9%
Occasionally	139	27%
Often	84	17%
Always	218	43%
Total	507	100%
No emotions		
Never	22	4%
Rarely	68	13%
Occasionally	195	38%
Often	66	13%
Always	156	31%
Total	507	100%

Source: Author (2019)

As a representative summary of the water-related emotions that the household participants felt, Figure 6.9 graphically summarises how emotions of the households were increasing with time and should be read together with Table 6-13. The columns in Figure 6.9 represent how water-related emotions of household participants increased from fear to bother over the duration of the QwaQwa water crisis. These related emotions were caused by the uncertainty and lack of access to water in QwaQwa.



Source: Author (2019)

Figure 6.9: Summary of water-related emotions of the household participants of QwaQwa during the water crisis

With the water crisis increasing from days to weeks, to months and years, the community of QwaQwa became dissatisfied with the water crisis and started expressing their frustrations through protests, with a major protest being presented and discussed in Section 6.4.

6.3.5 Contributing factors to the QwaQwa water crisis

The household participants were requested to indicate what they thought was the cause(s) of the water crisis (see Table 6-14). Participants were requested to choose possible contributing factors, with a possibility of more than one, which were climate change, corruption, negligence, dam crises, and ecological factors. Climate change was ranked as the most frequent response from 337 (66.5%) of the participants because they indicated that rain was not as frequent as before. The second highest response was negligence from 320 (63%) participants who indicated that MAP Water was not properly maintaining infrastructure in QwaQwa. The third highest response was corruption from 310 (61%) participants who indicated that they felt that corruption was to be blamed for the water crisis because the private water tankers appointed by MAP Water had cut a deal with some officials who benefited financially from the water crisis. The fourth highest response was dam crises from 290 (57%) participants who indicated that they believed that the dams were not collecting enough water to serve the community of QwaQwa. The last response was ecological factors from 279 (55%) participants that believed that the conditions where water is collected for the dams, have changed.

Table 6-14: Contributing factors of the QwaQwa water crisis according to household participants

Contributing factors	Frequency	Percentage	Mean	Standard deviation
Climate change(Infrequent rainfall)				
Not possible	23	4.5%		
Least possible	10	2.0%		
Slightly possible	15	3.0%		
Possible	122	24.1%		
Very possible	337	66.5%		
Total	507	100.0%		

Contributing factors	Frequency	Percentage	Mean	Standard deviation
Corruption				
Not possible	25	5%		
Least possible	27	5%		
Slightly possible	50	10%		
Possible	95	19%		
Very possible	310	61%		
Total	507	100%		
Negligence				
Not possible	16	3%		
Least possible	6	1%		
Slightly possible	59	12%		
Possible	106	21%		
Very possible	320	63%		
Total	507	100%		
Dam crises				
Not possible	38	7%		
Least possible	7	1%		
Slightly possible	47	9%		
Possible	125	25%		
Very possible	290	57%		
Total	507	100%		
Ecological factors				
Not possible	36	7%		
Least possible	35	7%		
Slightly possible	55	11%		
Possible	102	20%		
Very possible	279	55%		
Total	507	100%		

Source: Author (2019)

6.3.6 Synthesis of quantitative results

Documenting the lived experiences of the communities in QwaQwa could have only been possible by demographically and socio-economically profiling household participants, measuring the difference in accessing water before and during the crisis and water-related emotions caused by the water crisis. The age and gender profiling with an average of 44 years and females by household participants indicate that people with age challenges, because biologically with age, human-being are less physically capable and females have fewer physical capabilities for carrying the water.

All the household participants were black; therefore, the study revealed the systemised oppression of black people based on South Africa's historical and current realities. The majority of participants having some high school education allows limited access to formal employment opportunities and decreased possibility of a middle-class income because, on average, households earned R5 181.50 with average expenses of R5 017.23 that allowed for R164.27 disposable income before the crisis.

It is worth mentioning that the expense for water became a new encounter because households in villages of QwaQwa do not have metered water and were primarily provided with communal taps despite their reticulation. The majority of household participants had lived in QwaQwa for 21–30 years. They had sufficient household memory of how water access had occurred over time. Water is used for religious purposes and in the case of the majority being Christians, water was necessary for baptisms. On the positive side, most of the households indicated that they had ownership or permission to occupy their homes that reduced their monthly household expenses.

The results indicated that water per capita was affected negatively in terms of quantity, distance, time and cost. The average household participant had access to 69.7 ℓ per day less, travelled 1.9 km per day, spent 15 minutes more per day and R23.19 more per month on accessing water during the QwaQwa water crisis. As a result, water-related emotions have indicated that people of QwaQwa have suffered stress from the water crisis due to an increased severity over time. These changes in the quantity of water per capita, cost of water, time spent on fetching water and distance travelled to get water were statistically significant.

The contributing factors to the water crisis indicated that climate change was the reason that most of the participants thought resulted in the water crisis. When examining the data from individual household participants about the possible contributing factors of the QwaQwa water crisis, there was a link that suggested that participants with educational levels up to finishing high school felt that the QwaQwa water crisis was caused by climate change. On the contrary, participants that had educational levels higher than high school accounted for most of the responses of neglect and corruption because of possibly having more information at their disposal to make a judgement about the QwaQwa water crisis.

6.4 Manifestation of QwaQwa water crisis resulting in protests

The manifestation of the QwaQwa water crisis in this section is reported from an event called #shutdownQwaQwa that took place in QwaQwa from 18 to 22 January 2020. Due to the study nearing completion and limited funds, the events of the water war in QwaQwa were covered using news broadcasts from the SABC and the eNCA television news channel from 17 to 28 January 2020 that the author made publicly accessible on Google Drive (2020: online). The section is divided into four sections that first describe the cause of the war; second, how the community reacted during the war; third, effects of the water war; and lastly, proposed short- and long-term water access solutions in QwaQwa. The water war is a confirmation of the statement by Ismail Serageldin that wars are going to break out over water, as quoted in the opening statement in Chapter 1.

6.4.1 Cause of the protest by the community of QwaQwa

The 18th of January 2020 saw the loss of life of the seven-year-old Musa Mbele whose mother has sent her with her 12-year-old sister to collect water from the Kgotjwane River in QwaQwa. In a detailed report by SABC News, it was indicated that Musa's one shoe fell in the river and in an attempt to get it back, she fell into the river and drowned. After the incident, Musa's mother indicated in an interview that due to water not being available from taps and water tankers not being consistent, her only resort was to send her two daughters to go collect water on her behalf because she was not feeling well. One of the community members who were alerted of the incident by Musa's sister, took the body out of the river. She was already lifeless which caused a revolt by the community against the MAP municipality and water.

6.4.2 Reaction to the protest by the Maluti-a-Phofung Local Municipality

On the evening of 18 January 2020, a WhatsApp voice note was circulated calling for #QwaQwashutdown protest from Monday 20 January 2020, until there was an acceptable response from the municipality. The community reflected on the fact that it had been 10 years since they had struggled to access water, despite significant rainfall and rivers flowing throughout the year. There were four demands made by the protesters. The first was for water to be accessible from taps and no other means such

as collecting water from rivers that led to Musa's passing. The second demand was that water tankers appointed by MAP Water should stop delivering water to their communities because they were unreliable, were appointed through corrupt means and had not given them joy over the years they had been accessing water from such water tankers. The third demand was for the municipality to collect waste on time and not delay for months as they have done before. The last demand was for Mayor Masechaba Mosia Lakaje to step down with immediate effect because she had failed to service the basic needs of the community of QwaQwa. Police force was used to stop the #shutdownQwaQwa protest.

6.4.3 Effects of the protest on the community of QwaQwa

QwaQwa experienced a total shutdown from 20 to 22 January 2020 by the #QwaQwashutdown protesters, in which all businesses and institutional activities were on halt and roads were blockaded with rocks and flammable materials such as tyres and wood. The protest denied the community of QwaQwa access to their workplaces, schools, health care, and all other related activities until their demands were met. During the protest, there was an incident on 20 January 2020 where a family trying to access the Mofumahadi Manapo District Hospital failed, which led to the death of their elderly mother because paramedics were not able to leave the hospital and neither was the family able to get their mother to the hospital using a neighbour's car. Patients from the Mofumahadi Manapo District Hospital were shown in news reports having to collect water for themselves because hospital staff members were not able to reach the hospital, while some staff members had to work extended hours because patients could not be left unattended. Other than issues of accessing the hospital during the crisis, the pharmacist could not access the hospital to dispense medication to the hospital, and kitchen staff gave food to the staff that were meant for patients.

The key officials of sectors that are relevant to water access in QwaQwa voiced their sides on how they interpreted the water crisis and what could be done for the crisis to be resolved. The current administrator for MAP LM Blake Mosley, was allowed to respond to the protests that were taking place and he had the following to say: There should be calm in QwaQwa because the protests were affecting access to water from tankers, health care, educational, social and daily duties in general. He indicated that since the municipality had been placed under administration in February 2018, many

milestones had been achieved in addressing the issues of misappropriating of funds and non-compliance of the CoGTA objectives. Mosley's focal point about the QwaQwa water crisis was that climate, lack of capacity and funds were the main issues for the ongoing crisis. Lastly, even though the community did not want any more contracted water tankers, Mosley pledged for 20 more water tankers to increase water accessible to the community.

Thembeni Nxangisa, member of the executive council of the Free State CoGTA, acknowledged that issues of water had been going on in QwaQwa for many years, as he had also been an administrator for a month. Nxangisa indicated that since 2016, the provincial government had given MAP LM funds to resolve the water crisis, but the funds were returned because they were not spent. Nxangisa indicated that he believed that MAP was incapacitated to technically solve the issue due to a lack of qualified staff and, secondly, funds spent from the grant were used on operational expenses of the municipality instead.

6.4.4 Proposed short- and long-term solutions by government for water access in QwaQwa

On 22 January 2020 at 15:00, the protest leaders and various stakeholders as interested and affected parties, were invited to a meeting called by MAP LM and the Free State CoGTA officials. During the meeting, the interested and affected parties were allowed to express their frustrations as discussed in the demands they made. Interested and affected parties from the community emphasised how they were concerned that things were not getting better, despite that the municipality had been under administration since February 2018.

Following the meeting on 23 January 2020, the minister of Human Settlement, Water and Sanitation, Lindiwe Sisulu, convened a meeting with the community of QwaQwa to pledge the national government to resolve the water crisis. Sisulu indicated that she understood all the concerns raised by the community of QwaQwa and pledge to stop privately appointed water tankers. As a short-term solution, she indicated the national government was going to give the community 5 000 water tanks within seven days that are going to be distributed across QwaQwa. These water tanks would be supplied through an R220 million cash injection that would also help connect them to the water supply in QwaQwa for people to collect water within their areas. As a long-term

solution, Sisulu lastly indicated that to resolve the QwaQwa water crisis, the national government would commit R2.1 billion to ensure that adequate water is supplied. Both the short- and long-term solutions would be headed by Sedibeng Water in collaboration with MAP Water as they did not have the capacity. The R2.1 billion project was indicated to be done over the years that will be determined by a feasibility study and funded according to the milestones set out by the feasibility study.

