Investigating the challenges of the Chris Hani District Municipality's water sector value chain

by

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- This thesis does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
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Abstract

This study aimed to investigate the water sector value chain as it relates to a specific location, that is, the Chris Hani District Municipality (CHDM). The local municipalities under the CHDM handed over their water services provision function to CHDM, whose role in the water value chain includes water abstraction, pumping, purification, and distribution. The study employed qualitative research techniques for the purpose of delving deeper into the issues and for formulating a water provision model that is informed by a variety of viewpoints from stakeholders who are well-informed about the sector. Qualitative methods included analysis of relevant literature and semi-structured interviews with sampled participants in the value chain. The qualitative nature of the study enabled deeper engagement with each of the 10 sampled participants in this study. They included three CHDM officials and seven consumers from the local municipalities under CHDM. The results show that there is continuation of the non-payment culture by some water consumers due to the high cost of living, poor affordability due to high unemployment rate, and municipal billing challenges. Most of the respondents were of the view that consumers should pay for the water; affording consumers should pay and the indigent should be subsidised by the government. The positive contribution by some consumers towards service delivery is commendable as they claim to pay their municipal bills, report water leakages or pipe bursts, and use water wisely. Some respondents suggested that bulk water supply should be upgraded, dilapidated infrastructure should be replaced, revenue collection should be improved and there should be ring-fenced revenue for the provision of water services.

Keywords: Billing, Infrastructure, Non-payment culture, Unemployment, Water services

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List of acronyms

ANC	African National Congress
CHDM	Chris Hani District Municipality
DWS	Department of Water and Sanitation
Eskom	Electricity Supply Commission
GSB&L	Graduate School of Business and Leadership
GTZ	Gesellschaft für Technische Zusammenarbeit
IDP	Integrated Development Plan
IWRF	International Water Regulators Forum
MMC	Members of the Mayoral Committee
MIG	Municipal Infrastructure Grant
NDP	National Development Plan
PIC	Public Investment Cooperation
RBIG	Regional Bulk Infrastructure Grant
SALGA	South African Local Government Association
SAA	South African Airways
SABC	South African Broadcasting Corporation
SAPO	South African Post Office
SOEs	State-Owned Enterprises
SDGs	Sustainable Development Goals
UKZN	University of KwaZulu-Natal
WSIG	Water Services Infrastructure Grant
WWTW	Wastewater Treatment Works
WSA	Water Service Authority
WSP	Water Service Provider
WSDP	Water Services Development Plan

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CHAPTER ONE: INTRODUCTION

1.1 Introduction and background

Many South African communities are experiencing water supply challenges. A large population is struggling to access water for drinking, household use, and commercial use (mines, factories, and agriculture). The nature of the water supply challenges includes water shortages and poor quality of potable water. This is a serious challenge because it can lead to loss of life, loss of revenue, and poor sanitation. The different forms of water challenges have ripple effects because poor sanitation consequences, for instance, include dangerous water-borne illnesses such as cholera, typhoid fever, and diarrheal diseases. In addition to these illnesses and diseases, one of the effects of water challenges is that some of them are rather insidious and others manifest immediately with varying levels of severity, while others manifest years later. For instance, inappropriate chemical treatment of water can translate to over fluoridation that "can cause brittle bone disease, where … bones can break under mild stress and mottled teeth" (Department of Water and Forestry 2008, p. 1). Discoloration of the teeth is another effect. "Discoloration of the teeth occurs where fluoride is ingested during the tooth formative years in concentrations in excess of the optimum health level. Fluoride has no taste, colour or smell and cannot be detected aesthetically even at toxic concentrations" (Department of Water and Forestry 2008, p. 1).

Given these general South African water challenges, for feasibility purpose, this study sought to investigate them at a specific location, that is, Chris Hani District Municipality (CHDM) and particularly delve into the water sector value chain as it relates to this municipality. This is more so because the CHDM water challenges have led to cholera and other related diseases (Chris Hani District Municipality 2020a).

The CHDM is prone to severe water shortages caused by drought and a combination of systemic and structural issues. The systemic and structural issues include ageing infrastructure, power outages at pumpstations, politics, theft, vandalism, infrastructure capacity in relation to population growth, inadequate revenue collection, skills, financial and environmental non-compliance, poor operations and maintenance, dynamics of the district municipality with its local municipalities (such as dissatisfaction with the water supply services takeover by CHDM from the local municipalities), billing challenges, illegal connections, and sabotage (Ellis 2021, Kubukeli 2020).

The nature of these challenges depicts the wide range of the challenges and responsibilities, hence the investigation of the value chain for water services. The value chain concept outlines the whole range of activities carried out by various stakeholders to advance a product from its conception to its ultimate use and beyond (Gereffi and Fernandez-Stark 2016). Activities in a value chain include research, design, development, manufacturing, marketing, distribution, and customer support. They may be spread out throughout various organisations, firms and entities or contained within a single entity. The different

segments of a value chain require different skills, types of labour and tools of trade. For this reason, this study seeks to dissect the different segments to identify the problematic ones, and ultimately recommend customised solution(s).

The water services value chain includes:

- Department of Water and Sanitation (DWS) – water custodian in the country.
- Water boards – provide bulk water services.
- Water Service Authorities (WSA) – any municipality that ensures guaranteeing water service accessibility and has the ultimate responsibility of making sure that end-users have access to water and sanitation services within its area of jurisdiction (Water Services Act 1997).
- Water Service Providers (WSP) - the primary responsibility of a WSP is to deliver water services in compliance with the Water Services Act, the bylaws of the WSA, and any other special requirements spelled out in a contract with the WSA (Department of Water and Sanitation 2023).
- Water-user associations – these associations carry out water-related activities for the benefit of their members, with association members collaborating and pooling resources to address their water related needs such as water infrastructure for irrigation purpose.
- Municipalities – these are responsible for reticulation.
- Consumers – these are households and industries.
- Wastewater management and treatment entities – these are entities that manage and treat wastewater.

There are several challenges with the respective stakeholders that translate to compromised water provision services. The challenges include resources (lack and/or management of financial, material, and other resources), administration, and governance. Table 1 provides an overview of some of the challenges experienced by these stakeholders.

Table 1: Examples of challenges experienced by stakeholders in the water supply value chain

Entity	Examples of challenges
DWS	Struggles to deliver on its mandate – DWS failed to spend more than R2 billion of its budget in the 2021-2022 financial year (Gerber 2022).
Water boards	Debt collection – municipalities owe water boards across the country an amount of R14.6 billion (Matlala 2022).
WSA	High municipal consumer debt and poor financial management, poor governance and accountability, lack of skilled human resources, lack of planning, (most WSAs do not have a maintenance plan for their water infrastructure), infrastructure (backlog in the infrastructure

	provision, maintenance and rehabilitation. Some municipalities underspend on their allocations and fail to deliver on projects because of poor performance; financial and project management, as well as poor quality of workmanship by contractors) (Toxopeüs 2019).
WSP	Many WSPs have not been able to meet their obligation of consistently supplying clean water to communities.
Water-user associations	While their primary objective is to manage water resources and distribute them fairly to all authorised users, several issues that should have been addressed at inception, such as providing water to farm residents and supporting emerging farmers, were left out (Pegram and Mazibuko 2003).
Municipalities	Most municipalities have serious governance, accountability, capacity, consumer debt, and financial management challenges.
Consumers	The number of households that do not pay for consumed water is high and this affects the performance of municipalities.
Wastewater management and treatment entities	The quality of raw water is highly polluted in many areas and thus requires considerable chemical treatment which is a costly exercise and sometimes the treatment processes do not meet the required standards.

1.2 About Chris Hani District Municipality

CHDM is a Category C municipality that is situated at the centre of the Eastern Cape and its area size is 36 407km^2. As depicted in Figure 1, it comprises six local municipalities namely Inxuba Yethemba, Enoch Mgijima, Intsika Yethu, Emalahleni, Sakhisizwe, and Dr AB Xuma.

Figure 1: Map of Chris Hani District Municipality

Source: The Local Government Handbook: South Africa (2022)

The local municipalities' urban nodes are as follows:

- Inxuba Yethemba Local Municipality: Cradock and Middleburg.
- Enoch Mgijima Local Municipality: Komani, Whittlesea, Tarkastad, and Hofmeyer.
- Emalahleni Local Municipality: Cacadu, Dordrecht and Indwe.
- Intsika Yethu Local Municipality: Cofimvaba and Tsomo.
- Sakhisizwe Local Municipality: Cala and Ekhowa.
- Dr AB Xuma Local Municipality: Engcobo.

CHDM's total population is around 849 000 people, which is 12% of the Eastern Cape population, with 439 000 (51,69%) being females and 410 000 (48,31%) males (Chris Hani District Municipality 2020b). In terms of race, the population comprises 798 000 (93,92%) African, 15 600 (1,84%) White, 33 700 (3,97%) Coloured, and 2 310 (0,27%) Asian (Ibid.). This population predominantly (63,8%) lives in rural areas with only 35,2% living in urban areas, and it is estimated that there are 170 605 households, with an average family size of 4,8. The municipality's main sectors of the economy are Community Services (52%), Trade (15%), Finance (14%), Transport (6%), Manufacturing (4%), Agriculture (4%), and Electricity (2%).

Table 2: Households by type of water access - Chris Hani District Municipality (A)

Local Municipality	Piped water inside dwelling	Piped water in yard	Communal piped water: less than 200m from dwelling (At RDP-level)	Communal piped water: more than 200m from dwelling (Below RDP)	No formal piped water	Total
Inxuba Yethemba	12 358	7 677	293	32	417	20 777
Intsika Yethu	2 699	4 142	16 847	6 721	11 451	41 860
Emalahleni	2 095	9 634	13 496	4 156	3 747	33 128
Engcobo	3 162	2 567	10 578	4 869	17 554	38 730
Sakhisizwe	2 910	6 086	4 488	1 508	1 681	16 674
Enoch Mgijima	25 325	26 537	14 667	3 786	2 838	73 152
Total Chris Hani	**48 549 (21,64%)**	**56 642 (25,25%)**	**60 369 (26,91%)**	**2 1072 (9,39%)**	**37,689 (16,80%)**	**224 321 (100%)**

Source: Chris Hani District Municipality (2023a)

Table 3: Households by type of water access - Chris Hani District Municipality (B)

	Piped water inside dwelling	Piped water in yard	Communal piped water: less than 200m from dwelling (At RDP-level)	Communal piped water: more than 200m from dwelling (Below RDP)	No formal piped water	Total
Enoch Mgijima	26,400	15,900	16,900	4,340	8,400	72,000
Inxuba Yethemba	13,300	4,200	157	247	1,840	19,700
Intsika Yethu	2,880	5,910	13,400	4,570	15,200	41,900
Emalahleni	1,600	6,380	12,800	3,600	8,370	32,700
Engcobo	3,550	4,520	7,960	3,090	19,300	38,500
Sakhisizwe	2,340	3,320	5,090	1,800	4,260	16,800
Total Chris Hani	**50,097**	**40,184**	**56,285**	**17,642**	**57,402**	**221,608**

Source: Enoch Mgijima Local Municipality (2022)

1.3 Problem statement

1.3.1 Precarious water provision services

This study addresses the problem of precarious water provision services that are generally experienced in many South African communities, particularly the CHDM. The precarious water provision services range from intermittent to zero water supply in the respective communities. There is a myriad of reasons for this challenge, which include water scarcity, ageing infrastructure, water leaks, climate change, water treatment and distribution systems, population growth, unplanned human settlements, drought, worsening pollution. Further challenges include the concomitant deterioration of raw water quality caused by sewage getting into waterways due to failing municipal wastewater treatment works as well as chemicals from agricultural and mining operations. Weak water conservation mechanisms, collapse of freshwater ecosystems, which includes aquatic life because of the high concentration of contaminants flowing into water bodies, and the destruction of river catchments pose additional challenges.