6.4.5 Synthesis of the manifestation of the QwaQwa water crisis

The manifestation of the QwaQwa water crisis has been a clear indication that the community had reached a point where they felt helpless. The death of Musa became a clear indicator of how the unavailability had caused desperation of the community in a situation of normalised oppression. MAP had demonstrated their inability to resolve the water crisis and continuously blaming drought, despite evidence of rainfall not being severely disrupted as is shown in Figure 5.14. The community had further realised that using water tankers was not a long-term solution and that it put a strain on them to collect water daily and disadvantaged those who had a physical challenge due to disability and old age to access water. The indication that the province had given MAP LM funds to resolve the water crisis but they could not to it due to capacity, was a clear indication that there was no alignment between Free State CoGTA and the current capacity of municipalities. If Free State CoGTA had accurate information they would have realised that the water crisis could have been a result of poor management and that MAP LM would not be able to use funds accordingly as they had already been put under administration due to mismanagement of funds and corruption investigation which was still ongoing.

The response from minister Sisulu to commit funds, indicated that the government has viewed its role as reactionary even though funds are available to attend to basic needs which government is tasked with. This approach also clarifies the historical neglect that QwaQwa faces, even despite being a major source of water in South Africa. Through the QwaQwa protest, the community of QwaQwa has claimed their power back in the realm of power relations by demonstrating that they were tired of poor service delivery, which led to the death of the seven-year-old girl.

Despite the commitment made by Sisulu in the short-term to provide 5 000 water tanks in respective areas around QwaQwa, the community did not support the solution. The first reason they did not support the short-term solution was that for water to be available from the 5 000 tanks, manual labour would still be needed at a larger quantity through private water tankers daily, even after they failed on a smaller scale. The second reason was that community members would still have to dedicate time and effort to collect water from such water tanks in a reality where there are elderly and young people and people with physical limitations that would not be able to collect water for themselves. The community felt that the crisis had gone on for too long for the government to only propose a short-term solution that replicates a failed model of water access in QwaQwa. For the long-term solution to water access, the community indicated that promises that been made by the ANC-led government over the years to better the conditions of the community of QwaQwa; however, service delivery has instead been weakening over time. An interesting comment from an elderly community member was that she was willing to vote against the ANC even if it cost her the old-age grant she receives monthly. This comment was a powerful statement because post-apartheid, the ANC has led local governance and being continuously voted in because the community believes that they would not benefit from grants should the ANC be ousted, which is a clear indication of the negative effects of piecemeal social engineering. The police force used to stop the #shutdownQwaQwa protest signifies violent oppression (see 2.4.2.3) because people that were protesting for basic access to water were met by the strong force of the law.

6.5 Conclusion

Chapter 6 discussed the lived experiences that affected the communities in QwaQwa of the water crisis as specified in Chapter 1, Section 1.3. From the results discussed from the interviews and questionnaires, there was a common recurrence that the water crisis in QwaQwa affected the communities in terms of the water quantities they had available at their disposal that caused few negative effects. All groups of interview responses indicated cost, time and physical effort as negative effects of the QwaQwa water crisis and that for one of the participants the absence of water had become normalised. The manifestation of the QwaQwa water crisis resulting in the water war was a clear indication of water-related emotions that are depressive confirming results as discussed in 6.3.4.

Chapter 7
Assessment of Interventions by Various Actors during the QwaQwa Water Crisis

7.1 Introduction

As highlighted in Chapter 4, the findings were generated from both qualitative and quantitative responses. Chapter 7 presented the findings of the third research objective “to identify interventions by various actors during the QwaQwa water crisis”. The study defined actors as a person, institution, business and/or community initiative that was in place for people to access water during the QwaQwa water crisis. The results presented and discussed in this chapter are based on the reported QwaQwa water crisis of 1 January 2016. Qualitative responses included nine key participants, three households, six institutions, and eight businesses. The quantitative responses were the only document from a household level because households were the basic unit of society and were impacted on a larger scale.

The first section is a qualitative narration of how various actors accessed water during the QwaQwa water crisis. The various actors have been grouped into six areas, based on categories of informants (see Appendix 6), namely key participants (KPs), traditional leaders (TLs), household participants (HPs), institutional participants (IPs) and private sector participants (PSPs). There were some informal encounters (IEs) that occurred while conducting the study and experiences of those involved in the encounters formed another group.

The second section is divided into four sections based on quantitative responses. The section firstly presents and discusses how the household participants indicated they found out about the QwaQwa water crisis. The section secondly presents and discusses how the household participants accessed water during the QwaQwa water crisis. The section thirdly presents and discusses the household participants’ impression of the quality of water during the QwaQwa water crisis. The section lastly presents and discusses the synthesis the quantitative results how they collectively relate to the QwaQwa water crisis.

7.2 Oral narrative of the restricted quantity, increased cost and stretch of accessing water during the QwaQwa water crisis

The interview schedules that documented the lived experiences of communities in QwaQwa tell a narrative of how people accessed water during the crisis. The responses have been grouped into five types of participants (see Appendix 6) and coded as key participants (KPs), traditional leaders (TLs), household participants (HPs), institutional participants (IPs) and private sector participants (PSPs). There were some informal encounters (IEs) that occurred while conducting the study and their results are presented in their respective group type.

7.2.1 Responses from key participants (Maluti-a-Phofung Water)

The study saw it important to find out from MAP Water which measures were put into place for the people to access water during the QwaQwa water crisis. The Chief Operations Officer of MAP Water, indicated as KP1, participated in the study with valuable responses. The first response from KP1 regarding the QwaQwa water crisis was as follows:

> "Yes. We do acknowledge that there is a water crisis in QwaQwa. As you already would have heard, the Fika Patso Dam which supplies 85% of QwaQwa with water is low and isn't collecting enough water due to drought.

After being requested to respond on the measures that were put into place for water access during the QwaQwa water crisis, KP1 indicated:

> We were using close to about 70 trucks to supply all areas affected in QwaQwa. And then the Department of Water and Sanitation they also assisted. I think there were some clients I think they gave them 20 trucks when this thing started. But most of the time we had about 16 trucks from the Department of Water and Sanitation. And then we also had support from the other governmental centres like Gift of the Givers, the local departments such as health, security, they were also assisting and also LDC (Louis Dreyfus Company) in terms of supplying some of the institutions with their trucks.

Figure 7.1 depicts an example of a 10 000 ℓ water tanker used to supply water during the QwaQwa water crisis. The image of the water tanker in Figure 7.1 became a regular representation, despite the community finding it unsatisfactory as demonstrated in Chapter 6. Figure 7.2 further depicts nine water tankers collecting

water from the Sterkfontein Dam at 10 ML of water access per day in Phuthaditjhaba–N in a long queue that is representative of the demand for water during the QwaQwa water crisis, despite the water not meeting the supply demand.

Source: Author (2019)

Figure 7.1: A 10 000 ℓ water tanker that supplies water in QwaQwa on 7 March 2019

Source: Author (2019)

Figure 7.2: Water tankers lined up to collect water from the Sterkfontein Dam at 10 ML per day for water access in Phuthaditjhaba−N on 7 February 2019

The cost of appointing water tankers during the QwaQwa water crisis had surpassed the cost of finding a long-term solution because the current water tanker was a temporary means. Through IE10 with a former MAP LM employee, he indicated that each of the water tankers appointed during the crisis invoiced a minimum of R100 000 per month. An approximation of the cost is based on the number of 70 trucks that were contracted according to KP1 and assisted in calculating a figure based on the input of

IE10. The cost that was calculated for 48 months (1 January 2016 to 31 December 2019) for 70 trucks at a minimum cost of R100 000 each per month amounted to R336 000 000. The cost is an amount approximated by the researcher in order to demonstrate how much money could have been spent on transporting water during the QwaQwa water crisis. The cost is a considerable amount of money which could have made long-term changes to QwaQwa's water situation.

IE8 was intended to be a formal interview with the MAP Planning Department regarding water access and planning in QwaQwa. However, there were challenges as the water crisis was a highly politicised issue and municipal officials were reluctant to participate in the response from IE8 who indicated that:

> Our job as town planners is to assist with allocating suitable land for Maluti-a-Phofung.

While probing further for the role of the town planners in the municipality they replied that:

> MAP Water is the one that had to plan for water and we just assist them with town planning stuff.

It was shocking to get this response because, at the time of the interview in 2018, it had been over two years since the water crisis became severe. Then lastly, when IE8 was asked about where they resided, the response was:

> I live in Harrismith and drive to work daily. Where I live, we also have water problems occasionally.

The last response from IE8 showed that the municipal official did not have full-hand experience of the lived experience of the QwaQwa water crisis.

7.2.2 Responses from key participants (traditional leaders)

The participation of the traditional leaders as indicated in 5.3.2.1 was to offer in-depth institutional memory and responses about their access to water in QwaQwa during the crisis. All three traditional leaders indicated that they have all accessed water from the water tankers appointed by MAP Water. However, they stressed and raised concerns about some people collecting water from rivers, the elderly having to collect water for themselves and the uncertainty of how long the water crisis was going to last. This indicates how people had to dedicate time, effort and money to access water during the QwaQwa water crisis.

7.2.3 Responses from key participants (households)

The participation of the households as indicated in 5.3.2.2 was to offer in-depth responses about the lived experiences during the QwaQwa water crisis. The first response regarding various actors during the QwaQwa water crisis, came from HP1 who indicated that water tankers (as depicted in Figure 7.1) started as a temporary solution but became the normalised means of accessing water from MAP Water. HP1 was quoted as saying:

> As a former employee of the QwaQwa water department things have gone back to how they used to be because we can only access water from water trucks.

HP2 and HP3 indicated that water had to be collected daily from a water tanker at inconsistent hours. HP1, HP2 and HP3 further indicated that reusing water was essential to optimise the water at their disposal. Reusing water from a washing bowl for flushing the toilet was an example cited for maximising water use. Figure 7.3 shows the water tanker that brought water to the community of Phuthaditjhaba−H. In Figure 7.3 it is clearly depicted that even a young girl had to participate in the collecting water from the water tanker, without clarity on how she would be able to carry the container filled with water.

Source: Author (2019)

Figure 7.3: Community of Phuthaditjhaba–H collecting water from the water tanker on 18 April 2019

Figure 7.4 further shows a group of community members collecting water from an emergency hydrant in Phuthaditjhaba–A, which compromises water availability in QwaQwa in the case of an emergency.

Source: Author (2019)

Figure 7.4: QwaQwa household members collecting water from an emergency hydrant in Phuthaditjhaba–A on 18 April 2019

Figure 7.5 shows four children that have been sent to collect water using a wheel-barrow on a sloped terrain in the Matsikeng village.

Source: Author (2019)

Figure 7.5: Children taking a break before pushing a wheelbarrow up a steep road in the Matsikeng village, QwaQwa on 10 April 2019

Figure 7.6 shows a private water tanker pouring water into a 2 500 ℓ water tank in Phuthaditjhaba–H at a R600 delivery fee. As an indication of when water was delivered, the worker said:

> Our days start very early. We generally deliver water from 04:00 until 17:00 every day.