The implications for the precarious water provision services include dehydration and loss of life in humans, animals, and plants; school closures; sanitation crisis (such as poor hygiene, blockage of toilets, diseases such as cholera); job losses, particularly in the agriculture sector; and the imminent day zero (the day when the levels of dams are critically low). Below are several media reports demonstrating the direness of the situation as many lives have been lost due to the battle for accessing water:

- ‘Phoenix woman killed in fight over water queue’ (Khanyile 2024);
- ‘Boy killed in 'fight over water' (Magubane 2015); and
- ‘South Africa: Four killed at protest over water shortages’ (Maseko 2014).

Furthermore, some places in CHDM are marred with sewerage that is spilling all over, water supply interruptions, severe water shortages, and health risks (Chris Hani District Municipality 2024, Kubukeli 2024, Kubukeli 2019). The Public Protector’s report on CHDM’s provision of municipal services reveals that some households’ taps have been dry for a long time, and some residents have to travel a long distance to collect water from a stream; water infrastructure is old and poorly maintained. In addition, to deliver water to communities, water truck drivers exploit the desperate situation and demand bribes; and the residents are prejudiced due to poor delivery of water services that is incompatible with the municipality’s legal obligations as per the Constitution (Menzelwa 2023).

1.3.2 Tricky balance of water provision services: Water the Constitutional right and water the commodity

The South African Constitution guarantees everyone the right to adequate food and water, but many communities face challenges in enjoying this right due to various factors. Protests over consistent water supply are one of the indicators of the challenges the country has in this regard. The country’s

water scarcity challenge is aggravated by high water consumption in relation to the global average, high water wastage due to infrastructure challenges, as well as challenges with water treatment and distribution systems, including non-payment for water services, mismanagement, corruption, and compromised operation and maintenance.

As access to water must be recognised, supported, and fulfilled by the State, the Constitutional mandate of water access by all citizens is pursued through the Indigent Policy for the households that do not have enough money to buy water services. However, the non-payment of water consumption even by those who can afford to pay, compromises the delivery of water services. The non-payment is due to several factors such as poverty, and inefficient municipal systems including billing and debt collection challenges.

A report by the South African Human Rights Commission (2000) argues that the current split between government spheres in South Africa's water provision presents challenges in coordinating services. As municipalities are responsible for retail water supply, better coordination between national, provincial, and local governments, including parastatal organisations, is needed to ensure access to sufficient water. Currently, not every citizen has access to clean and adequate water, especially those without jobs and living in poverty. Factors such as inability to pay for water, uncompleted projects, infrastructure problems, and unsolved issues between local authorities contribute to this problem. Indicators should be used to monitor progress and identify gaps for government to progressively realise the right to water.

1.4 Aim of the study

The aim of this study is to identify the challenges in the water sector that are responsible for the precarious water provision services that are experienced in some parts of CHDM to establish an alternative water provision model that will contribute towards the elimination of the CHDM water-related service delivery protests that have angered many communities. A thorough diagnosis of these challenges was undertaken to have a deeper understanding of their cause, nature, and extent, to formulate a water provision model that would be devoid of the challenges that have been identified, taking into consideration the business aspect of water services and the Constitutional imperatives.

1.5 Research questions

The research questions in this study seek to diagnose the problem from multiple perspectives to ensure that the envisaged new model covers all related aspects of water provision in CHDM. The questions seek to establish the weak links in the value chain and explore ways of either fixing or replacing them. They, *inter alia*, include the following:

- What is the role and function played by respective stakeholders?

- What are the main hindrances to CHDM's efficient and effective water supply?
- What can the different parts of the water value chain do differently to ensure reliable water supply?

1.6 Research objectives

The study objectives are to:

- examine the role(s) and function(s) played by the respective stakeholders (institutions / entities / departments / units) in the water value chain.
- understand and address the obstacles to the implementation of the CHDM water service delivery goals.
- explore alternative ways of having the roles of the respective stakeholders fulfilled in a more reliable manner.

1.7 Limitations and delineation of the study

Limitations of this study refer to the shortcomings due to issues that were out of the researcher's control, thus affected the seamless attainment of research goals and objectives. Like many research studies, this study relied on the participation and cooperation of the sampled individuals whose participation was voluntary. Due to several factors such as time constraints, research fatigue, and bureaucracy, the study experienced some delays and reluctance to participate by some identified potential participants. This was mitigated by the large pool of potential participants because in cases where some could not participate, for whatever reason, another potential participant was approached, hence the number of targeted participants was reached.

Moreover, the provision of water services is a technical competence that comprises abstraction, pumping, purification, and distribution. These processes are not clearly understood by many consumers; they fall within the ambit of engineering and most consumers' interest and knowledge is about the quality and quantity of water that runs/does not run from their taps. Many respondents in this study were the consumers of water, however, their understanding of the value chain was limited, thus heavy reliance in this regard was placed on the municipal officials.

The water value chain includes several stakeholders such as DWS, Water boards, WSAs, WSPs, water-user associations, municipalities, consumers, and wastewater management and treatment entities. For feasibility purpose, this study could not investigate all the stakeholders even though many of them, in one way or the other, have a bearing on CHDM water services. The focus of this study was limited to CHDM.

Considering the population size at CHDM, around 849 000 people in about 170 605 households, it would have been prudent to have a bigger population size. This, however, was mitigated by the fact that water provision is a community issue and not an individual issue. Therefore, the respondents from the different local municipalities could reliably give an account of their communities' experiences and observations. Moreover, the fact that the study used qualitative research techniques enabled for deeper delving into the CHDM water challenges as the researcher used semi-structured interviews to guide the conversations with the participants.

While the water challenge is a national phenomenon, the generalisability of research findings from a study undertaken from a constructivist research paradigm is limited because this paradigm takes into consideration the view that knowledge is produced from a specific context. While there may be commonalities, the experiences from the CHDM do not necessarily reflect the experiences of other people in different municipalities. While the inability to generalise the findings is a limitation, it is not a deficiency because it was not the intention of the study given that the knowledge gained from CHDM is a construct of the people from that municipality, thus generalisability would not have been appropriate.

1.8 Organisation of chapters

Chapter One: Introduction

Chapter One gives an overview of the study that includes more information about CHDM, problem statement, main goal of the study, research questions, research objectives, research methodology and limitations and delineation of the study. The discussion in this chapter provides motivation for this study and the backdrop against which the study is framed.

Chapter Two: Literature review

According to Snyder (2019), the review of literature is an organised approach for compiling and summarising the findings of previous research. This is undertaken in Chapter Two of this study. This chapter outlines the water sector value chain and identifies the weak links in the chain according to scholars who have researched the area. The chapter provides a detailed review of the literature from research articles, research reports, governance reports, and media reports to aid and facilitate the investigation and provide an apt background to this study.

Chapter Three: Methodology

This chapter explains the research process. It unpacks the research design and methodology and gives details on sampling, data collection, data analysis, limitations of the study and ethical considerations. It justifies the choice of the research methodology by outlining its strengths and weaknesses and how the weaknesses are mitigated in this study. It unpacks the appropriateness of the

research methodology in light of the water sector value chain, and also outlines the procedures for data collection, cleaning, and analysis.

Chapter Four: Research findings

This chapter presents the qualitative analysis and synthesis of the data using thematic and content analysis techniques. It reports the research findings from the semi-structured interviews undertaken with CHDM officials and water consumers, thereby shedding light on their understandings, experiences, and observations of water services at this municipality.

Chapter Five: Discussion

This chapter provides interpretations of the findings. It gives an overall discussion of the dissertation by revisiting the research problem and research questions for the purpose of establishing their alignment to the findings, that is, responding to the question: 'has the research question been addressed?' It thus presents the conclusions reached through the interpretation of the data. This chapter summarises the key findings and the results. As the study is limited due to several issues such as resources (time and labour), this chapter also indicates areas for further research which this study could not address. On the basis of the findings, recommendations are made in this chapter.

Chapter Six: Conclusion

Given the research findings and interpretation of the data, the conclusion chapter then addresses the 'so what?' question. It does this by taking into consideration all the work that has been undertaken, including the research problem, research questions, results, and findings. Given the achievements of the study, this chapter demonstrates the value of this study's contribution to the body of literature and the potential resolution of the water supply challenges at CHDM.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

By reviewing literature by scholars who have researched the area and practitioners with expertise in the area of water provision, this chapter outlines the water sector value chain and identifies the weak links in the chain. It unpacks the water provision model by identifying the gaps in the current model and making a case for a new effective and efficient model. As will be unpacked in Section 2.3, the theoretical base of this study is the interplay between water as a Constitutional right and water as a business and the meaning and dynamics of this relationship are defined through the lenses of constructivism theory that is unpacked in Section 2.2.

2.2 Theoretical framework

This study is positioned within the constructivist paradigm, which moves from the premise that knowledge creation happens through experience, engagement, and interaction with the environment (Brau 2020, Mascolo and Fischer 2005). The paradigm is aptly referred to as constructivism because it is based on active participation of the participants in the construction of new knowledge through the application of their existing ideas, knowledge and experiences and integration of the old and new knowledge that emerges from this process (Helen, Carr and Steinruck 2015). Constructivist research examines people's interpretation of their experiences and viewpoints, which are then used to develop a deeper understanding of the issue being investigated, and to inform policy making. Through a constructivist design, that is, application of constructivist principles, the participants actively process and interpret their experiences and their world.

Forough and Dariush (2022) contend that the ontological basis for constructivism is relativism; reality is a mental construct that can vary and / or be contradictory among people as our senses enable us to believe in various structural-social realities since the world is meaningless without consciousness. The epistemological basis, they argue, is subjectivism because the world only exists within the boundaries of how we understand it. In lieu of being discovered, meaning is constructed through awareness' interaction with the world. Hence, the constructivist methodology seeks to understand a phenomenon from the perspective of the participants by examining their interaction with the context in which they live. The constructivists' goal is to understand the interpretations people give to the phenomena with which they interact. The various dimensions of constructivism include personal, psychological, social, contextual, and radical constructivism (Mogashoa 2014).

Within the constructivist paradigm, there are various research methodologies one can choose to address particular research questions. The methodologies within the constructivist research paradigm are important for determining the meanings of experiences and these may then be used to inform and improve practice (Burns, et al. 2022). Starks and Brown (2007) suggest that a good choice of research

methodology should be aligned with the researcher's philosophical assumptions, study purpose, research area's current state of knowledge, and research exercise's desired outcome.

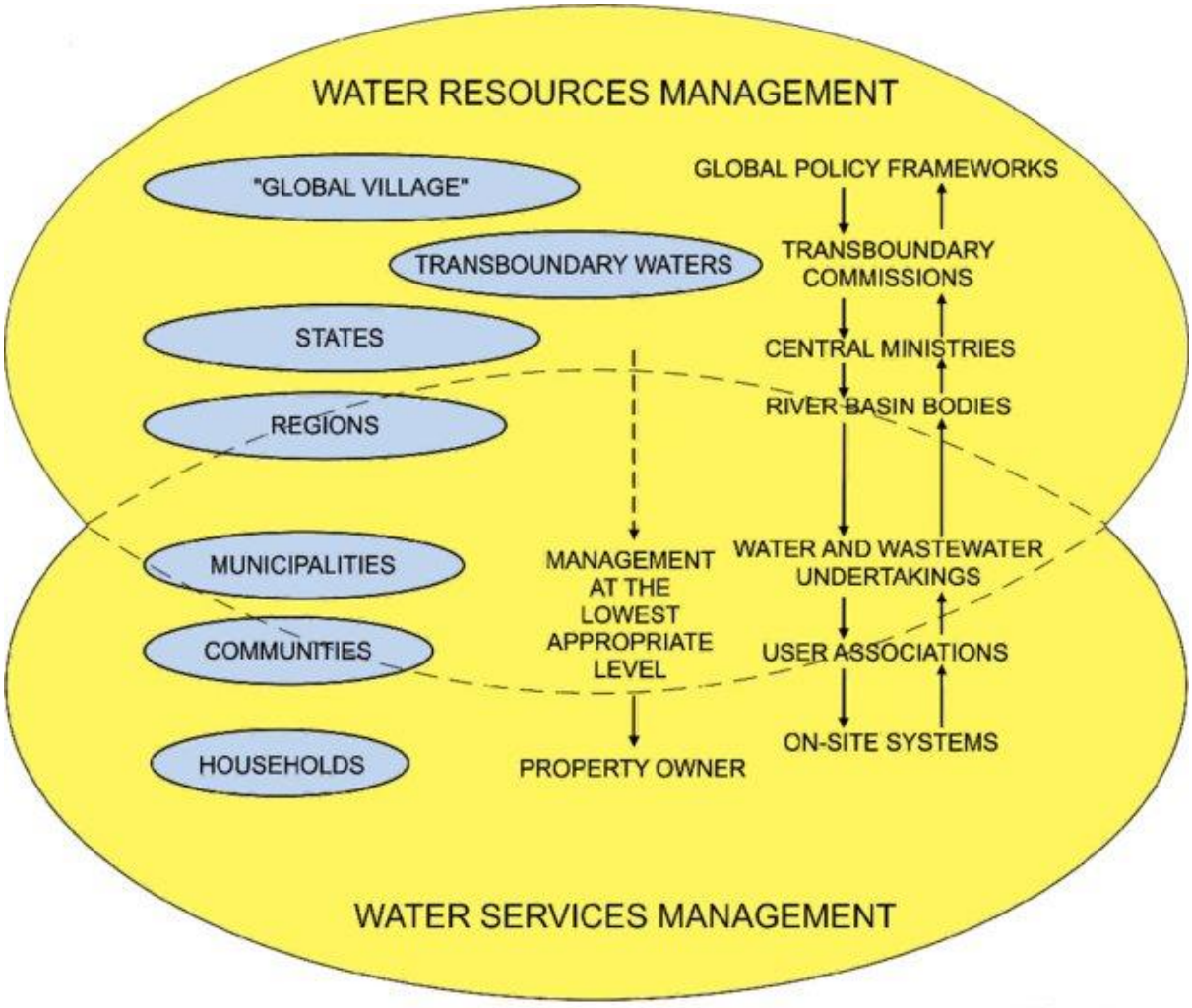
Thompson (2017) observes that constructivist researchers predominantly employ qualitative data collection mechanisms such as focus groups, interviews, and observations, thus giving the research participants space to show or describe their experiences. Thus, the research findings include direct citations of what the participants said or description of their actions. The data analysis mechanisms include identification and categorisation of themes from the data. The constructivist approach to data analysis is inductive and the participants' interpretations are helpful for the generation of new understandings of the phenomena and creation of new theories based on the participants' perspectives.

Forough and Dariush (2022) as well as Malekian et al. (2017), note that the conceptualisation of many studies on water challenges relies on positivist-based paradigms; as such, they use quantifiable parameters with the goal of developing policies to improve water quantity and quality. This worldview overlooks the human dimensions that include institutional and social aspects (Bakker and Morinville 2013).

2.3 Overview of the water sector: Roles of the various actors in the precarious water provision services

According to Wendy Ovens and Associates (2013), the two main sub-sectors of the water sector are management of water resources, which is managed by the National Water Act (1998), and supply of water services, which is governed by the Water Services Act (1997). Stakeholders from the national, regional, and local levels are represented in these sub-sectors, while international/global stakeholders are represented in various international forums such as the International Water Regulators Forum (IWRF) and regulated by, *inter alia*, the International Water Law. Figure 2 depicts the interconnectedness of water systems, hence the need for integrated water resources management (IWRM) from the larger geographical scale to water services at the lowest levels.

Figure 2: Management of water resources versus water services: tiers of systems and significant linked bodies



Source: Katkoa et al. (2015)

Figure 2 depicts the complexity of managing water resources and water services, which includes a wide range of stakeholders. The unintended consequences of a multi-stakeholder responsibility such as water provision includes lines of demarcation that are sometimes blurred. This is aptly depicted in the National Development Plan (2013, pp. 50-51) which argues that:

> "weak, poorly performing systems make it hard to attribute responsibility, with the frequent result that no one is accountable. The plan cites the example of what happens when the water in a town is found to be undrinkable. The media blame the Minister of Water Affairs. The community blames the mayor. The mayor blames the head of the water utility. The head of the water utility blames the technical engineer. The engineer says that the maintenance budget has been cut for the past three years and now the water is undrinkable. The head of finance in the municipality says that the budget was cut because personnel costs have crowded out maintenance expenditure. The mayor argues that the salary structure is negotiated at a national

level by the South African Local Government Association. The association says that municipalities can opt out of these agreements if they are unaffordable. And so on."

The National Development Plan (2013) notes that while the Constitutional framework permits greater differentiation in the allocation of functions and powers, the system, however, requires improvement to clarify responsibilities in the areas of water, sanitation, housing, electricity, and public transport. It further argues that:

> "for infrastructure that supports human settlements (housing, water, sanitation, roads, parks and so on) the picture is unnecessarily complicated. The planning function is located at local level, the housing function is at provincial level, and the responsibility for water and electricity provision is split between those responsible for bulk services and reticulation. In practice, these arrangements do not work. In general, human settlements are badly planned, with little coordination between those installing water reticulation infrastructure and those responsible for providing bulk infrastructure." (National Planning Commission 2013, p. 35)

The water value chain, with so many stakeholders responsible for different parts of the system, is frustrating to consumers who suffer when certain parts of the chain fall short. This is part of the dynamics of the CHDM with its local municipalities as it was echoed during one of the service delivery protests wherein the spokesperson of the Emalahleni Local Municipality tried to explain to the protesters that they were erroneously blaming the local municipality, yet the water provision service is the responsibility of the district municipality (Damba-Hendrik 2023).

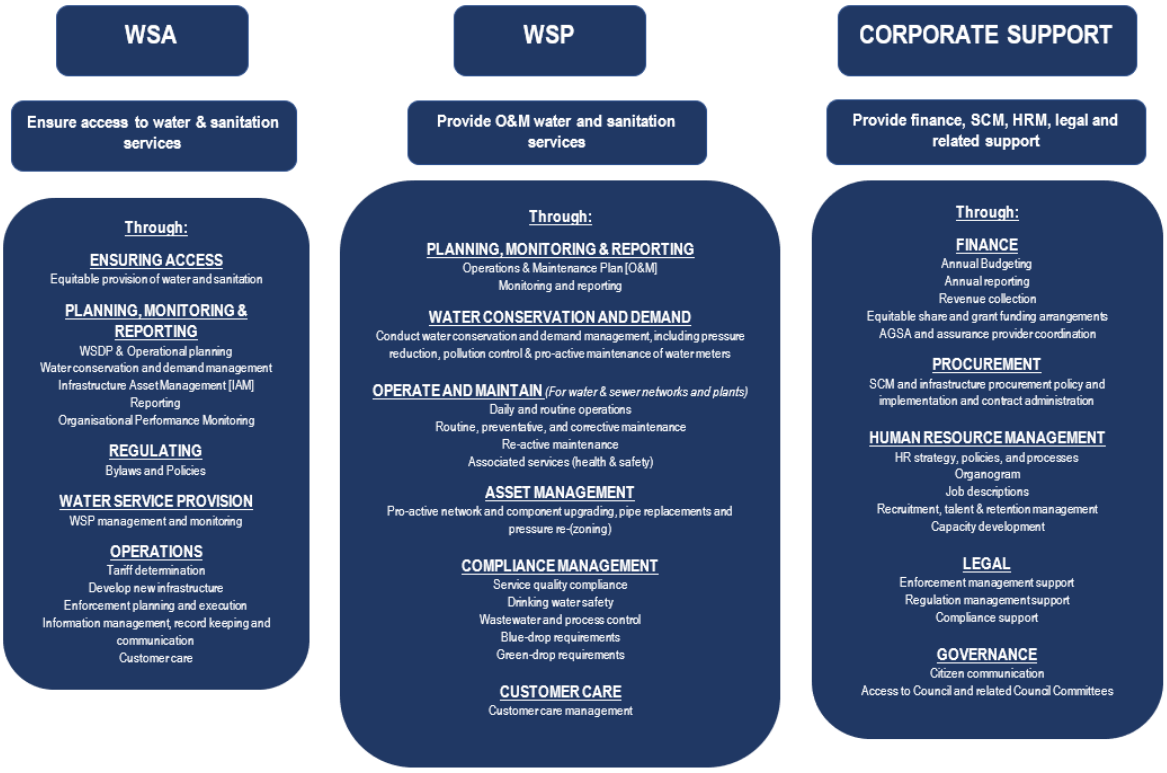
Moreover, the various components of the value chain experience various challenges as the water custodian in the country, the DWS, is experiencing several governance challenges that compromise its ability deliver on its mandate. These include unspent budgets and procurement delays. Persistent procurement delays that are experienced by the department have a significant bearing on service delivery (Githahu 2022).

With respect to water boards, as South African State-Owned Enterprises (SOEs) are characterised by leadership deficiencies and governance weaknesses, some of the water sector SOEs are also included. Some of the SOEs are deemed to be "symptomatic of pathological corporate governance deficiencies" (Office of the Public Protector 2014, 144). This is depicted in several reports on SOEs including investigative reports on South African Airways (SAAs), South African Broadcasting Corporation (SABC), Electricity Supply Commission (Eskom), Public Investment Cooperation (PIC) and the South African Post Office. Despite the well-established conceptual and legislative frameworks, SOEs continue to experience challenges such as high turnover of chief accounting officers and other executive management members, shareholder interference in operational affairs, and perennial under-performance that causes them to be perpetual recipients of bailouts from the government.

Municipalities use an integrated development plan (IDP) to ensure overall paying of attention to all service delivery components that are social, economic, institutional, financial, technical, and environmental, yet the communities continue to experience water-related challenges. Within an IDP, there should be a water sector plan called water services development plan (WSDP). Water and sanitation issues are part of the WSDP and integration and coordination at all levels is encouraged – project level, WSDP level and IDP level. The WSDP outlines the division of labour for the stakeholders involved including WSAs and WSPs.

According to DWS (2023), a WSA may carry out the duties of a WSP and collaborate with another water services entity to supply water services. To provide effective, efficient, cheap, and reliable access to water services, a WSA must create a WSDP that is in line with the water management area's catchment management strategy. The strategy ties the delivery of water services and management of water resources together. Figure 3 depicts the core functions and interplay between WSA, WSP and Corporate Support.