Source: Author (2019)

Figure 7.6: Private water tanker delivering water to a water tank in Phuthaditjhaba–H on 24 December 2019

Figure 7.7 depicts a group of community members queuing to collect water from an emergency hydrant in Industrial Park 1 in QwaQwa during the water crisis.

Source: Author (2019)

Figure 7.7: Community of QwaQwa queuing to collect water from a hydrant in Industrial Park 1 on 10 April 2019

The image in Figure 7.8 is evidence that there is a presence of groundwater that could be used to supplement water from dams within QwaQwa to ensure that more water would be available.

Source: Author (2019)

Figure 7.8: Borehole drilled by the Gift of the Givers in the Bolata village to provide water access during the crisis and thereafter 10 April 2019

7.2.4 Responses from key participants (institutions)

The participation of the institutions in the study played an essential role in determining how institutions were accessing water through various actors during the crisis in QwaQwa. A brief background of each institution is discussed, followed by how they were affected.

7.2.4.1 Thekolohelong Welfare Centre

In the first response from IP1, they indicated that the welfare centre accessed water from four actors. The first was from a water tanker appointed by MAP Water that was assigned to deliver water daily and on average would deliver 2 500 ℓ to 5 000 ℓ a day. Additional water was collected from the Bluegumbosch stadium 8 km away using vehicles from the welfare centre. The welfare centre has a 60 000 ℓ water reservoir that was installed before the water crisis, but it could not function because of no supply from the water pipes. The TFS Wholesaler drilled a borehole on-site and donated an uncounted number of 5 ℓ and 20 ℓ bottles of water for the welfare centre.

7.2.4.2 Mofumahadi Manapo District Hospital

The second response from IP2 was that the hospital received a donation of four 10 000 ℓ and two 5 000 ℓ water tanks. Only one of the six water tanks was connected to the water reticulation system of the hospital but it did not cater sufficiently for the demand. Water was delivered twice a day by a truck contracted by MAP Water.

7.2.4.3 University of the Free State, QwaQwa Campus

The third response from IP3 from the QwaQwa Campus of the University of the Free State indicated that they had two boreholes that were drilled for emergencies only and not for daily supply. Unfortunately, due to the water crisis in QwaQwa, the University ended up using the boreholes for daily consumption through a treatment plant on campus. The University also constructed a 1 ML water reservoir (see Figure 7.9) that is connected to the municipal water supply services that will store water for use exclusively to the university. Lastly, IP3 indicated that they also installed water tanks (see Figure 7.10) for rainwater harvesting to optimise and increase water access on campus. South Africa has challenges with the high cost of accessing higher education

and therefore the QwaQwa water crisis increases the financial burden of students and developing water infrastructure at a cost.

Source: Author (2019)

Figure 7.9: A 1 000 000 ℓ water reservoir on the University of the Free State, QwaQwa Campus on 7 February 2019

Source: Author (2019)

Figure 7.10: Water harvesting of rainwater from the University of the Free State, QwaQwa Campus on 7 February 2019

7.2.4.4 Riverside Crèche

The fourth response was from IP4 that indicated that they only had access to water from a water tanker when it was not available from the tap. IP4 further indicated that delivery times were unfortunately not consistent and they had to use 5 ℓ to 25 ℓ containers to collect water when needed. The development of children requires water consumption, cooking, and sanitation.

7.2.4.5 Methodist Church of Southern Africa, QwaQwa

The fifth response was from IP5 that contributed to how the church access water during the crisis. The congregants were asked to bring at least 2 ℓ of water when they came to church for sanitation and reducing health hazards. The church further bought a 2 500 ℓ water tank to store water and for rainwater harvesting to be used when needed. Having to bring water to the church on Sundays was an additional burden during their time of accessing the right to religious associations during the QwaQwa water crisis.

7.2.4.6 Thabo Mofutsanyana Secure Centre

In the response from IP6, the secure centre indicated that they relied on a water tank provided to them by MAP Water but has still not been able to provide sufficient water for optimal operation of the centre. Water is delivered daily by a MAP Water contracted water tanker. The secure centre defies the human rights of the juveniles and personally is infringed by the QwaQwa water crisis because they need water to drink, and for cooking and sanitation purposes.

7.2.4.7 Maluti Technical Vocational Education and Training College, Main Campus, QwaQwa

The last responses were from IP7. The college indicated that they erected water tanks that are used by both staff and students to drink water and for ablution facilities. Furthermore, staff and students were allowed to take some of the water to their homes. The water tanks on the campus reduced the impact of the crisis but were still not sufficient for the needs of IP7.

7.2.5 Responses from key participants (private sector)

The private sector was also included to indicate how they accessed water during the water crisis in QwaQwa.

7.2.5.1 Mocwagae Poultry

PSP1 indicated that they had to buy an additional 2 500 ℓ of water, beyond the 10 000 ℓ they already had to ensure that they had water available for a long time (see Figure 7.11). The water was delivered at a fee of R500 for water quantities up to 10 000 ℓ per delivery. The costs incurred by PSP1 to access water during the QwaQwa water crisis have caused a burden on their profitability.

Source: Author (2019)

Figure 7.11: Mocwagae Poultry's 10 000 ℓ (left) and 2 500 ℓ (right) water tanks 7 February 2019

7.2.5.2 Sasko Bakery

In the second response, PSP2 indicated that they had to start collecting water twice a day with their 2 000 ℓ water tanker from Van Reenen, 84 km outside of QwaQwa. The quality of the water from Van Reenen was not tested and made it a challenge to sell bread to customers. PSP2 invested in two 10 000 ℓ water tanks that were connected to the municipal water supply and also used to store water obtained from Van Reenen. Despite PSP2 purchasing two water tanks, it was still not able to sustain the optimal productivity of the bakery and had a negative impact on the economy of QwaQwa.

7.2.5.3 Kamohelo Guesthouse

The third response was from PSP3 who indicated that their guesthouse had to invest in a water tank that received water from a private water delivery truck for R500 per delivery. Guests were given cold water for drinking and hot water in buckets for ablution purposes. P3P had to commit more funds to access water during the QwaQwa water crisis which affected the amount of business that it was getting because clients were confident of water being available for their use.

7.2.5.4 Harmony Ed-u-College

When asked to respond on how water was accessed during the QwaQwa water crisis, PSP4 indicated the following:

> A 2 500 ℓ water tank was bought and if water was finished in it, we would need to go stand in long queues for an hour to 1:30 to collect water.

The amount of time spent on collecting water in long queues is an indication that water accessibility was a challenge during the QwaQwa water crisis.

7.2.5.5 Bibi Cash and Carry

The fifth response from PSP5 indicated that:

> We had to buy water tanks for all five outlets in QwaQwa and purchase a water tanker to supply water to all of these.

PSP5's profitability was affected by the QwaQwa water crisis which could affect the cost of the food that their customers buy.

7.2.5.6 Bonono Bottle Store Carwash

The sixth response from PSP6 communicated how much the water crisis affected them:

> During the crisis, I had to wake up early in the morning at 04:00 to get water from the tap, using buckets. From 06:00 to 07:00 there wouldn't be water available. This situation cost me time and money because we only had a few buckets to wash, which led to me losing clients and having a lazy day.

For PSP6, they had the following to say:

> The problem of accessing water became an opportunity for other people. There is a guy with a bakkie that went around QwaQwa collecting water for households and businesses at R200 per a load of water. This was the most convenient way for us to access water.

7.2.5.7 Triple M Dry Clean

In the seventh response, PSP7 indicated that:

> We bought a 5 000 ℓ water tank that we have to pay an additional cost to get filled so that we can render our services."

Even though dry cleaning uses a lot of chemical products, some activities require water which was impacted by the QwaQwa water crisis.

7.2.5.8 Sugar's Hair Salon

In the eighth response, PSP8 stated that:

> Accessing water during the water crisis was costly to us. On some days we only get two customers but needed to commit about R200 per day in 25 ℓ containers which take all the money to water for that day. The owner on the salon and I have an agreement where we share profits daily. I had to start getting used to their not being profits to share because money was spent on the water.

The amount of food that PSP8 could bring to their table daily was therefore reduced due to the QwaQwa water crisis.

7.2.5.9 Happy Smiles Dental Clinic

In the final response, PSP9 indicated that:

> We bought two water tanks of 5 000 ℓ and 1 000 ℓ each which were filled by MAP Water and through rainwater harvesting.

Fortunately, PSP9 became innovative and resorted to rainwater harvesting as a source of water during the QwaQwa water crisis.

7.2.6 Synthesis of the oral narrative of the restricted quantity, increased cost and stretch of accessing water during the QwaQwa water crisis

The oral narrative of the restricted quantity, increased cost and stretch of accessing water during the QwaQwa water crisis exhibited similar means of accessing water

during the QwaQwa water crisis. The study was able to demonstrate that the water tankers appointed by MAP Water were an unreliable source of accessing water during the QwaQwa water crisis. All participants indicated that they had to invest money, time and travelling long distances to access water during the QwaQwa water crisis. This section was able to further demonstrate how holistic social engineering of QwaQwa in the 1970s still affected QwaQwa post-apartheid. Powerlessness and marginalisation (see 2.4.2.3) of the five faces of oppression were evident because only those with financial means could access water through private means and not rely on the MAP Water contracted tankers.

7.3 Quantitative results of the restricted quantity, increased cost and stretch of accessing water during the QwaQwa water crisis

The quantitative results of household participants are discussed in this section on how the various actors were provided water to households during the water crisis in QwaQwa as officially reported since 1 January 2016. The first results discuss how the households found out about the water crisis. The second results discuss how households accessed water during the crisis. The third results discuss the impression of water quality by households during the crisis.

7.3.1 Awareness of water crisis

The awareness of the water crisis was important for the study to determine to report on how households got to know about the QwaQwa water crisis. Table 7-1 provides a summary of all the results about how households found out about the QwaQwa water crisis. From the 507 participants of the study, 211 (41.6%) were in the majority by reporting that they did not have prior notice to water access challenges in QwaQwa until they tried accessing water from their taps. The second majority of 198 (39.1%) indicated that they learned about the water crisis through media reports on radio, newspapers and social media that there was going to be a total water shutdown in QwaQwa. The third majority of 52 (10.3%) participants learned about the water crisis through word of mouth from friends and acquaintances. The fourth majority of 43 (8.5%) participants have indicated that they learned about the water crisis from the ward and municipal-based systems. Lastly, only 3 (0.6%) indicated that they found out about the water crisis through other means that were not provided as options in the

questionnaire. The results from how households learned about the water crisis in QwaQwa gave a clear indication that people were left to their own devices to see the outcome and MAP Water did not put enough effort into notifying them, which is a human right violation because people were left without water.