Figure 3: WSA, WSP and Corporate Support core functions



Source: Department of Water and Sanitation (2023)

While the functions of WSPs are determined by the contract signed with the WSA, generally they include:

- Operating the system for providing water services,

- Handling relations with customers,
- Collecting water services' revenue payments,
- Preparing plans for business and operations and manage technical and human resources,
- Installing and maintaining water services provision and infrastructure for clients to continue being pleased with the service,
- Preparing budgets and managing funds,
- Doing substantial repairs and maintenance, and
- Gathering information about water and sanitation (Department of Water Affairs and Forestry 2001).

The challenge, however, is that some of the contracts by the various role players in the water sector are characterised by corruption, particularly in areas where private companies are involved. Discussing corruption in South Africa's water sector, Muller (2020) observed that for council members and their associates to secure contracts to truck water, some communities' taps are sometimes dried up. Construction of dams to provide water to various communities is sometimes delayed, partly because some of the stakeholders seek to change procurement rules to help themselves or their cronies. Companies pay bribes to get business. Some businesses encourage pointless initiatives and demand payment for poorly or never completed work, frequently in collusion with the people in charge of monitoring their operations. Some people monopolise certain types of work to outrageously overcharge for their services. Through unauthorised, unmetered water connections, frequently made by the same plumbers who maintain the supply systems utilising supplies from their companies, water consumers also contribute to this challenge.

Regarding the municipalities' operation, management, and administration, this falls within the ambit of public administration (officials) and politics (councillors). The responsibilities and interests of these stakeholders (officials and councillors) sometimes conflict in the process of execution of operations, and there are also inherent risks. The weight of violent protests against service delivery falls on council members since they are seen by their communities as the ones in charge of providing services. Occasionally, enraged locals set fire to their cars and residences. Council members experience the pressure from the communities, hence "the SA Local Government Association has called on the national government to urgently implement the risk insurance scheme for councillors" (Mabuza 2012, p. 1). SALGA and GTZ South Africa (2006, p. vi) note that "the difficult challenges that councillors ... face during their five-year term" include "high level of expectations of the community they serve, competing interests among the different groups of citizens living in the municipality, limited human and financial resources and tight timeframes for delivery of services." As a result, they provide the Directors and other municipal officials instructions to enhance their work output and service provision in line with community priorities and for their own personal safety from community retaliation. These

might not always align with the goals and objectives of the municipality. The council members are frustrated by community expectations because, as Mudzuli (2013, p. 1) so eloquently states, “they don’t have the resources or the power to make things happen. All they do is serve as middlemen between communities and local authorities.”

According to the National Planning Commission (National Planning Commission 2013, p. 55), communities' misdirected rage directed towards council members during service delivery protests stems from "weaknesses in the accountability chain, with a general culture of blame-shifting," which translates to the public's confusion over who bears responsibility for the inadequate provision of services.

The contestation at municipalities depicts the idea of the two centres of power that is a structural impediment which has dire consequences for municipal operations and service delivery. According to Ngamlana (2013, p. 1), “the role of politics and administration is blurry in South Africa, particularly at the local government level.” Writing at the time when Jacob Zuma was the State President and Gwede Mantashe, the ANC’s Secretary General, Sefara (2009, p. 1) asserted that the national government is likewise marked by hazy boundaries, posing the question, "Zuma or Gwede, who is in charge?" Sefara's (2009) inquiry was prompted by multiple instances in which the ANC was thought to be usurping official duties. Among them was the gathering at the ANC headquarters “to sort out the Occupation Specific Dispensation, a programme on how to increase the pay of civil servants” and summoning of “Public Enterprises Minister Barbara Hogan and her deputy, Enoch Godongwana, ... to explain Hogan’s controversial statement that unprofitable state companies should be sold off” (Sefara 2009, p. 1). Similar to the dispute between intervention and interference at the local level, the ANC viewed these occurrences as fulfilling its supervision duty to guarantee "that its policies were implemented" rather than as interference (Sefara 2009, p. 1).

According to Twalo (2014), municipal employees seem to be caught between deferring to their employer's authority or the authority of the governing political party. For example, the study demonstrates that in theory, directors and council members who are on the Mayoral Committee (MMC) collaborate closely. Councillors are expected to communicate, but not to give orders to the Directors, and the directors are then expected to provide directions to municipal officials. However, the fact that MMC council members are given directorates to manage, causes conflict. They may not be subject matter experts in the directorates they oversee, but their considerable power allows them to shape the goals and workings of the organisations, sometimes at the expense of the subject matter experts among their staff. Consequently, they exercise their power and insist that tasks be carried out the way they perceive as appropriate to ensure the success of their separate directorates. To this end, officials are forced to choose between following the politicians' lead or using their expertise and experience, which is how the idea of the two centres of authority came up. Officials note that some of the council members' views are populist, which makes sense given that they must win over enough votes to be re-elected. On

the other hand, professional theories and standards inform the officials' understanding and direct them in following best practices.

The mayor is the one to whom the MMCs are accountable as overseers for their directorates. While they work together with MMCs, officials, especially directors, are answerable to the municipal manager, not the other way around. Tensions arise when the interests of politicians (MMCs) and administrators (officials) do not align, and this is when the two centres of power are more noticeable.

Aside from the conflict between the two centres of authority and the various meanings attached to intervention and interference, employees are also uneasy about their political status in the workplace. A few prominent members of political parties are junior employees. Since council members get directives from their political parties, the majority political party in a municipality holds authority and the council is essentially the employer in that body. This sometimes translates to the phenomenon of workers with strong dual identities, which underscores the occasionally hazy distinctions between administration and politics. For example, a general employee of a municipality who is also a prominent member of a political party's regional committee gives instructions to the municipality through the council members regarding the proper operation of the municipality in his or her capacity as a member of the political party regional committee. However, as a general worker, he or she would be a subordinate and would be required to follow the directives of officials who are lower in the political hierarchy. This results in conflict at work since the subordinate might not be amenable to directives that go against the platform of his or her political party.

Steytler, de Visser, and Annette's (2009) research revealed a significant distortion of the lines of accountability: the appointment of political party office bearers to managerial roles. Ayele, Ntliziywana, and de Visser's research (2011, p. 2) presents an ideal example of a clerk in a municipal administration who felt empowered to provide directives to municipal councillors due to his political party position. They also saw that in cases where top party leaders held administrative posts, city administrators were powerless to impose disciplinary actions. In these situations, however, the municipal manager "takes instructions from his subordinate, resulting in maladministration" (Visser 2011, p. 2). They inquire, "Who's managing whom?" as a result (Visser 2011, p. 2). In agreement, Ngamlana (2013) claims that it is typical for a municipal manager to fail to discipline any directors or senior managers due to their senior roles within the party. The speaker has occasionally chastised the chief financial officer for cutting off services to specific political activists who have not paid their municipal charges. This undoubtedly impedes the chief financial officer's capacity to carry out their duties without needless intervention and violates the municipality's policies regarding revenue collection services.

The water sector value chain also comprises wastewater management and treatment entities. According to the Water Research Commission, the “malfunctioning wastewater treatment works (WWTW) is a major cause of the deteriorating water quality in the country”

(Mitchell, et al. 2014, p. iii). It is reported that South Africa is experiencing a "dismal state of wastewater management" with the Green Drop 2022 report reflecting "a serious deterioration in the management of wastewater treatment plants" since only "23 wastewater systems out of 995 assessed have qualified for the prestigious Green Drop certification" (Bega 2022, p. 1). The Green Drop programme was introduced by the Department of Water Affairs for the purpose of reversing the state of deteriorating water quality in South Africa by improving the performance of WWTWs through an incentive-linked scoring system.

The last part of the water sector value chain are the consumers of water. The Department of Water and Forestry (2008) acknowledges that in addition to rights, people also have responsibilities which include:

- Identifying and negotiating their water services needs with the WSA.
- Participating in the process of planning and making decisions on their water requirements.
- Paying agreed-upon charges for rendered water services.
- Monitoring water services by the WSP.
- Supporting the WSP by alerting them to leaks and unauthorised connections.

Due to several reasons, some consumers of water and electricity services do not pay for their consumption; as a result, the service providers (municipalities) fail to meet their obligations to their creditors thereby undermining the continued delivery of the respective services. There is a view that "the non-payment culture for municipal services has its origin from the anti-apartheid struggle" as this form of defiance was one of the means used to resist the apartheid system (Enwereji and Uwizeyimana 2020, p. 333). The other causes of this non-payment practice include poverty, unemployment, "culture of entitlement, dissatisfaction with service provision, corruption of municipal workers, rise in the cost of municipal services, communication gap issues, and problems associated with the municipal decision-making process" (Enwereji and Uwizeyimana 2020, p. 333).

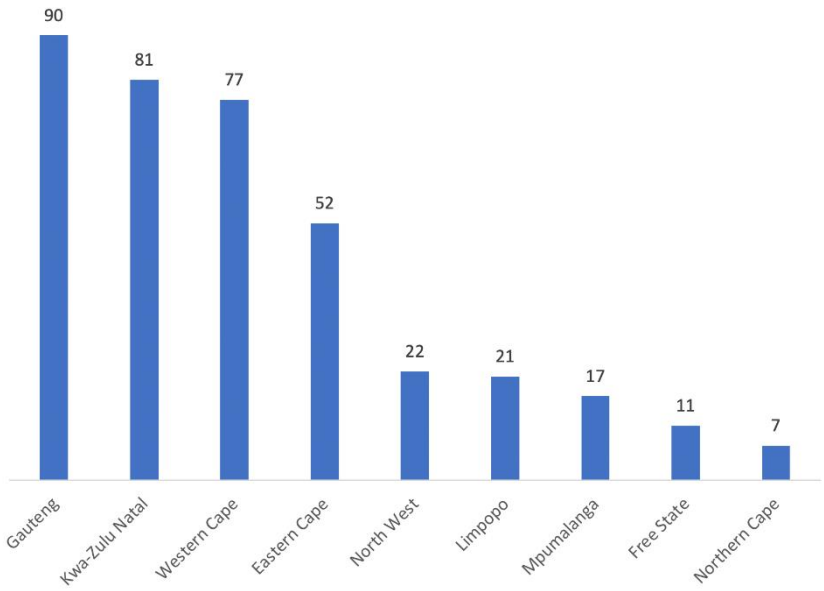
2.4 Water as a Constitutional right vs water as a business

The South African Constitution (1996, p. 11) notes that, "everyone has the right to have access to sufficient food and water." While water provision is a Constitutional right in South Africa, there are several factors that compromise its successful delivery to many communities around the country, hence the recurrent service delivery protests. Countrywide protests over consistent water supply are a regular occurrence as reflected in the reports from the media, municipalities, water entities and government departments (Chiguvare 2022, Tapela, Ntwana and Sibanda 2015). Water and sanitation service delivery protests translated to more than 585 public demonstrations between January 2013 and April 2021 (Gould 2021). Service delivery protests also continue to bedevil the CHDM as residents complain

about water shortages, malfunctioning sewerage systems and rubbish collection (Damba-Hendrik 2023).

The situation may worsen as water forecasting shows that "South Africa is expected to face a water deficit of 17% by 2030" (WWF-SA 2017, p. 4). Given the current water-related violent protests as depicted in Figure 4, it is disheartening to imagine the extent of protests and their concomitant destruction by 2030 when the country has the 17% deficit. There also seems to be correlation between population size and water-related protests since the provinces with the highest population size had the highest occurrences of water-related protests, namely the KwaZulu-Natal, Gauteng, Western Cape and Eastern Cape provinces. The Northern Cape and Free State provinces have the lowest population sizes and so were their water-related protests respectively.

Figure 4: Water-related violent protests: Jan 2013 – April 2021



Source: Gould (2021)

With the world's rising population, it is predicted that demand for water will continue to rise, and 3,5 billion people will be living in countries with limited or no access to water by 2025, which would be an increase from 500 million in 2002 (McNiven 2005). It is reported that of the 8 billion world population, about 2,2 billion do not have access to clean drinking water (Centers for Disease Control and Prevention 2021). Ironically, while South Africa is a water-scarce country, South Africans use more water than the global average, as the "235 litres per person daily, per capita water consumption in the country is above the global average of 173 litres" (Institute for Security Studies 2018, p. 1).

Despite the 2030 water forecast, South Africa has committed itself to achieve the Sustainable Development Goals (SDGs) by 2030. With respect to water and sanitation, the SDG targets are to:

- attain fair and universal access to reasonably priced, clean drinking water for all,

- attain, for all, universal access to fair and sufficient sanitation and hygiene, and
- minimise the discharge of dangerous chemicals and materials, end dumping, and reduce pollution to improve the quality of the water (United Nations 2022).

Despite these noble goals, there are challenges with the water treatment and distribution systems. These include non-payment for water services, mismanagement, corruption (Marcatelli and Büscher 2019), and compromised operation and maintenance of water systems. As it is a Constitutional right, the responsibility of government includes the provision of water services, at all spheres that is, national, provincial, and local, with the DWS being the caretaker of the water resources in South Africa. The DWS' mandate is to promote effective and efficient water resources management for the purpose of ensuring sustainable socio-economic development.

To ensure access to water by all South Africans, the country adopted the Indigent Policy which stipulates access to free basic services (water, electricity, and solid waste collection) by eligible citizens. The objective of the Indigent Policy is to include those who may be excluded from access to basic services on account of poverty, thereby provides a social safety net (Department of Provincial and Local Government 2012). According to regulations made under the Water Services Act, 1997, a minimum of 25 litres of drinkable water per person per day or 6 kilolitres per family per month is needed for basic water delivery services:

(i) within 200 meters of a household,
(ii) at a minimum flow rate of ten litres per minute or higher, and
(iii) sufficient to guarantee that no consumer has a supply shortage for longer than seven consecutive days in any given year (Department of Water Affairs and Forestry 2001).

However, these regulations for water supply services are not adhered to in some parts of the CHDM. In some cases, the "people have to wake up as early as 3am to collect water … [as] the taps only run for about an hour each day", and some of the reservoirs are kept dry for several months (Sizani 2023, p. 1). The fact that 21 072 that is, 9,39% (Table 2) or 17 642, which is 7,96% (Table 3) of CHDM households have shared piped water more than 200 meters away from the residence plus 37 689, which is 16,80% households (Table 2) or 57 402 that is, 25,90% (Table 3) with no formal piped water, is indicative that the CHDM is falling short of the minimum requirement for water supply services as per the Water Services Act, 1997.

The free basic services are appreciated by many people at CHDM as the "percentage of people living in poverty has increased from 73.05% in 2010 to 74.92% in 2020" (Chris Hani District Municipality 2023b, p. 103). The term 'basic water supply' refers to the minimal amount of water supply services that must be provided in order for residences to consistently receive an acceptable quantity and quality of water to support life and personal hygiene (Republic of South Africa 1997). Water that is used over and above the free allocation must be paid for by the consumers. The payment

of water consumption is, however, a serious challenge due to the non-payment culture by many South Africans, inability of municipalities to collect debt from water consumers which translates to the inability of municipalities to pay bulk WSPs, and consequently the inability of bulk WSPs to carry on with their obligations that include collection, treatment, and distribution of water to municipalities.

2.5 Conclusion

This chapter has given critical, comprehensive, and contextualised review of relevant literature. It first provided the theoretical framework of the investigation undertaken for the purpose of enhancing the understanding of the challenges of the CHDM's water sector value chain. It also gave an overview of the water sector, zooming particularly into the roles of the various actors in the precarious water provision services and unpacked the roles of the different players such as the DWS, WSA, WSP, municipalities, consumers, and wastewater management and treatment entities. It used the constructivism theory to make sense of the interplay between water as a Constitutional right and water as a business.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter explains the research methodology for this study. The chapter justifies the selected research methodology's by outlining the advantages and disadvantages as well as how the study's shortcomings are mitigated. It describes in detail the appropriateness of the methodology given the water sector value chain and it also unpacks the procedures for sampling, gathering, cleaning, and analysing the data.

3.2 Research design and methodology

Research design and methodology are used interchangeably by some scholars because of their blurred lines of demarcation (Jacobs and Cornelius 2022, Chauhan 2012, Onwuegbuzie and Nancy 2005). Conversely, other scholars posit that research design is general, and methodology is specific. According to de Vos et al. (2005), a research design describes the researcher's strategy for data collection and analysis. It also specifies how, when, and from whom the data will be collected. Hussey and Hussey (1997) are of the view that the entire approach employed in the research process, from the theoretical underpinnings to the data collection and analysis, is known as the research design.

A research design is a comprehensive operational plan or strategy that includes processes, data collection and data analysis (Leedy and Ormrod 2001). They contend that approach is particular and thorough, choosing the right tools in the process (Leedy and Ormrod 2001). For instance, it might not be the greatest approach to investigate chromosomes using a questionnaire and attitudes using a chemical analysis. Additionally, Easterby-Smith, Thorpe, and Lowe (2004) draw attention to the unique characteristics of research methodology, arguing that although methods are discrete approaches to data collection or analysis, research methodology refers to a combination of techniques employed to investigate a particular scenario.

In their explanation of the research challenge, research design, and research technique, Leedy and Ormrod (2001) use the example of a young man making his first flight by plane from a remote town to the city. His non-aviation-experienced friends question him differently upon his return, depending on what it is that they want to know. As expected, they receive various responses. The questions cover topics such as the speed of the plane, the distance flown, how far it was from the ground, how it felt to be in the air and above the clouds, and the view from above. As a result, the friends will report various versions when they recount the flying incident. Their knowledge of flying is constrained to the questions they have asked and the responses they have received, so while they might not be factually inaccurate, they are most likely not going to provide the complete picture. This is research; each phenomenon may

have numerous dimensions and levels, and different concerns and challenges call for various designs and approaches.

As a result, many researchers have come to the realisation that there is not only one absolute truth waiting to be uncovered (Leedy and Ormrod 2001). Instead, there are numerous viewpoints held by various people, and each of these viewpoints is equally true or valid. Because of this, the scope of this study is restricted to investigating a water provision model for CHDM that would not present the difficulties described in the preceding sections. Given the weaknesses with the current water provision system, the data-gathering exercise of this study sought to elicit some insights regarding the participants' perspectives on these, as well as other sustainable water provision models that they can propose. The research design and data analysis took this into consideration by not aiming to reach consensus on the observations, experiences, and proposed solutions, but rather to gain a deeper understanding of the challenges and their proposed solutions. This is because different people may observe things differently due to their knowledge, interests, experiences, and expectations.

As the objective of the Water Services Act and the National Water Resource Strategy's vision for "equitable and sustainable access to water and sanitation services in support of socio-economic growth and development" (Department of Water and Sanitation 2022) have not yet been fully realised, the interviews with the research participants in the value chain shed some light regarding their perspectives on this objective and vision, as well as other sustainable water provision models that they proposed.

For the purpose of diagnosing the weak links in CHDM's water sector value chain to formulate a sustainable water provision model, the study employed two approaches for delving deeper into this challenge. The first one was a desktop study that reviewed different sources of literature on the stakeholders in the value chain. The second one was engagement with the sampled individuals in the value chain, interviewing them and getting their respective perspectives on the issue. This study also investigated the different links of the value chain to determine their potential contribution towards the identified malfunction in the system.

The study used qualitative research methods for the purpose of delving deeper into the issues and for formulating a water provision model that is informed by a diverse range of views from stakeholders who are well-informed about the sector[1]. Qualitative methods include analysis of pertinent literature and semi-structured interviews with a sample of participants in the value chain, that is, CHDM municipality officials and consumers.

[1] Ethical clearance to conduct the study was obtained from the University of KwaZulu Natal - Protocol No. HSSREC/00006090/2023

3.3 Sampling

Purposeful sampling was used in this study. Mack et al. (2005) observed that in qualitative research, snowball sampling, purposive sampling, and quota sampling are the three most used sampling techniques. They argue that sampling is informed by the study's research objectives and features of the study population (such as size and variety). Purposeful sampling refers to an intentional form of data collection that is guided by an understanding of the holders of the required data.

Judgmental sampling and/or selective sampling also refers to purposeful sampling (Heath 2023). It begins with the end in mind. For instance, as the purpose of this study is to pinpoint the issues in the water sector that contribute to the insecure delivery of water services that many people in CHDM face, purposeful sampling then works backwards to ascertain the relevant potential respondents. It entails finding and choosing people or groups of people who are knowledgeable about or experienced with a phenomenon of interest (Cresswell and Plano 2011).

Purposeful sampling differs from other data collection approaches, strategies and methods like exploratory study that are akin to throwing a net in the ocean and retrieve various species of fish that are then analysed in terms of their relevance and desirability based on the purpose of the fishing exercise. It also differs from probabilistic or random sampling whose primary focus is to ensure the generalisability of findings by reducing selection bias and account for the influence of both known and unknown confounders (Palinkas, et al. 2015).

Conversely, purposeful sampling moves from the premise that for example, the fisherman knows the type of fish he is looking for in terms of its nature, size, behaviour or habitation. He then purposefully designs an apt instrument to obtain the desired and targeted fish. This is ideal for saving resources (time and effort) as this approach allows the researcher to focus on the people s/he thinks are most likely to have knowledge, experience, or insights regarding the subject of the study (Mack, et al. 2005).

As purposeful sampling is a targeted data collection approach with predetermined research participants who are included in the study on the basis of their relevance, it is 'deep diving' into the knowledgeable research participants and extracting the required information, thus Mack et al. (2005) argue that it uses a preselected criteria that is relevant to a particular research question. This is different from extracting the required information across a range of participants and ending up with a variety of information pieces that have varying levels of usefulness. Going deeper into the understanding of the research participants who are known to have the required information is strategic and includes the quality vs quantity argument. Thus, the quality (usefulness and relevance) is more important than the number of participants whose relevance may be inapt or whose knowledge about the subject may only be determined upon their engagement and interview.

The inclusion and exclusion factors into this study are, therefore, relevance as purposeful sampling is primarily premised on the relevance of potential respondents. The relevance of the potential respondents is determined by their knowledge and experience of water services at the CHDM. This means only the most relevant officials were included, and the least relevant ones were excluded. Generally, everyone has a view with regards to water services by virtue of the product (water) being used and consumed by everyone, hence, the notion of the most and least relevant.

Purposeful sampling was also used with respect to consumers. In this regard, the researcher was of the view that adults who have been residing at the CHDM for the past five years would have useful information about their experiences and observations of the CHDM water services.