Table 7-1: Awareness of water crisis in QwaQwa

Variables	Frequency	Percentage
Own observation	211	41.6%
Media	198	39.1%
Word of mouth	52	10.3%
Ward and municipal systems	43	8.5%
Other	3	0.6%
Total	507	100%

7.3.2 Water access during the crisis from various actors

As already discussed in 7.2, household participants were required to indicate how they accessed water during the crisis. Table 7-2 is a summary of the results on how household participants indicated that they accessed water during the QwaQwa crisis. It should be noted that participants had an opportunity to choose more than one response on how they accessed water during the crisis in QwaQwa. The highest result of water access was from a municipal water tanker where 247 (48.7%) of the participants indicated that they accessed water. The result is substantially low considering that this was the primary means that MAP Water used to get water to people during the crisis. Donations and community initiatives were the second highest means of accessing water during the crisis, indicating that the community saw it better to help themselves and accept assistance from non-government institutions too. Even though the water crisis was severe in QwaQwa, their third highest responses indicated that they accessed water from their taps during the crisis, but through further investigation, it emerged that this was only when water was available. Rainwater harvesting was also used as a means of accessing water during the crisis by 108 (21.3%) participants to optimise the amount of water they had at their disposal. There were 63 (12.4%) participants that resorted to purchasing water in bottled containers and water delivery for both water tanks and larger containers of water. Forty-eight (9.5%) participants indicated that they accessed water from boreholes that were

available in their communities, a majority of which were from the Bolata village. The least amount of responses about water access were from 41 (8.1%) participants that indicated that they collected water from the rivers in QwaQwa.

Table 7-2: Water access during the crisis in QwaQwa

Variables	Frequency	Percentage
Tap water		
Yes	166	32.7%
No	341	67.3%
Total	507	100.0%
Municipal (contracted) water tanker		
Yes	247	48.7%
No	260	51.3%
Total	507	100%
Purchasing		
Yes	63	12.4%
No	444	87.6%
Total	507	100.0%
Borehole		
Yes	48	9.5%
No	459	90.5%
Total	507	100%
River		
Yes	41	8.1%
No	466	91.9%
Total	507	100%
Rainwater harvesting		
Yes	108	21.3%
No	399	78.7%
Total	507	100%
Donations and community initiatives		
Yes	179	35.3%
No	328	64.7%
Total	507	100%

During the process of participant observation, a community member was seen accessing drinking water from an emergency fire hydrant as shown in Figure 7.12. Some health and safety issues were encountered when accessing water during the crisis. There were 132 (26%) household participants that encountered safety issues when collecting water, while the majority of 375 (74%) did not encounter any safety issues. Safety issues encountered include a resident breaking an arm and leg, being

mugged, buckets and containers being stolen, exhaustion due to physical activity and the dangers of accessing water from busy main roads that could have led to fatalities.

Source: Author (2019)

Figure 7.12: Community member accessing water from an emergency fire hydrant tap on 10 April 2019

7.3.3 Impression of water accessed from various sources during the QwaQwa water crisis

This subsection of the impression of the water quality that household participants had during the crisis was requested from participants to determine how they felt about the quality of water they received during the crisis. To create a synchronised discussion of the results, the levels of impression are discussed individually to rank the variables of clearness, taste, quality, smell, and drinkability. Table 7-3 offers a summary of the results that were collected from household participants. All responses were ranked from the highest to the lowest. The worst impression is discussed first as follows: accessibility – 89 (17.6%) participants; quality – 26 (5.1%) participants; taste – 25 (4.9%) participants; drinkability – 21 (4.1%) participants; clearness – 18 (4%) participants and smell – 8 (1.6%) participants. The bad impression of water quality is discussed second as follows: quality – 87 (17.2%) participants; taste – 84 (16.6%) participants; accessibility 74 (14.6%) participants; drinkability – 73 (14.4%) participants; clearness – 64 (13.6%) and smell – 40 (7.9%) participants. The average

impression of water quality was as follows: accessibility – 239 (47.1%) participants; smell – 230 (45.4%) participants; clearness – 200 (39%) participants; taste and drinkability – 197 (38.9%) participants; and quality 189 (37.3%) participants. The good impression of water quality was as follows: smell – 65 (12.8%) participants; clearness – 64 (12.6%) participants; drinkability – 59 (11.6%) participants; quality – 51 (10.1%) participants; taste – 43 (8.5%) participants; and accessibility – 35 (6.9%) participants. Lastly, for the very good impression of water quality the results were as follows: smell 164 (32.3%) participants; clearness – 161 (32.4%) participants; taste – 158 (31.2%) participants; drinkability – 157 (31%) participants; quality – 154 (30.4%) participants; and accessibility – 70 (13.8%) participants. When all impressions of water quality during the crisis are analysed individually, all of the impressions were ranked as average.

Table 7-3: Impression of the water quality that household participants accessed from various actors during the QwaQwa water crisis

Variables	Frequency	Percentage
Clearness		
Worst	18	4%
Bad	64	13%
Average	200	39%
Good	64	12.6%
Very good	161	32.4%
Total	507	100%
Taste		
Worst	25	4.9%
Bad	84	16.6%
Average	197	38.9%
Good	43	8.5%
Very good	158	31.2%
Total	507	100.0%
Quality		
Worst	26	5.1%
Bad	87	17.2%
Average	189	37.3%
Good	51	10.1%
Very good	154	30.4%
Total	507	100.0%
Smell		
Worst	8	1.6%
Bad	40	7.9%
Average	230	45.4%

Variables	Frequency	Percentage
Good	65	12.8%
Very good	164	32.3%
Total	507	100.0%
Drinkability		
Worst	21	4.1%
Bad	73	14.4%
Average	197	38.9%
Good	59	11.6%
Very good	157	31.0%
Total	507	100.0%
Accessibility		
Worst	89	17.6%
Bad	74	14.6%
Average	239	47.1%
Good	35	6.9%
Very good	70	13.8%
Total	507	100.0%

The impression of the water provided during the QwaQwa water crisis was benchmarked against MAP Water's previous water quality management rating from the Department of Water Affairs. Figures 7.13 and 7.14 are proof that MAP Water had been ranked nationally as one of the best water schemes in South Africa, due to contributing factors raised in 6.3.5.

Source: Author (2019)

Figure 7.13: Blue drop certificate of excellent drinking water quality management of QwaQwa in 2011 on 14 October 2019

Source: Author (2019)

Figure 7.14: Blue drop certificate of excellent drinking water quality management of QwaQwa in 2012 on 14 October 2019

Figure 7.15 shows an image of the poor quality of water that was accessed on 11 March 2017, on the day that water was accessible from a neighbour's tap after eight months of no access from such a tap.

Source: Author (2019)

Figure 7.15: Water collected by a community member in Bolata on 11 March 2019 after eight months of non-provision

7.3.4 Synthesis of the quantitative results of the restricted quantity, increased cost and stretch of accessing water during the QwaQwa water crisis

The quantitative results of this chapter have indicated that household participants were left destitute because most of the participants indicated that they saw by their own observation that there was a water crisis. Even though most of the participants received water from the contracted water tanker, household participants indicated that they had challenges of accessing water because the times of water delivery were inconsistent and the odds were not in their favour. The impression of the water was compromised during the QwaQwa water crisis because it was not to the standard that QwaQwa once enjoyed as confirmed by the awards from the Department of Water Affairs from both 2011 and 2012.

7.4 Conclusion

The chapter discussed the various actors who assisted in accessing water during the crisis in QwaQwa. From the interview schedules, it became evident that all participants felt that that challenge such as time and cost were at the centre of all forms of initiatives that participants took to access water during the crisis. The water crisis has presented a significant challenge to the people of QwaQwa to a point that some started finding it as normalised. From the quantitative results, the figures gave a clearer indication of the level of impact over a wider population of the QwaQwa water crisis. There was no clear communication with the community that the water situation in QwaQwa was depreciating and water-related emotions began escalating to a point of depression. Chapter 8 will present an opportunity for a synthesis of the findings presented in Chapter 7 to be discuss how planning can effectively address QwaQwa water crisis post-apartheid.

Chapter 8
Implications of the QwaQwa Water Crisis for Effective Planning Post-Apartheid

8.1 Introduction

Chapter 8 is the last chapter of the thesis and is based on the reviews of current knowledge, legislative framework, methodological considerations, and research findings and discussion. The purpose of the study was to explore the implication of the QwaQwa water crisis for effective planning post-apartheid. This chapter, therefore, responds to the fourth objective which was “to explore the implications of the QwaQwa water crisis for effective planning in post-apartheid South Africa”. Backed by sound empirical evidence, Chapter 8 concludes the study by confirming the two research claims:

1. Holistic social engineering is a structural control exercise that was used to create former homelands in South Africa, which resulted in negative planning that has led to the water crisis in QwaQwa that has manifested post-apartheid.
2. The South African political landscape hinders effective post-apartheid planning to resolve the water crisis in QwaQwa and has rendered planners as spectators through piecemeal social engineering.

This chapter first discusses the summary of the findings that relate to exploring the QwaQwa water crisis for effective planning post-apartheid. Second, the chapter discusses the implications of the QwaQwa water crisis to urban and regional planning post-apartheid. Third, the chapter discussed the implications of the QwaQwa water crisis for effective planning. The fourth section will offer some recommendations on how urban and regional planning can contribute to effective planning post-apartheid for water in QwaQwa. This is followed by the contribution of the study to knowledge in urban and regional planning, and lastly, the chapter offers areas of further research related to post-apartheid for effective planning for water in the former homelands of South Africa.

8.2 Summary of the findings

The findings of the QwaQwa water crisis presented and discussed in Chapters 5, 6 and 7 are summarised according to the research objectives as outlined in Chapter 1:

1. To explore the history of water policies in South Africa and the water crisis in QwaQwa.
2. To document the lived experiences of the affected QwaQwa communities.
3. To assess interventions by various actors during the QwaQwa water crisis.
4. To explore the implications of the QwaQwa water crisis for effective planning in post-apartheid South Africa.

8.2.1 History of water governance in South Africa and the water crisis in QwaQwa

The history of water governance in South Africa and water crisis in QwaQwa were explored to give an accurate account of how access to water has occurred in South Africa, generally, and how these have impacted on QwaQwa, specifically.

8.2.1.1 History of water governance in South Africa

The study established that before colonialism, water governance had to adhere to customary water laws. In 1652, the water laws were disrupted by the Dutch colonial settlers who protected their interests of accessing water in the Cape colony. The Dutch water laws (*placcaets*) only addressed the limitation of hours for irrigation and the resolution of conflicts for access to water from streams only for the Dutch settlers. These actions and inactions demonstrated the disinterest of the Dutch settlers to provide rights for adequate water access for the natives. There was no demonstration in the literature that the Dutch settlers had any interest in providing for the rights of the Africans to access water on land they occupied upon their arrival.

When the British conquered the Dutch in 1806 in the Cape, they presided over a new era of primitive accumulation (see Section 2.3.4) and introduced restrictive water governance laws. First, they illegitimately gave water rights to landowners that had questionable means of ownership of the land and they reduced access to water available for native Africans who lived and worked the land. Second, through the

Native Land Act of 1913, the British reduced the land owned by Africans to 13% and thereby reducing the access Africans had to water. Third, since the white minority – through the dispossession of the African majority – was entitled to 87% of land in South African, the introduction of the Irrigation and Conservation Act ensured that they benefitted economically, while Africans had inadequate access to water. Fourth, the British created the means through which their economic interest would be protected by establishing the Rand Water Board 17 years after gold was discovered in Johannesburg to ensure that more water was made available to the region as most of it had been misused through mining activities. The commodification of water in South Africa was not to the benefit of Africans and reaffirmed social engineering of water governance. Lastly, through the Water Act of 1956, the apartheid government intensified the process of accumulation by dispossession (2.3.5) with the development of water transfer schemes to provide economic regions of South Africa with water which those regions other wouldn't have had access to. Examples of these are responses to rapid urbanisation in cities and the historical gold rush of Johannesburg.