Given that the CHDM has several directorates and officials, and the study is particularly about water services, therefore, the most relevant officials with the required information would be those who are in the Engineering Department's Technical Services. The Engineering Department's Technical Services comprises three sections, WSA, WSP and Project Management Unit (PMU). The Technical Services component is responsible for reticulation of the water and sanitation network, renovation of the infrastructure supporting water services, development of bylaws, development of bulk water and sanitation services, geographic information systems (GIS) that are used for water services development planning, water demand management, and water services provision through the operation and maintenance of water service infrastructure (Chris Hani District Municipality 2020b).

The research participants were thus, three senior officials from the Engineering Department's Technical Services and seven consumers that were randomly selected from the CHDM's local municipalities. As depicted in Table 4, the three CHDM officials and seven consumers from the local municipalities covered by CHDM comprised the 10 sampled participants. The aim was to have the most relevant persons with the information and experience of water issues at CHDM, hence purposeful sampling was made.

Table 4: List of research participants and sample size

Research participants	Sample size
CHDM officials	3
Consumers from the six local municipalities under CHDM	7
TOTAL	**10**

As this is a qualitative study, each participant was probed deeper, thus the sample size was sufficient to provide rich information that assisted in identifying the challenges in the water sector that are responsible for the precarious water provision services that are experienced in some parts of CHDM.

3.4 Data collection

Interviews and examination of pertinent literature are the qualitative study approach tools employed in this study. The research methodology included primary data collection through semi-structured interviews with a sample of relevant officials from the CHDM and water consumers. The semi-structured interviews enabled a thorough diagnosis of the challenges from a demand (consumer) and supply (municipality) perspective, thereby shedding a deeper understanding of the cause(s) of the problem, as well as its nature and extent. Secondary data collection was also made from relevant documents such as official reports from the CHDM, government departments, and Parliament.

Guided by the research problem and research questions, questionnaires were developed as the data collection tools from the different data sources (officials and water consumers). The different questionnaires were aligned to the respective roles and responsibilities of these stakeholders as they pertain to water services at CHDM, thereby eliciting their understanding of the operations, practices, and experiences.

The interviews were conducted face-to-face and they took about 45 minutes. Interview appointments were scheduled with the sampled participants, and they were requested to participate in the study[2]. To expedite the interview process, where possible, the questionnaire was emailed to the participants before the interview so they could respond to it, and then during the interview, most of the questions from the researcher were mainly for clarity purposes and filling in the gaps where necessary.

Two questionnaires were used[3]. One was for water supply (municipal officials) and another one for water demand side (household and commercial consumers). The participants were interviewed after they had consented to participate in the study and signed the consent form. The consent form outlined the purpose of the study, requested the potential participant to be part of the study and outlined the rights of the participant, such as the right to withdraw at any stage of the study should the participant require, as well as voluntary nature of the participation.

3.5 Data analysis

The data gathered from the interviews and document analysis was then analysed logically and methodically with qualitative techniques such as content analysis and thematic analysis. The participants' responses were juxtaposed with the data from other forms of data such as official reports from the CHDM, other municipalities, government departments, and Parliament.

[2] Permission to conduct the study at Chris Hani District Municipality was obtained from the Municipal Manager, Mr. Mashiyi on 19 June 2023 (see Appendix B).

[3] The questionnaires are in Appendix D and E

Content analysis is a research method that examines data content by taking a closer look at specific concepts and words because of their significance as depicted through commonality among research participants. Such analysis reveals patterns, trends, and differences in responses, so the researcher can make connections between concepts. It is made for the purpose of reaching reliable conclusions about the respondents' thinking and perspectives.

According to Hotjar (2023), to recognise, examine, and explain patterns in qualitative data, thematic analysis is helpful. The concepts behind content analysis and thematic analysis are different, despite their apparent similarity. The goal of content analysis, which can be used on both qualitative and quantitative data, is to find common themes and word patterns. Only qualitative data can be used for thematic analysis, which concentrates on finding themes and patterns.

3.6 Ethical considerations

The protection of participants through the application of appropriate ethical principles is important in all research studies. This study was guided by the following ethical considerations:

Informed consent

Participants were given information regarding the purpose, goals, objectives, and research methodology of the study prior to the commencement of the interviews. They were also advised that a research report will culminate from this study, and it will be submitted to the University of KwaZulu-Natal's (UKZN's) Graduate School of Business and Leadership (GSB&L) as part of my studies towards the Masters in Business Administration (MBA) qualification. The Informed Consent Form that the participants signed had all the relevant information including the contact information of the Humanities and Social Sciences Research Ethics Administration Research Office, as well as the researcher's contact information, in case the participants had questions or queries. They were also provided with an opportunity to ask questions about the study.

Voluntary participation

No incentives or forms of coercion were used to get any of the subjects to participate in the study. The participants were informed that their involvement in the research is entirely voluntary and that they are free to discontinue at any time without facing any consequences or losses of any kind.

Confidentiality and anonymity

The participants were notified that the study would result in a research report and that no research-related material or presentation would include their names. The interviews were held in appropriate locations to ensure the confidentiality and relaxation of the participants such as the participants' workplaces. The recordings were kept in the researcher's password protected devices. The transcripts

that emanated from the research interviews were kept in a lockable cupboard that was only accessible to the researcher.

Beneficence

As the study aimed to improve human welfare, participants' rights to be free from injury, discomfort, and mistreatment were upheld.

CHAPTER FOUR: RESEARCH FINDINGS

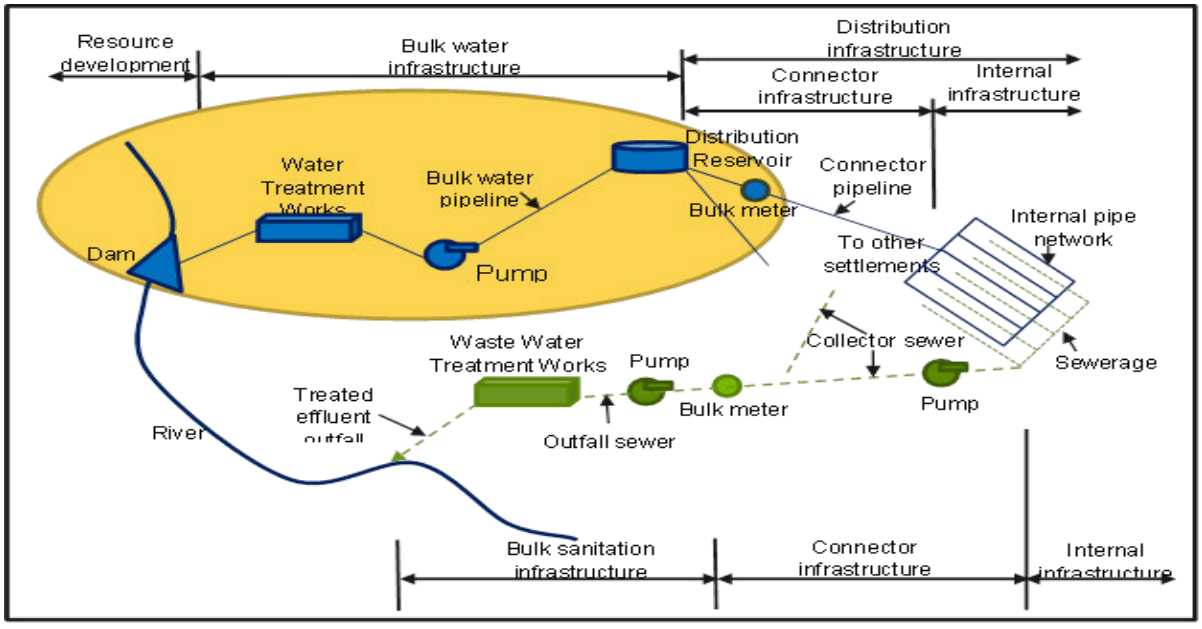
4.1 Introduction

This chapter presents the qualitative analysis, synthesis, and interpretation of the data using systematic and logical analysis. It reports the research findings and conclusions reached through the interpretation of the data. To ensure confidentiality and anonymity of the research participants, the responses from the participants were coded as Respondent 01 to Respondent 10. Respondents 01 to 03 are the CHDM officials and Respondents 04 to 10 are the consumers of the CHDM water services.

4.2 Roles and functions played by respective stakeholders in the CHDM the water value chain

As depicted in Figure 6, water services at CHDM take the full circle. This includes taking responsibility for bulk water infrastructure like dams and pipelines (construction, operation and maintenance), running the whole system up to the delivery of potable water to households and taking responsibility for used water to ensure its safe return to the system for re-use. Hence, the CHDM's role in the water value chain according to its officials includes water abstraction, pumping, purification, and distribution, as well as sewer collection and treatment. Water services in the contract with Sakhisizwe Local Municipality is defined as excluding "procurement of water services related activities, revenue management (meter reading, billing, collection, customer management, and credit control and debt collection) associated with providing water services" (Sakhisizwe Municipality 2014, p. 1).

Figure 1: Water Services Value Chain at Chris Hani District Municipality



Source: CHDM (2023a)

The local municipalities under the CHDM handed over their water services provision function to CHDM and CHDM signed water and sanitation services contract with the respective local municipalities. To this end, the CHDM satellite offices in the local municipalities work in collaboration with the local municipalities on the following areas:

- Budget and Treasury Office – Finance, cashiers, enquiries, meter readers,
- Customer care,
- Technical services – Water and sanitation operations and maintenance, and
- Water quality.

Respondent 04 and Respondent 10 noted that the difference between the supply of water services in CHDM and other municipalities is that the supply of water rarely reaches the entire community in the villages around CHDM. These are part of the CHDM households depicted in Table 2 and Table 3 with no officially supplied water via pipes and households with shared piped water that is more than 200m from the dwelling. This, however, affects many other municipalities because many rural households do not have access to piped water and rely on community taps with water sources ranging from municipal water, boreholes, rivers or streams, and dams. This suggests that the CHDM does not seem to adhere to the regulations of the Water Services Act, 1997 that require water supply services to not exceed 200m from the dwelling.

The efficiency of communication of interruption of water services was also bemoaned by Respondents 05; 09 and 10 as they were of the view that CHDM is rather weak in relation to other district municipalities. They reported to have been without water for varying extended periods in their respective communities, thereby underscoring the CHDM's violation of the Water Services Act, 1997 that requires water services to be "effective enough to ensure that no consumer is without supply for more than seven full days in any given year" (Department of Water Affairs and Forestry 2001, p. 2).

Respondents 01, 02 and 03 noted that CHDM is a WSA and WSP within itself, thus it has not outsourced the WSP function to water boards or private companies as some municipalities do. District municipalities without the WSP role only perform oversight on its local municipalities that are performing the WSP function. According to these respondents, being both a WSA and WSP is better because the operational and overseeing components are in-house.

While Respondent 06 highlighted the negative differences between the supply of water services in CHDM and other municipalities, she also acknowledged the positive one that include the sparing of CHDM from water-borne diseases. Different parts of the Gauteng, Limpopo, Mpumalanga, Free State and North-West provinces had reported cholera cases, and Respondent 06 was grateful that the CHDM was spared in this regard. While the CHDM may not have been affected by the 2023 cholera outbreak,

it is important to note that it should continue to increase ensure efficiency and prevent future outbreaks of water-borne diseases, particularly because it had experienced cholera cases in the past (CHDM 2020a).

Regarding the supply of water services in South Africa and other countries, most of the respondents credited South Africa for trying to ensure safe and clean water for all citizens. They mentioned issues such as water infrastructure in which South Africa is doing well, although some countries are more advanced than South Africa in this regard. Respondent 02 was of the view that the model is almost the same with only legislation governing water provision varying from country to country.

Seemingly, there is confusion regarding the division of labour among municipal officials, this is even more so with respect to the consumers. Respondents 01, 02 and 03 are proud of the municipality's contribution towards the water successes experienced in the municipal area, as the municipality engages in public involvement and customer care. Water services are decentralised units at the respective local municipalities and CHDM contributes towards addressing the water challenges experienced in the municipal area through allocation of resources (financial, human and technical). In its WSP role, CHDM's responsibilities include ensuring that water is available to all communities, thus it allocates funds accordingly for the construction of infrastructure and monitors infrastructure projects whilst ensuring that communities are involved during the construction phase through Project Steering Committee (PSC). In cases where the water services are not provided or interrupted, CHDM communicates accordingly through community meetings, social media, and other platforms to make sure that communities are informed of the problem and are given feedback regarding the resolution process. On the other hand, the message from the Emalahleni Local Municipality spokesperson to the protesters was that they were erroneously blaming the local municipality because the water provision service is the province of the district municipality (Damba-Hendrik 2023). However, there is no clear understanding by all the stakeholders that water services are decentralised units at local the respective municipalities and that water services are the province of the district municipality. While there may be valid reasons for the shifting of water services to the district municipality, some consumers still criticise the local municipalities for a service for which they are not responsible. Other consumers are also of the view that the service by the district municipality is not as responsive as the service they enjoyed from the local municipalities because the turnaround times for attending to reported water issues now seem to be longer.

Nonetheless, the DWS plans to amend the Water Services Act for the purpose of providing clarity regarding the division of labour/responsibilities between WSAs and WSPs. This will ensure that WSAs can only recognise WSPs with an operating license and that only licensed WSPs are able to offer water in a municipality. It will also clarify the functions that are under a WSP and those that are under a WSA

(Odendaal 2023). It has been observed that the challenge with the blurring of lines between the WSAs and WSPs translates to the overlooking of the seriousness of WSPs that are unable to explore external options to improve their performance (Mulenga 2017, Smith 2009). SALGA (2011) notes that the general lax regulation of water and sanitation services is a result of the hazy boundaries between the WSA and WSP. Furthermore, one obstacle to the efficient monitoring of the WSP is the absence of specialised internal capability and resources. Some municipalities maintain the water provision role in-house, even when they lack the necessary capability, partly because of the ineffective interpretation and application of the Section 78 process. When municipalities restructure, the Municipal Systems Act mandates that they go through a Section 78 process to determine whether services, including water and sanitation services, will be provided internally or externally.

Respondents 01, 02 and 03 were of the view that the municipality's roles and functions can be fulfilled or performed by another entity or department because the institutional arrangement is prescribed in the Municipal Structures Act Section 78. The shifting of roles, however, could disrupt service delivery to communities and there would be many teething problems. To ensure sustainable water supply in CHDM, they believed that what should be done differently includes getting additional funding, replacing old infrastructure, securing all water services infrastructure against vandalism and theft, and building capacity of personnel rendering the service.

According to SALGA (2011), the water and sanitation departments confront difficulties because of poor capital investment in cases where the line between the WSAs and WSPs is not well defined, and activities are not ring-fenced. Furthermore, the lack of financial independence of the water and sanitation departments at some of the municipalities is identified by SALGA (2011) as one of the factors contributing to the infrastructure challenges, because these departments receive their share of budgetary allocations from the Council's pool. These departments then face competition from others for their budgetary allocation, thereby jeopardising the respective municipalities as neglected upkeep and growth of water and sanitation infrastructure is one of the problems resulting from the lack of ringfenced funding for these departments. The DWS is of the view that WSPs must be able to support themselves financially, have the resources to manage and maintain the infrastructure for providing water services, can grow the water network as needed, and make long-term investments for infrastructure replacement and rehabilitation. Lack of funding, among others, leads to postponed maintenance and delayed growth of the water and sanitation infrastructure.

4.3 Main hindrances to CHDM's efficient and effective water supply

Regarding the question about whether water should be paid for by the consumers, all the respondents were of the view that it should be paid for. The reasons given were mostly about the costs of providing water, the logic of consumers to pay for what they consume, and consumers' contribution

towards the sustainability of water infrastructure and water services. The costs incurred by the municipality for which consumers must pay include water purification (chemicals and electricity), infrastructure (pipes to different communities and homes), machinery, and personnel. This is echoed by Pongoma (2022, p. 1) who sought to clarify the misunderstanding that people are paying for water, and further explained that "it's not the water that they pay for. It is the service that is needed to draw the water from the river. We then pipe it, clean it and pump it to bring it to their houses. That's the service we provide and charge for because there is a cost element involved." Respondent 03 added that, "to achieve the water provision responsibility, the municipality needs to pay for bulk water from DWS, construction cost / capital cost and operations and maintenance cost. These costs are not all covered by grant funding. Therefore, affording consumers should pay and the indigent get subsidised by government through Equitable Share Grant". Respondent 07 added that municipal water services reduce the burden of carrying water by women from faraway places, thus also ensures their safety as well as safe drinking water.

While some water consumers agreed that they consistently pay for the water they consume, others admitted that they do not. The reasons given for the causes of the non-payment culture by some water consumers included poor provision of water services to communities due to inconsistent supply in some areas, high cost of living and poor affordability in light of the high unemployment rate, continuation of the *toyi-toyi* (protest) culture from the refusal to cooperate with the state during apartheid times, and billing challenges.

The CHDM (2020b) survey revealed that:

- Most people reside in highly impoverished rural areas, townships, and informal settlements. Over 75% of the age groups that are economically active are unemployed.
- Almost 75% of families lack access to a clean water source. There are significant backlogs in the district's water and sanitation systems, which have led to cholera and other related illnesses.
- There are inadequate and unsafe sanitation practices in about 75% of the households.

According to the CHDM (2020a), the provision of water services mainly compromises two performance areas: (1) the ability of local municipalities to recover water and sanitation monies from their customers and, (2) the inability of waste water treatment plants to produce effluent that complies with legislative standards due to the treatment works' state of dilapidation, which requires significant capital investment to bring them up to acceptable standards.

Respondent 01 noted that the inconsistent water supply in some areas is partly attributed to high demand due to population increase and mushrooming of new unplanned settlements. This translates to

unhappiness of consumers who then resort to non-payment of services as a reaction to their dissatisfaction. He added that load shedding is another contributing factor to the inconsistent water supply as some pumps run on electricity.

The billing challenges seem to be a considerable deterrent to some of the consumers as Respondent 08 argued that "the municipality does not send invoices. When they do, most of the time, the bill is inflated because they do not take meter readings but just estimate the household consumption. This is so frustrating such that some who can afford are resorting to providing their own water through boreholes and water tanks, the same way people are running away from Eskom through installation of solar panels". While Respondent 08 and 09 bemoaned the billing challenges, they added that on the other hand, the non-payment culture is unlikely to stop as there are no consequences for non-payment, and this aggravates the municipality's revenue collection challenges and consequently undermines service delivery efforts.

The positive contribution by some consumers towards service delivery is commendable as they claim to pay their municipal bills, report water leakages or pipe bursts, and use water wisely. Some have an indirect contribution in this regard as they are off the municipal water grid since they use water tanks to collect rainwater and boreholes to extract underground water.

4.4 Required changes to ensure reliable water supply

The respondents had mixed views regarding the performance assessment of the stakeholders in the South African water value chain. Respondents 01 and 03 thought that DWS is not performing satisfactorily and echoed their understanding of the transfer of old infrastructure by DWS to local municipalities, yet DWS is now reluctant to fund replacement of that old infrastructure. While the municipality receives the Municipal Infrastructure Grant (MIG), Water Services Infrastructure Grant (WSIG), and Regional Bulk Infrastructure Grant (RBIG), these fall below the required financial resources considering the volume of infrastructure that require replacement, hence the backlogs are not getting successfully cleared. MIG is for the creation of new water services infrastructure as well as renovation and modernisation of current infrastructure, RBIG is for the construction of sanitation and bulk water infrastructure, and WSIG is for the creation of temporary and intermediate water supplies to clear up water and sanitation backlogs and to renovate the infrastructure that is already in place.

There was also a sense from Respondent 02 that due to its distance away from the communities, DWS as a national department does not have insight of the issues in the various communities, hence the delays in funding the much-needed water infrastructure. Despite the DWS' negative performance assessment, Respondents 01, 02 and 03 maintained that it should not be removed or replaced in the value chain, instead it should improve on its regulatory and funding roles.

The performance of the water boards was also negatively viewed by Respondents 01, 02 and 03 because, despite their capacity and expertise that generally exceed that of many municipalities, they are only interested in bulk water supply and not reticulation. The respondents remarked that many municipalities could benefit if the mandate of the water boards is extended beyond bulk supply to also cover reticulation. They were of the view that there are some water boards that are involved in reticulation maintenance, through operations and maintenance contracts with certain municipalities, and these are the services that should be extended to be a permanent feature of the water boards, including wastewater treatment works. Despite the unfavourable performance assessment of the water boards, Respondents 01, 02 and 03 maintained that they should not be removed or replaced in the value chain, instead they should focus on addressing the challenges they experience in their bulk water supply services.

The motivation for those who viewed the performance of the WSA positively (Respondents 02 and 03) is that their focus is on regulation, thus, by and large, their monitoring of the WSPs is quite controlled as the guiding prescripts are clear since they are legislated. Given this positive performance assessment of WSAs, Respondents 02 and 03 were of the view that they should not be removed or replaced in the value chain, as their focus on compliance is a crucial role in the chain. However, it was noted that despite their proximity to communities, WSAs struggle with revenue collection and maintenance.

Respondents 01, 07 and 09 reported that the positive performance assessment of the water-user associations was on account of their perceived efficiency over years as they look after the interests of their members. Apparently, they are generally known to have a good response time. Given this positive performance assessment, the motivation for them not to be removed or replaced in the value chain by these respondents is that they seem to be effective in dealing with allocations to their users.

The positive performance assessment of the municipalities by Respondents 01, 02 and 03 was on account of their commendable attempts to effectively render services despite the environment that is characterised by lack of funding. They were empathetic to the municipalities given their operational challenges. Hence, they advocated for them not to be removed or replaced in the value chain; instead, they should improve their water provision role, revenue collection and infrastructure maintenance, and they should also be adequately supported.

The positive performance assessment of some of the consumers (households and industries) by Respondents 04, 05, 08 and 10 was on account of their commendable practice that includes payment for consumed services. Since the payment for services is not a culture practiced by all the consumers, these respondents were of the view that effective systems should be put in place to encourage and/or force affording consumers to pay for water services.

The motivation for those who viewed the performance of the wastewater management and treatment entities positively (Respondents 01, 02 and 07) is that their sole focus is on water treatment, thus, their treatment is commendable. However, they were of the view that they should be removed or replaced in the value chain as their services are a duplication of the services carried out by municipalities and water boards.

Regarding what could be done to address the problem of unreliable water supply in CHDM, Respondents 02 and 03 suggested that bulk water supply should be upgraded, dilapidated infrastructure should be replaced, revenue collection should be improved and there should be ring-fenced revenue for the provision of water services.