The Water Act of 1956 therefore led to the QwaQwa water crisis. The implementation of transfer schemes left the people of QwaQwa destitute because, since its establishment as a homeland during apartheid and even post-apartheid, they have not benefited from water which originates in QwaQwa. Due to racially tied legislation in South Africa, the Water Act of 1956 made the provision of water a human right for the white minority, and marginalised Africans (see 2.4.2.3). Traces of the implementation of the Water Act of 1956 are still evident in QwaQwa because the Tugela Vaal Transfer Scheme, dependent on the Sterkfontein Dam, still prioritises water supply for Gauteng.

8.2.1.2 History of the water crisis in QwaQwa

The study has demonstrated in Chapter 5 that the QwaQwa water crisis occurred years before the reported water crisis of 1 January 2016. Before the forced settlement of the Basotho in QwaQwa during the early 1970s, there was already a population of 24 000 people that were accessing water from streams and rivers in QwaQwa, while three boreholes (see 5.3.1) were drilled for irrigation purposes and not for human consumption during the same period. The operation of the Metsi Matsho Dam in 1976 in QwaQwa was expressed as a sigh of relief regarding access to water. Unfortunately, the demand for water needed from the Metsi Matsho Dam was not realistically

matched with the apartheid government's intention to develop industrial activities in QwaQwa and also had to serve a population that had increased to approximately 240 000 (an increase of 1 000%) by the 1980s.

With an increased population drive in QwaQwa during the 1980s, the Fika Patso Dam opened in 1986 as a solution to the water demand but was already regarded as an unreliable source of perennial water. By not addressing issues that occurred after the Fika Patso Dam became operational, the water crisis had not been effectively planned for. Participants indicated that from 1990 there had not been any new water infrastructure development and that poor maintenance was one of the primary sources of the current water crisis event. The lack of maintenance was demonstrated mainly through non-functional waste treatment plants that could supply approximately 50% (20 ML) of the water demand of QwaQwa per day. Despite MAP Water placing prominence on the drought as a cause for the water crisis, Chapter 5.4 has indicated that the Sterkfontein Dam was not substantially affected by climate change and has sufficient capacity to supply water to QwaQwa on its own because it is 99 times bigger than the Fika Patso Dam and the Metsi Matsho Dam combined. MAP failed to fulfil its water supply functions because it was not able to demonstrate capacity in terms of the technical skills needed to comprehend the true nature and extent of the water crisis. Through having a sufficient technical capacity diagnosis, planning and maintenance could have been put into place to resolve the QwaQwa water crisis and reduce opportunities for corruption. The situation created by MAP in not being able to provide water has not been sufficiently challenged according to legal prescripts of access to water in QwaQwa because the three dams continue to perform the primary functions that they were established for. A paradigm shift is urgently needed to ensure that what legislation sets out to do is realised to resolve the QwaQwa water crisis.

8.2.2 Lived experiences of the communities in QwaQwa during the water crisis

The lived experiences of the communities in QwaQwa during the water crisis were important to discuss because they gave a detailed account of how people were negatively impacted by not having access to water. Through both qualitative and quantitative results, responses from all the participants of the study indicated that their way of living was negatively affected because they had to dedicate time, money and physical energy to access water. QwaQwa is a mountainous area and collecting water

during the QwaQwa water crisis therefore caused physical strain. The community of QwaQwa was negatively affected due to limited water for drinking, sanitation, cooking, leisure and religious purposes, domestic cleaning, subsistence agriculture, the profitability of businesses and the quality of services offered by businesses and institutions.

8.2.3 The various actors at play during the QwaQwa water crisis

Various actors were at play during the QwaQwa water crisis. The primary actor that was appointed and expected to provide water in QwaQwa was the water tanker system that had 70 trucks to provide water to the community of QwaQwa. The appointment of water tankers since January 2016, came at a substantial monthly cost of R7 million and a possible R336 million over four years to MAP Water, without long-term results. The water tankers were further not available at consistent times to the communities which made it difficult for them to collect water. Water was collected from as early as 04:00 and also contributed to safety concerns of water containers being stolen, protests against water access challenges and muggings. The quality of water that was accessible during the QwaQwa water crisis was not on par with that which the community accessed before the reported QwaQwa water crisis.

Beyond accessing water from MAP Water service providers, the community had to commit funds to source water by buying water tanks and paying for delivery of water to their households. Some of the community members introduced the method of rainwater harvesting to gather water that they would use to substitute the water they were collecting. The community also had to go as far as collecting water from rivers, which was a hazardous condition. The community also had to rely on donations and community initiatives to access water during the crisis. Lastly, water was accessed through private and public sector interventions of drilling boreholes that were proof that groundwater is available in QwaQwa.

8.3 Implications of the QwaQwa water crisis for effective planning

This section responds to the fourth research objective about the implications of the QwaQwa water crisis for planning. This section intends to link the literature, legislation, and findings to demonstrate the direct implication of the QwaQwa water crisis for planning.

8.3.1 Theoretical, legislative and empirical implications of the QwaQwa water crisis for effective planning post-Apartheid

Chapter 2 of the study discussed urban and regional planning, the state and power, and water. From an urban and regional planning perspective in section 5.3.1, the study has demonstrated how a lack of strategic planning from the establishment of QwaQwa in 1974 could cause ineffective planning post-apartheid as the water crisis has presented itself. Strategic planning for water access in QwaQwa should have commenced in 1986 as discussed in section 5.3.2. when the DBSA indicated that the Fika Patso Dam would have an inconsistent supply of perennial water. A form of strategic planning could have been put into place to allocate land parcels for water and/or leveraging the water of the Sterkfontein Dam that was only being used as a reservoir. The result of the strategic planning would have led to effective planning because the community would have had sufficient access to water. Communicative and participatory planning approaches could have been used as a means of strategic planning for the water crisis in QwaQwa.

The role of the state in South Africa has occurred for different interests over time and has affected how people access water. Post-apartheid, the role of the state has been to reconcile South Africans and tackle the injustices of the past. However, the study had been able to demonstrate that power relations have had a major influence on the continuation of the colonial and apartheid water governance trajectory. The African population of QwaQwa had been left destitute and impoverished despite the virtual presence of water in streams and rivers in QwaQwa, as discussed in Chapter 6. As was discussed in the claims made in 1.1, social engineering was used by the apartheid government to forcefully place African people in QwaQwa for cheap labour, which was not a market and/or natural process and has led to the current socio-economic conditions of poverty that has given the community of QwaQwa less power in the realm of power relations.

The *placcaets* that were introduced by the Dutch over land that was commonly owned by Africans were a form of enclosure act that influenced how the land, and ultimately water, was governed in South Africa. The act of the Dutch undermining customary water laws and illegitimately legislating the use of water, created control over how the land was accessed for domestic agricultural purposes that required water. The victory

of the British over the Dutch meant that they came into power illegitimately and enforced their laws which laid a foundation for primitive accumulation of land through the Irrigation and Conservation Act of 1912 and the Native Land Act of 1913. The Water Act of 1956 was much like the Irrigation and Conservation Act of 1912, with an addition of allowance for constructing a water transfer scheme established through the Sterkfontein Dam, namely the Tugela Vaal Transfer Scheme. The Tugela Vaal Transfer Scheme implemented accumulation by dispossession of taking water from the region of QwaQwa to the Vaal Dam river system. In the post-apartheid era, access to water was commodified by establishing municipal water schemes in a neoliberal global economy through the Water Services Act of 1997 and the National Water Act of 1998.

Water as a common was the point of focus of the study on the water crisis in QwaQwa with a detailed account of how it was accessed, in Chapter 7. The importance of water was discussed in terms of a minimum quantity of 50 ℓ, for a maximum of 30 minutes per day, less than 1 km away, and would cost not more than 3% of the total household income. The household participants decreased by 50.09% (from 82.09% to 32%) that accessed more than 50 ℓ of water per day, for longer than 30 minutes per day and further than 1 km away from their homes. Water availability is a challenge for South Africa, therefore, there are multiple factors such as water regime, ecology, climate change, climate change discourse, and ecological insufficiency.

8.4 Recommendations

Based on the implications of the QwaQwa water crisis for planning, the following recommendations are presented:

- MAP Water should perform its functions constitutionally and according to the Water Service Act of 1997, the Municipal Systems Act of 2000 and the global standards of the United Nations SDGs on water. A violation of any of the listed legislation and policies is a contravention of the standard of service through the water that should be provided to households, businesses and institutions in QwaQwa.
- To ensure that infrastructure stay resilient to changes in climate conditions so that the community in QwaQwa does not experience another water crisis.

- Maintenance, upgrading and constructing new infrastructure are how climate change can begin to be tackled. If regular maintenance is done by internal staff members of MAP LM, then it would reduce vulnerability to the water crisis and reduce opportunities for corruption.
- Water use education is important to teach the community about the limitation of the availability of water and standards in which to access water regarding time, cost, quantity, and distance.
- Strategic planning should be done for the effective rendering of services at all times.
- Exploration of alternative water sources such as boreholes, rainwater harvesting, and waterless infrastructure sanitation systems are needed.
- Reinstatement of the *sethabathaba* for the villages in QwaQwa as a flat-rate tax contribution to the municipality that will focus on developing localised water access through groundwater is suggested.

8.5 Contribution to knowledge

The contestation of water is a global issue due to the shortage of fresh drinking water, as well as human rights and increased urbanisation which scholars pay much attention to. The study has contributed to knowledge by developing a cycle of social engineering that resulted in the QwaQwa water crisis as depicted in Figure 8.1.

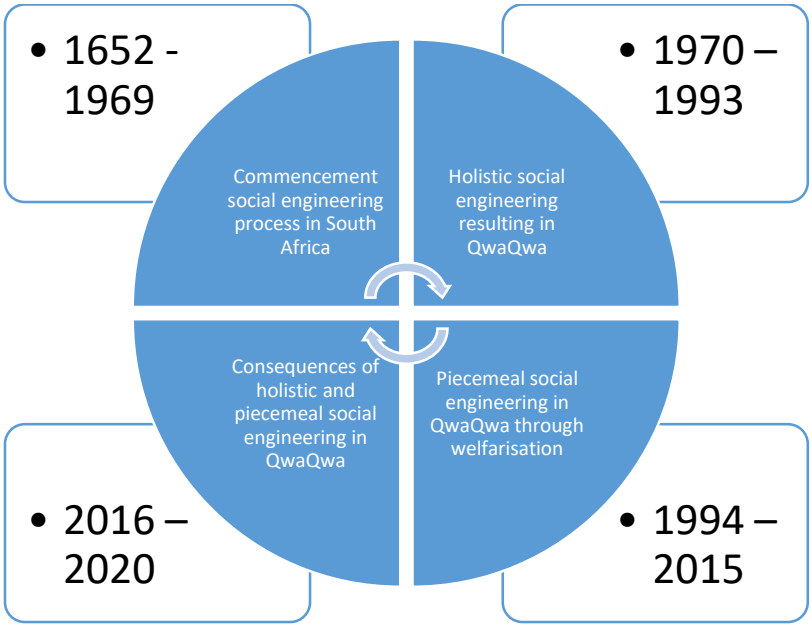


Figure 8.1: The cycle of social engineering resulting in the QwaQwa water crisis

The study has demonstrated that social engineering (see Figure 8.1) has played a central role in how water is accessed in South Africa and has resulted in the QwaQwa water crisis. The study found that social engineering commenced from 1652 to 1969 in South Africa. This is first demonstrated by the Dutch settlers that arrived in South Africa (see 5.2.1), with a disregard of customary water laws of Africans that were living in the area when planning for water access. Second, the British (see 5.2.2) from the 1800s introduced water laws and the land act that further marginalised Africans because access to water was linked to illegitimate ownership of land by colonial settlers. The last instance demonstrated that from 1948 to 1969, the apartheid government introduced water laws that further solidified what colonialism has started in 1652, further marginalising Africans because they only owned 13% of land in South Africa from which some water was being sourced from. The apartheid government dispossessed the people of QwaQwa of water to supply the Vaal River system when they established the Sterkfontein Dam on the periphery of QwaQwa.

From 1970, the apartheid government engaged in holistic social engineering of marginalising access to water in QwaQwa through accumulation by dispossession (see 2.3.5) because when the Basotho people were forcefully settled, no adequate means of accessing water were provided. The establishment of the QwaQwa homeland was a move by the apartheid government to create a black labour force reserve and with a disregard of the right to adequate access to water because it was being sourced from streams, rivers and water tankers. In 1976 and 1986, the Metsi Matsho Dam and the Fika Patso Dam respectively became operational to provide water to QwaQwa, but concerns were already cited in 1986 that they were not no sufficient. From 1994 post-apartheid government applied piecemeal social engineering without addressing the primary purpose of planning effectively for water access to QwaQwa. The Sterkfontein Dam has retained its primary function of being a water reservoir for the Vaal River system while QwaQwa marginally benefits from its water. Historical data (see 5.3.2) has demonstrated that the Sterkfontein Dam has had sufficient water to supply all of QwaQwa with water from when it was established in 1969.

From 2016 to 2020, the QwaQwa water crisis demonstrated the consequences of social engineering through which people resorted to the same means of accessing water in QwaQwa as they did when they were settled in the 1970s. Accessing water from water tankers, rivers and streams became normalised in QwaQwa, leading to the loss of life of Musa Mbele when she drowned in the Kgotjwane River on 18 January 2020. Holistic social engineering of water access in QwaQwa has created an order through which water remains dispossessed because government failed to effectively plan for water access in QwaQwa post-apartheid. Figure 8.1 lastly demonstrates how social engineering will remain cyclic when there is not any disruption of water governance in South Africa that will benefit the marginalised people of QwaQwa.

8.6 Areas for further research

The study has only been able to explore the factors at a place which led to the QwaQwa water crisis in QwaQwa post-apartheid. There are further areas of research as follows:

- Examine the current allocation of water resources for former homelands post-apartheid.
- Explore alternative water sources which reduce the reliance of water supply from municipalities.
- Develop water access criteria that takes topography into consideration in the case of communal taps in QwaQwa.
- Explore how apartheid planning social engineering practices can be reversed that still negatively affect the African majority in terms of limited access to water.

8.7 Conclusion

The study has been able to demonstrate through theoretical, legislative and empirical findings that MAP Water has not been able to sufficiently provide water access to the community of QwaQwa. The study has been able to demonstrate that the QwaQwa water crisis is beyond climate change and drought as reported by MAP Water. The QwaQwa water crisis was a result of historical dispossession of water, lack of maintenance and development of new infrastructure, the commodification of the crisis

by appointing private water tankers which enjoyed major profits, and the incompetence of municipal officials to render water access as a basic service and human right. Much attention has been put into researching the water crisis events of big cities such as Cape Town's Day Zero, to the neglect of the previously disadvantaged homelands that still have people in destitute water conditions. Upon the completion of the study, the QwaQwa water crisis was still ongoing because the situation had remained unchanged.

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Appendix 1
Ethical Clearance Approval

Faculty of Natural and Agricultural Sciences

27-Nov-2017

Dear **Mr Kgosi Mocwagae**

Ethics Clearance: **Exploring the QwaQwa Water Crisis**

Principal Investigator: **Mr Kgosi Mocwagae**

Department: **Urban and Regional Planning (Bloemfontein Campus)**

APPLICATION APPROVED

This letter confirms that a research proposal with tracking number: **UFS-HSD2017/0504** and title: **'Exploring the QwaQwa Water Crisis'** was given ethical clearance by the Ethics Committee.

Your ethical clearance number, to be used in all correspondence is: **UFS-HSD2017/0504**

Please ensure that the Ethics Committee is notified should any substantive change(s) be made, for whatever reason, during the research process. This includes changes in investigators. Please also ensure that a brief report is submitted to the Ethics Committee on completion of the research.
The purpose of this report is to indicate whether or not the research was conducted successfully, if any aspects could not be completed, or if any problems arose that the Ethics Committee should be aware of.

Note:

1. This clearance is valid from the date on this letter to the time of completion of data collection.
2. Progress reports should be submitted annually unless otherwise specified.

Yours Sincerely

Prof. RR (Robert) Bragg
Chairperson: Ethics Committee
Faculty of Natural and Agricultural Sciences

Natural and Agricultural Sciences Research Ethics Committee
Office of the Dean: Natural and Agricultural Sciences
T: +27 (0)51 401 2322 | +27 (0)82733 2696 | E: smitham@ufs.ac.za
Biology Building, Ground Floor, Room 9 | P.O. Box/Posbus 339 (Internal Post Box G44) | Bloemfontein 9300 | South Africa
www.ufs.ac.za

Appendix 2

Informed Consent

1. English version

Junior Lecturer: Urban and Regional Planning Junior Lektor: Stads- en Streekbeplanning
Faculty / Fakulteit: Natural and Agricultural Sciences / Natuur- en Landbouwetenskappe PO Box / Posbus 339, Bloemfontein 9300, Republic of South Africa / Republiek van Suid-Afrika
+27 (0)51 401 2795
+27 (0)82 514 7219
MocwagaeKS@ufs.ac.za

30 October 2017

To whom it may concern,

Request for your consent to participate on a PhD research titled: A Tale of Three Dams: Exploring the QwaQwa Water Crises for Effective Planning in Post-apartheid South Africa

This research is meant to elicit information on water crisis in Qwaqwa to enable me to complete my PhD thesis. The aim of this research is to understand the Qwaqwa water crisis vis-à-vis history and policies; its effects on people and interventions by various stakeholders. The information provided here will be treated confidentially and it is not for political or profit making venture; hence, there is no compensation for participants. There is no harm or risk for anyone who participates or chooses not to. May I invite you, if you are willing to participate to complete the Consent Form.

Kind regards,

Kgosi Mocwagae

2. Sesotho version

Junior Lecturer: Urban and Regional Planning Junior Lektor: Stads- en Streekbeplanning
Faculty / Fakulteit: Natural and Agricultural Sciences / Natuur- en Landbouwetenskappe PO Box / Posbus 339, Bloemfontein 9300, Republic of South Africa / Republiek van Suid-Afrika
+27 (0)51 401 2795
+27 (0)82 514 7219
MocwagaeKS@ufs.ac.za

30 Mphalane 2017

Ho ya amehang,

Kopo ya ho amohela hore o nke karolo diphuputsong tsa lengolo la PhD tlasa sehlohotaba: A Tale of Three Dams: Exploring the QwaQwa Water Crises for Effective Planning in Post-apartheid South Africa

Diphuputso tsena ke ho fumana lesedi ka bothatha ba metsi Qwaqwa e le ka ho ka nthusa ho bakeng sa phethela dithuto tsaka tsa lengolo la PhD. Sepheo sa diphuputso ke ho ke ho utlwisisa bothata ba metsi Qwaqwa re ipapisitse le nalane la le maano; hore tsena di amme batho jwang le ditharollo ka bohle ba amehang.

Tlhahiso leseding yohle o faneng ka yona e tla bolokwa ka tlhokomelo ya sephiri, ha ena ho sebediswa bakeng sa dipolotiki kapa ho etsa phaello ka ho e rekisa. Ke kahoo ho senang tefo ho bohle ba nka karolo. Ho ke ke ha eba le tshoso kapa ditlamorao tse ka beyang tsietsing mang kapa mang a nkang karolo kapa a kgethang ho se nke karolo. Ka tlhompho ke kopa hore ebang o dumela ho nka karolo o ka tlatsa foromo tumellamo (Consent Form).

Ke ya leboha,

Kgosi Mocwagae

Appendix 3
Consent Forms

CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet. I have had sufficient opportunity to ask questions and am prepared to participate in the study. I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable). I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interview, nominal group technique and or questionnaire

I have received a signed copy of the informed consent agreement.

Full Name of Participant: _____

Signature of Participant: _____ Date: _____

Full Name of Researcher: _____

Signature of Researcher: _____ Date: _____

Appendix 4
Interview Schedules

1. Maluti-a-Phofung Local Municipality and Water officials interview schedule

Section 1: Institutional Information

1.1. What is your role in the institution?

_____

1.2. How long have you been performing duties in this role?

_____

1.3. Which department / unit are you under and what is its role?

_____

_____

1.4. How many people do you work with in your department?

_____

Section 2: Developments of the Water Crisis

2.1. When did developments leading to the water crisis begin?

_____

_____

_____

_____

_____

_____

2.2. What were the interventions that were put in place to try to prevent this from occurring?

2.3. How effective were the interventions that were put in place, in response to the water demand?

2.4. Which institutions / actors were involved in providing interventions during the crisis?

Section 3: Long-term Water Supply Plan

3.1. Has MAP made any effort to plan to resolve the water issue in future? If so, please indicate how and by when?

3.2. How will MAP access resources to realise this objective?

3.3. Which institutions are going to assist MAP to resolve the crisis?

2. Key participant interview schedule

Section 1: Institutional Information

1.1. What is your role in the institution?

1.2. How long have you been performing duties in this role?

Section 2: Developments of the Water Crisis

2.1. When did developments leading to the water crisis begin?

2.2. What were the interventions that were put in place to try prevent this from occurring?

2.3. How effective were the interventions that were put in place, in response to the water demand?

2.4. Which institutions / actors were involved in providing interventions during the crisis?

Section 3: History of water crisis

3.1. Do you have a recollection of water access challenges in QwaQwa? If so, please give a detailed account of the time and how people accessed water during that time.

3.2. Additional comments

3. Household interview schedule

Area:_____ Date:_____

1. How long the person has been in the QwaQwa?

2. How many people they live with?

3. How important is water to you and what do you use it for?

4. Water challenges they've faced (time, distance and money) regarding accessing water since living in the area.

5. What they feel the causes were and what possible solutions there are.

6. Any additional comments

4. Institutional interview schedule

Name of enumerator: _____ Date: / /

Type of building: _____ Institution address: _____

1. **Do water crises exist and what interpretations do people give to it at the institutional level?**

2. **How do the water crises exist at the institutional level?**

3. **Why do the water crises exist at the institutional level?**

4. **Describe the effects of water crises you have heard, seen and/or experienced at the instutional level.**

Economic
Income -
Labour -
Time -
Household production (agriculture) -
Biological
Psychological -
Physiological -
Health -

Socio-cultural
Cultural and spiritual practices:
Gender roles -
Aggression -
Violence and theft -
Domestic choices -
Leisure -

5. **Narrate any stories of the water crises at the institutional level.**

Causes -
Consequences -
Cures / Solutions -

6. **Discuss solutions to the institutional level**

What	Where	When	How	Who

5. Business interview schedule

Name of enumerator: _____ Date: / /

Type of building: _____ Business address: _____

1. **Do water crises exist and what interpretations do people give to it at the business level?**

2. **How do the water crises exist at the business level?**

3. **Why do the water crises exist at the businessal level?**

4. **Describe the effects of water crises you have heard, seen and/or experienced at the instutional level.**

Economic
Income -
Labour -
Time -
Household production (agriculture) -
Biological
Psychological -
Physiological -
Health -

Socio-cultural
Cultural and spiritual practices:
Gender roles -
Aggression -
Violence and theft -
Domestic choices -
Leisure -

5. Narrate any stories of the water crises at the business level.

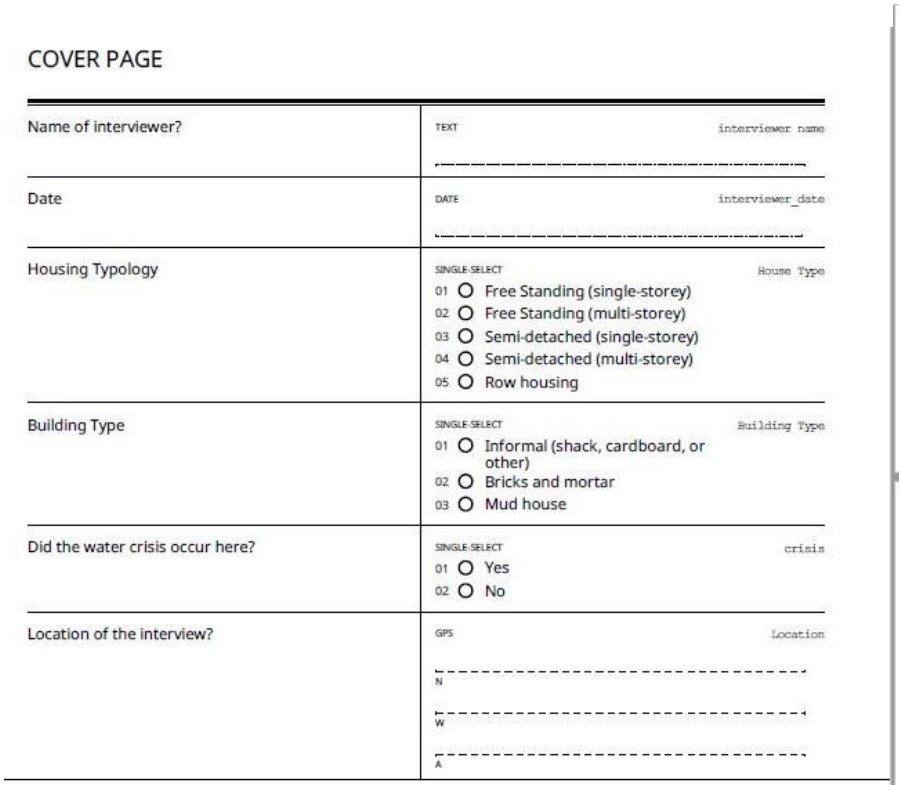
Causes -
Consequences -
Cures / Solutions -

6. Discuss solutions to the business level

What	Where	When	How	Who

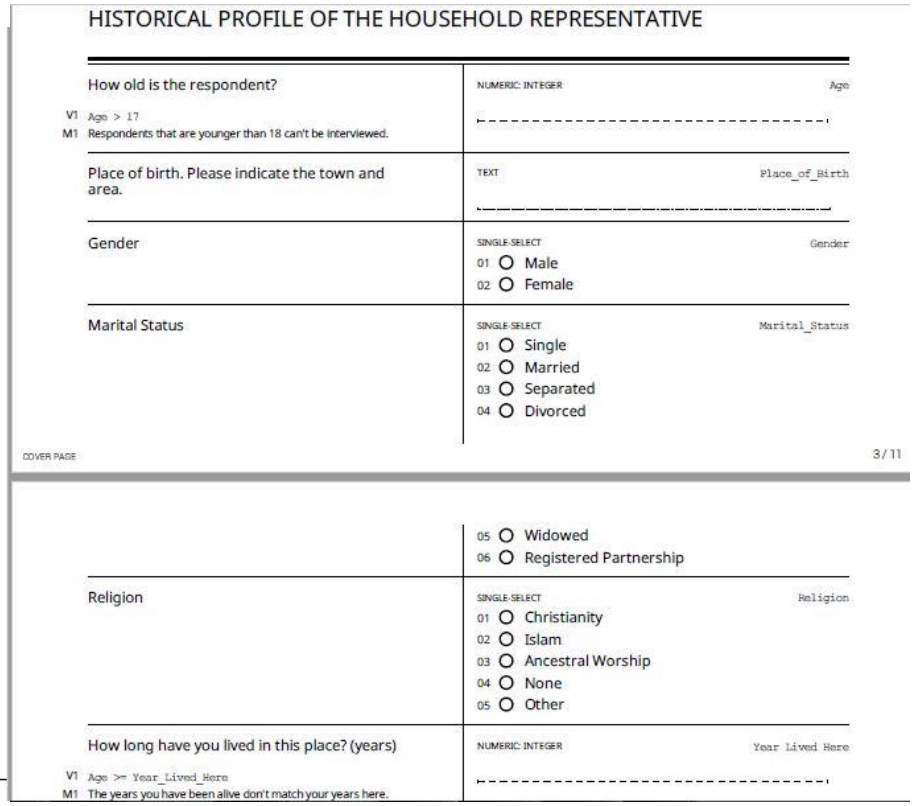
Appendix 5

Household Questionnaires



COVER PAGE

Name of interviewer?	TEXT interviewer_name
Date	DATE interviewer_date
Housing Typology	SINGLE-SELECT House_Type 01 ○ Free Standing (single-storey) 02 ○ Free Standing (multi-storey) 03 ○ Semi-detached (single-storey) 04 ○ Semi-detached (multi-storey) 05 ○ Row housing
Building Type	SINGLE-SELECT Building_Type 01 ○ Informal (shack, cardboard, or other) 02 ○ Bricks and mortar 03 ○ Mud house
Did the water crisis occur here?	SINGLE-SELECT crisis 01 ○ Yes 02 ○ No
Location of the interview?	GPS Location N W A



HISTORICAL PROFILE OF THE HOUSEHOLD REPRESENTATIVE

How old is the respondent? V1 Age > 17 M1 Respondents that are younger than 18 can't be interviewed.	NUMERIC INTEGER Age
Place of birth. Please indicate the town and area.	TEXT Place_of_Birth
Gender	SINGLE-SELECT Gender 01 ○ Male 02 ○ Female
Marital Status	SINGLE-SELECT Marital_Status 01 ○ Single 02 ○ Married 03 ○ Separated 04 ○ Divorced

COVER PAGE 3 / 11

	05 ○ Widowed 06 ○ Registered Partnership
Religion	SINGLE-SELECT Religion 01 ○ Christianity 02 ○ Islam 03 ○ Ancestral Worship 04 ○ None 05 ○ Other
How long have you lived in this place? (years) V1 Age >= Year_Lived_Here M1 The years you have been alive don't match your years here.	NUMERIC INTEGER Year_Lived_Here

Education (Formal) Level	SINGLE-SELECT Level_of_Education 01 ○ No Schooling 02 ○ Primary School 03 ○ High School 04 ○ Higher Education 05 ○ Other
Employment	SINGLE-SELECT Employment_Type 01 ○ Unemployed 02 ○ Employed 03 ○ Self-employed 04 ○ Both employed and self-employed 05 ○ Discouraged Work Seeker 06 ○ Not Economically Active

OTHER HOUSEHOLD MEMBERS PROFILE

Is there anyone living here other than yourself?	SINGLE-SELECT othermembers 01 ○ Yes 02 ○ No
What are the names of the people you live with? E othermembers == 1	LIST Members_Other

OTHER HOUSEHOLD MEMBERS PROFILE
Roster: HOUSEHOLD_INFORMATION
generated by list question Members_Other Household_Information
E othermembers == 1

Gender	SINGLE-SELECT Gender_other 01 ○ Male 02 ○ Female

HISTORICAL PROFILE OF THE HOUSEHOLD REPRESENTATIVE

How old is the respondent? V1 Age > 17 M1 Respondents that are younger than 18 can't be interviewed.	NUMERIC INTEGER Age
Place of birth. Please indicate the town and area.	TEXT Place_of_Birth
Gender	SINGLE-SELECT Gender 01 ○ Male 02 ○ Female
Marital Status	SINGLE-SELECT Marital_Status 01 ○ Single 02 ○ Married 03 ○ Separated 04 ○ Divorced

COVER PAGE 3 / 11

	05 ○ Widowed 06 ○ Registered Partnership
Religion	SINGLE-SELECT Religion 01 ○ Christianity 02 ○ Islam 03 ○ Ancestral Worship 04 ○ None 05 ○ Other
How long have you lived in this place? (years) V1 Age >= Year_Lived_Here M1 The years you have been alive don't match your years here.	NUMERIC INTEGER Year_Lived_Here

Education (Formal) Level	SINGLE-SELECT Level_of_Education 01 ○ No Schooling 02 ○ Primary School 03 ○ High School 04 ○ Higher Education 05 ○ Other
Employment	SINGLE-SELECT Employment_Type 01 ○ Unemployed 02 ○ Employed 03 ○ Self-employed 04 ○ Both employed and self-employed 05 ○ Discouraged Work Seeker 06 ○ Not Economically Active

OTHER HOUSEHOLD MEMBERS PROFILE

Is there anyone living here other than yourself?	SINGLE-SELECT othermembers 01 ○ Yes 02 ○ No
What are the names of the people you live with? E othermembers == 1	LIST Members_Other

OTHER HOUSEHOLD MEMBERS PROFILE
Roster: HOUSEHOLD_INFORMATION
generated by list question Members Other
E othermembers == 1
Household_Information

Gender	SINGLE-SELECT Gender_other 01 ○ Male 02 ○ Female

Age	NUMERIC INTEGER Age_other
Employment	MULTI-SELECT Occupation 01 ☐ Unemployed

OTHER HOUSEHOLD MEMBERS PROFILE 4 / 11

	02 ☐ Employed 03 ☐ Self-employed 04 ☐ Employed and self-employed 05 ☐ Discouraged job seeker 06 ☐ Not economically active
Education Level	SINGLE-SELECT Education 01 ○ No School 02 ○ Pre-schooling 03 ○ Some primary schooling 04 ○ Some high schooling 05 ○ Matric 06 ○ Tertiary Education
Marital Status	SINGLE-SELECT Marital S O 01 ○ Never married 02 ○ Married 03 ○ Divorced 04 ○ Seperated 05 ○ Widowed 06 ○ Registered Partnership

HOUSEHOLD SOCIO-ECONOMIC DATA

What type of housing ownership?	SINGLE-SELECT — Type of Ownership 01 ○ Rental 02 ○ Fully-owned 03 ○ Permission to Occupy 04 ○ Bond / Loan Payment 05 ○ Other
How many bedrooms does this household have?	SINGLE-SELECT — Nr Bedrooms 01 ○ None (joint kitchen, living room and bedroom) 02 ○ 1 bedroom 03 ○ 2 bedrooms 04 ○ 3 bedrooms 05 ○ 4 bedrooms 06 ○ 5+ bedrooms
What is the average household monthly income (rands)?	NUMERIC: INTEGER — Monthly Income _____.
Which of the following expenses do you have	MULTI-SELECT — Expenses 01 ☐ Rent / Bond 02 ☐ Water 03 ☐ Electricity 04 ☐ Municipal Rates and services (water removal and sewage) 05 ☐ Household Groceries 06 ☐ Others (Domestic, DsTV, etc.

How much does this cost you per month in rands?	NUMERIC: INTEGER — Cost _____.
Indicate which of the following your household has.	MULTI-SELECT — Household_Access 01 ☐ In-yard tap 02 ☐ Communal tap 03 ☐ Flushing toilet 04 ☐ Shower 05 ☐ Bath tub 06 ☐ Swimming pool 07 ☐ Kitchen sink 08 ☐ Bucket toilet 09 ☐ VIP toilet 10 ☐ Washing bowl (bathing) 11 ☐ Washing bowl (Dishes) 12 ☐ Irrigation System

HOUSEHOLD SOCIO-ECONOMIC DATA

Roster: FUNCTIONING FACILITIES

generated by multi-select question Household_Access — Facilities

Indicate which of the following are currently functional.	MULTI-SELECT: YES/NO — water_functionality 01 ☐ / ☐ Functional 02 ☐ / ☐ Out of order
Who is your water service provider?	MULTI-SELECT — Service Provider 01 ☐ Self-help 02 ☐ Government 03 ☐ Community-driven project 04 ☐ Private / Commercial (Business)

HOUSEHOLD SOCIO-ECONOMIC DATA

Roster: PROVISION OF WATER

generated by multi-select question Service Provider — Provision

Which one of these do they provide you with?	MULTI-SELECT — Provision_Types 01 ☐ Tap Water 02 ☐ Borehole 03 ☐ River 04 ☐ Water Tank 05 ☐ Spring 06 ☐ Bottle Water 07 ☐ Filtered Water 08 ☐ Other

WATER USES BEFORE CRISES

What do you use water for?	MULTI-SELECT — Water_Uses 01 ☐ Drinking 02 ☐ Cooking 03 ☐ Hygiene

	04 ☐ Cultural/Religious purposes 05 ☐ Watering 06 ☐ Household duties 07 ☐ Leisure 08 ☐ Car wash 09 ☐ Other

WATER USES BEFORE CRISES

Roster: WATER USES

generated by multi-select question Water Uses — Drinking_Water

How many liters do you drink?	NUMERIC: INTEGER — Liters_Drank
What is the average distance you travelled per day?	NUMERIC: INTEGER — Distance to access Water
What was the average time spent per day?	NUMERIC: INTEGER — Time for Accessing Water

THE EFFECTS OF WATER CRISES

How did you found out about the water crisis?	TEXT — Finding out
How did you access water during the crisis?	MULTI-SELECT — Access_crisis_2 01 ☐ Tap water 02 ☐ Water tank 03 ☐ Purchasing 04 ☐ Borehole 05 ☐ River 06 ☐ Rainwater harvesting 07 ☐ Donates and / Community initiatives

THE EFFECTS OF WATER CRISES

Roster: IMPRESSION OF WATER

generated by fixed list

Impression

01 Clearness
02 Taste
03 Quality
04 Smell
05 Drinkability of water
06 Accessibility of water (time and distance)

What is your impression of the water you received during the crisis? Please rate on a scale of 1 (worst) to 5 (best)	SINGLE-SELECT 01 ○ Worst 02 ○ Below Average 03 ○ Average 04 ○ Above Average 05 ○ Best	Impression of water

How many liters of water were you able to access per day during the crisis?	NUMERIC: INTEGER	times_water_accessed
How much water have you been able to access per day during the crisis? Indicate the amount of times per day.	NUMERIC: INTEGER	frequency_of_water_access_daily
Further to this, how many times a week was water accessible?	NUMERIC: INTEGER	frequency_per_week
At what time(s) did you collect water during the crisis?	TEXT	Times_water_accessed_2
Have you ever experience any safety issues when collecting water?	TEXT	safety_issues
How long (months) have you experience the water crisis for?	NUMERIC: INTEGER	crisis_duration
Had you ever experienced a water crisis before the current one? If yes, please indicate the period (months)?	TEXT	Previous_crisis_experience

THE EFFECTS OF WATER CRISES

Roster: WATER-RELATED EMOTIONS:

generated by fixed list

water_related_fear

01 Fear
02 Worry
03 Anger
04 Bother

Rate your emotions on an extremely scale	SINGLE-SELECT 01 ○ Never 02 ○ Rarely 03 ○ Occassionally 04 ○ Often 05 ○ Always	Fear
Rate your emotions on a high scale	SINGLE-SELECT 01 ○ Never 02 ○ Rarely 03 ○ Occassionally 04 ○ Often 05 ○ Always	Fear_highly

fearful/worried/angry/bother scale	01 ○ Never 02 ○ Rarely 03 ○ Occassionally 04 ○ Often 05 ○ Always
Rate your emotions on a not so much scale	SINGLE-SELECT Fear Not 01 ○ Never 02 ○ Rarely 03 ○ Occassionally 04 ○ Often 05 ○ Always

CONTRIBUTING FACTORS TO THE WATER CRISES

CONTRIBUTING FACTORS TO THE WATER CRISES
Roster: CONTRIBUTING FACTORS
generated by fixed list

Contributing

01 Climate Change
02 Corruption
03 Negligence
04 Dam Crises
05 Ecological Factors

Rate on a scale of 1 (not possible) to 5 (very possible).	SINGLE-SELECT Rating 01 ○ Not possible 02 ○ Least possible 03 ○ Slightly possible

SOLUTIONS TO THE WATER CRISES

SOLUTIONS TO THE WATER CRISES
Roster: WHAT ARE THE POSSIBLE SOLUTIONS
generated by fixed list

Solutions

01 Building a new dam
02 Educate people and tackling climate change
03 Maintaining current infrastructure
04 Enforcing population control
05 Putting urban planning practices into place
06 Ensuring that plans for the town are not distored
07 Fighting Corruption
08 Reducing poor planning

Goverment - rate solution on a scale of 1 to 5.	SINGLE-SELECT Government 01 ○ Not a possible 02 ○ least possible

	03 ○ slightly possible 04 ○ Possible 05 ○ Very possible

Community - rate solution on a scale of 1 to 5.	SINGLE-SELECT Community 01 ○ Not a possible 02 ○ least possible 03 ○ slightly possible 04 ○ Possible 05 ○ Very possible
NGOs - rate solution on a scale of 1 to 5.	SINGLE-SELECT NGOs 01 ○ Not a possible 02 ○ least possible 03 ○ slightly possible 04 ○ Possible 05 ○ Very possible
Goverment and Community - rate solution on a scale of 1 to 5.	SINGLE-SELECT Goverrment_Com 01 ○ Not a possible 02 ○ least possible 03 ○ slightly possible 04 ○ Possible 05 ○ Very possible
Community and NGOs - rate solution on a scale of 1 to 5.	SINGLE-SELECT Comm NGOs 01 ○ Not a possible 02 ○ least possible 03 ○ slightly possible 04 ○ Possible 05 ○ Very possible
Government and NGOs- rate solution on a scale of 1 to 5.	SINGLE-SELECT NGOs Government 01 ○ Not a possible 02 ○ least possible 03 ○ slightly possible 04 ○ Possible 05 ○ Very possible

Goverment, NGOs and Community - rate solution on a scale of 1 to 5.	SINGLE-SELECT Gov Com NGOs 01 ○ Not a possible 02 ○ least possible 03 ○ slightly possible 04 ○ Possible 05 ○ Very possible
Any other comments?	TEXT Additional comments

Appendix 6

Interview Schedule Coding of Research Participants

1. Key participants were grouped as municipal official and political leaders in MAP

Coding Name	Description
Key Participant 1	Maluti-a-Phofung Water - Chief Operations Officer
Key Participant 2	Maluti-a-Phofung Local Municipality - Chief Town Planner
Key Participant 3	Maluti-a-Phofung Local Municipality - Town Planner
Key Participant 4	Opposition party member- Economic Freedom Fighters (EFF)

2. Traditional leaders

Coding Name	Description
Traditional Leader 1	Chief of the Mabolela Village, QwaQwa
Traditional Leader 2	Self-proclaimed chief of the Monontsha Village, QwaQwa
Traditional Leader 3	Chief of the Monontsha Village, QwaQwa

3. Household participants

Coding Name	Description
Household Participant 1	Lived in QwaQwa since the 1972
Household Participant 2	Lived in QwaQwa since the 1986
Household Participant 3	Lived in QwaQwa since the 1990

4. Institutional participants

Coding Name	Description
Institutional Participant 1	Thekolohelong Welfare Centre
Institutional Participant 2	Manapo District Hospital
Institutional Participant 3	University of the Free State, QwaQwa Campus Maintenance Officer and Student Representative Council Member
Institutional Participant 4	Riverside Crèche
Institutional Participant 5	Methodist Church of Southern Africa
Institutional Participant 6	Thabo Mofutsanyana Secure Centre
Institutional Participant 7	Maluti TVET College

5. Private Sector participants

Coding Name	Description
Private Sector Participant 1	Mocwagae Poultry
Private Sector Participant 2	Sasko Bakery
Private Sector Participant 3	Kamohelo Guesthouse
Private Sector Participant 4	Harmony Ed-u-College
Private Sector Participant 5	Bibi Cash and Carry
Private Sector Participant 6	Bonono Bottle Store Carwash
Private Sector Participant 7	Triple M Dry Clean
Private Sector Participant 8	Sugar's Hair Salon
Private Sector Participant 9	Happy Smiles Dental Clinic

6. Informal Encounters

Coding Name	Description
Informal Encounter 1	Maluti-a-Phofung Local Municipal Admin Personnel
Informal Encounter 2	Security guard at the Maluti TVET College
Informal Encounter 3	Community member of Phuthaditjhaba-H
Informal Encounter 4	Community members collecting water in Bolata village
Informal Encounter 5	Private and non-contractual water delivery person for community members
Informal Encounter 6	Employee of the Free State Department of Cooperative Governance and Traditional Affairs
Informal Encounter 7	Bolata community members
Informal Encounter 8	Maluti-a-Phofung Planners
Informal Encounter 9	Parking attendants at the Maluti-a-Phofung Main Offices
Informal Encounter 10	Former employee of Maluti-a-Phofung Municipality