4.5 Conclusion

The chapter presented qualitative analysis, synthesis, and interpretation of the data using systematic and logical analysis. It clearly depicted that the water services provided by CHDM include water abstraction, pumping, purification, and distribution, as well as sewer collection and treatment. CHDM is responsible for all water services as the local municipalities under it handed over their water services provision function to it. The provision of water services, however, is compromised due to challenges with infrastructure, payment of water services and underperformance by some of the stakeholders in the water value chain.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

This chapter provides an overview of the study to determine whether the research problem and research questions are in line with the findings, and whether the research question has been addressed. Further, the chapter interprets the data and summarises the main conclusions. Due to the study's limitations which include labour, time, and other resources, this chapter also suggests areas that require additional research that could not be included in the study. The chapter finally provides a summary of the study, and in light of the findings, recommendations are then made.

5.2 Data and definition challenges

While caution is required in the reading and analysis of the data from CHDM and its local municipalities since there appears to be discrepancies (evident in Table 2 and Table 3) with data on households by type of water access. This, however, does not affect the analysis of the data for this study because for the areas wherein the data was not reliable, the aim was not to get specific numbers but understanding of the status quo. The discrepancies do not change the picture of the status quo as the overall situation could be established from the data despite its weaknesses.

Notably, over 75% of the homes lack access to a clean water source as the district has significant infrastructural backlogs, particularly in the water and sanitation areas with collapsed irrigation schemes and silted dams that are meant for irrigation purposes (Chris Hani District Municipality, 2020c). However, the municipality receives the Municipal Infrastructure Grant (MIG) that is geared towards clearing municipal infrastructure backlogs in underdeveloped areas thereby enhancing the delivery of essential services such as water, sanitation, roads, and public lighting. While the justification for such a high infrastructural backlog could be attributed to the insufficiency of the MIG, presumably, it is challenging to clear the backlogs in a context that is characterised by unplanned, mushrooming developments, vandalism, and absence of a regularly updated municipal inventory that illuminates assets, their age, condition, as well as a clear and costed picture of the required infrastructure. It is, therefore, crucial for the CHDM to promptly address these issues to resolve its infrastructural challenges.

Defining exactly what ‘lack of access to a clean water source’ means is important. For instance, given the spatial setup of the CHDM, the municipality uses a wide range of water provision systems that include regional and local water schemes, boreholes, springs, water tanks, dams, rivers, and streams. The observation that 75% of the homes lack access to a clean water source is also difficult to reconcile with the 16,80% of households with no formal piped water and 9,39% households with communal piped water that is more than 200m from dwelling as depicted in Table 2. The combination

of these would mean that 26,19% of households do not have a clean water source if lacking access to a clean water source means not being officially supplied with water via pipes and shared piped water that is greater than 200 meters from the residence. As CHDM (2020c) has not defined what 'lacking access to a clean water source' means, it is rather difficult to make sense of the figures. Moreover, the seeming discrepancy could, *inter alia*, be indicative of the water quality even from those with access to piped water. This is concerning given that providing safe drinking water that satisfies SANS 241 (2006, 2011) for the duration of the reporting period and earning a score over 95% on the adherence to Blue Drop requirements is the water services authorities' ultimate goal (Mulenga 2017). With an overall BD score of 83,42%, the CHDM has improved from its 2011 score of 73,47. Since the technical services are working hard to maintain infrastructure and hire qualified staff, CHDM is making remarkable progress to the extent that it received a Blue Drop Award in 2012 for its excellent performance (Fava, 2016). Furthermore, the understanding of a clean water source requires deeper understanding. The Centers for Disease Control and Prevention (2022) defines access to safe drinking water as the ability to use improved drinking water sources. The UNICEF (2023) further unpacks this to indicate different drinking water service levels:

- Safely managed – drinking water from a better source that is readily available at home, free from contamination with priority chemicals and faeces, and available when needed.
- Basic – drinking water from a better source, so long as the total collection time, including waiting and line-up, is no more than thirty minutes.
- Limited – drinking water from a better source, given that the entire collection process, including waiting and line-ups, takes more than thirty minutes.
- Unimproved – consuming water from an exposed spring or uncovered well.
- Surface – surface water comes straight from a dam, river, stream, lake, pond, canal, or irrigation canal and is used for drinking.

It is unfortunate that the CHDM data is not presented according to the UNICEF drinking water service levels. It is presented in terms of 'piped water' and its availability and proximity to a dwelling with the understanding that 'piped water' refers to 'safely managed', 'basic', and 'limited' drinking water sources.

5.3 Striking the balance of water provision services: Water the Constitutional right and water the commodity

The need for the payment of water provision services has clearly been articulated by the respondents as well as the hindrances causing non-payment for the services. The factors that translate to non-payment for the services include structural (poverty), systemic (billing challenges) and human (rebellion) factors. These must be dealt with accordingly, using well customised, specific, detailed and

appropriate solutions. The appropriateness of the solutions, for instance, is akin to researching chromosomes using a questionnaire and attitudes through a chemical analysis and leading to recommendations that will not be feasible as the tools used were not appropriate.

As poverty is one of the factors contributing towards the non-payment of services by consumers and concomitantly compromised delivery of water services by the municipality, this underscores that job creation must be prioritised. The several job creation initiatives at CHDM have mixed results, however, they have not managed to substantially change the municipality's economic outlook. To improve job creation at CHDM, the municipality's competitive advantages should be considered. Given that CHDM's main economic sectors are Community Services (52%), Trade (15%), Finance (14%), Transport (6%), Manufacturing (4%), Agriculture (4%), and Electricity (2%) (Chris Hani District Municipality 2020a), this requires serious structural and systemic changes given the municipality's competitive advantages such as agriculture (huge arable land) and youthful population. The most dominant sector, Community Services (52%), is not income-generating and does not directly contribute towards economic development. Community Services include providing the communities with education services, health services, social services, environmental services, community safety services, sports, arts, and cultural services, road traffic management, and emergency services.

Regarding the systemic factors that include billing challenges, it is important for the CHDM to review the efficiency and effectiveness of its systems, including its performance management system. Part of the review processes should include an examination of internal and external CHDM communication, implementation of policies and consequence management, standard operating procedures, induction programmes, and compliance.

Furthermore, it is unfortunate that municipalities sometimes rely on other stakeholders for their effective delivery of services. The billing challenges are, to some extent, aggravated by the inefficiencies in the South African Post Office because the municipalities use it, among other means, to send monthly statements to consumers. Some consumers are not yet optimally using digital communication services like electronic mail, thus cannot receive their monthly statements if the post office is unable to send them.

Regarding the human factors that include rebellion, it is important for CHDM to restore its authority and respect. CHDM officials and customers should have genuine care, respect, and trust in the municipality and, this could be done, among others, by having the municipality leading in this regard through being exemplary in its services. As positivity attracts positivity and negativity attracts negativity, the positive image of services by the municipality will most likely encourage the consumers to avoid non-payment as they will acknowledge the value for their money and the delivery of services

for which payments must be made. Of course, this will not work for all the consumers, thus appropriately customised strategies should be considered such as the legal route where appropriate.

The combination of the different steps towards the resolution of the CHDM challenges will eventually translate into the fulfilment of the business part of the water provision services. The findings reveal that the water supply challenges at CHDM are due to multifarious factors which include several components of the value chain for water. For the smooth delivery of water services, it is crucial for all the components of the water value chain to play their respective parts with excellence.

5.4 Improvement of the CHDM's performance management system

The systemic and operational challenges attributed to the CHDM such as billing issues underscore the notion that an improvement of the CHDM's performance management system is required. The practice of continuously enhancing an institution's functioning and accountability with the aim of carrying out plans, determining the effects of those plans, and gauging the effectiveness of those plans' execution is known as performance management (Foreign Affairs, Trade and Development Canada 2013, The Presidency 2007, Department of Constitutional Development 1999). The Department of Local Government supports this understanding by stating that the management of performance is a strategic way of doing management. It offers a set of tools and procedures to managers, executives, employees, and stakeholders at different levels so they may plan, monitor, measure, and review the organisation's performance on a regular basis in terms of impact, efficiency, and effectiveness indicators and targets (eThekwini Municipality 2008, p. 15).

According to the Local Government Municipal Systems Act (2000), the municipality must formulate suitable key indicators of performance as a benchmark for evaluating performance, including results and impact, in terms of its performance management system. It also recognises that the performance management system enables the municipality to maximise its potential to accomplish its goals and raise the standard of living for its citizens. This is because the performance management system is useful for making decisions, tracking the results of strategic plans, evaluating performance, diagnosing problems that impede the achievement of goals, managing processes for continuous improvement, providing motivation, comparing, and creating records (Bredrup 1995).

5.5 Conclusion

This chapter has provided an overview of the dissertation, data interpretation and summary of the main conclusions. It identified discrepancies in the data on households but noted that this did not compromise the richness of the discussion. The chapter also underscored the issue of significant infrastructural backlogs in the district that compromise the quality of water services. Clarity of concepts was also underscored as a factor that requires attention as what is meant by 'lack of access to a clean

water source' seemed to be rather unclear. The need for efficient and sustainable water provision services is crucial, however, its realisation is compromised by factors such as poverty, billing challenges, and rebellion contributing to non-payment. To address these issues, the municipality must prioritise job creation and consider its competitive advantages, such as agriculture and its youthful population. A performance management system, which provides methods and resources for consistent planning, monitoring, and evaluation, is essential for achieving the CHDM goals for reliable water services.

CHAPTER SIX: CONCLUSION

6.1 Introduction

This chapter responds to the 'so what?' question by taking into consideration all the work that has been undertaken, including the research problem, research questions, results, and findings. Given the achievements of the study, this chapter demonstrates the value of this study's contribution to the body of literature and the potential resolution of the water supply challenges in South Africa. As per the constructivist paradigm practices that include examining people's interpretation of their experiences and using these interpretations to develop a deeper understanding of the issue being investigated for policy-making and decision-making purposes, these were helpful in identifying the challenges in the CHDM water sector as well as potential solutions.

6.2 Water infrastructure at CHDM

As discussed in this study, water infrastructure challenges at CHDM require a speedy resolution as there are water leaks, broken meters, and regular bursts in the water pipelines. CHDM needs to deal with theft of water infrastructure by closely working with community members and South African Police Services (SAPS) to curb this challenge. As water services are a key factor in determining (attracting or discouraging) investments in an area, it is crucial for CHDM to prioritise excellence in this area as that could potentially translate to increased investments and job creation.

For partnering with the private sector, it may be important for the CHDM to have a grounded understanding of its infrastructure needs by conducting an infrastructure audit and thereafter, in collaboration with the private sector, engage in the refurbishment of existing infrastructure to reduce losses and waste, obtain a precise database of connections and meters, as well as the population profile so as to determine the categories of non-paying consumers (indigent and affording defaulters). This will improve municipal revenue, particularly if this database is connected to the billing and collection database. To extend the life of the infrastructure, CHDM should invest in an asset management system that is connected to an operations and management system.

6.3 Improving the provision of water services

This study's recommendations for improving the provision of water services build on the six proposals that have been developed by Graham et al. (2023) to help address the various problems that arise with local government and the WSA model. They include:

1. Review of the WSA model

Although there are no inherent problems with the WSA concept, it is important to review the process of selecting WSAs and have a straightforward, logical, and objective process that does not consider the financial viability of municipalities as this is a fiscal framework issue.

2. WSA performance and support

A reassessment of the local government's two-tier system is necessary since it has led to uncertainty in the provision of numerous services, including water services. The erroneous allocation of blame to a local municipality for a district municipality responsibility and vice versa is a classic example in this regard. As indicated by the National Planning Commission (2013), the piecemeal approach to service delivery and development is not effective because it translates to poor planning, and weak coordination within the value chain. A revision of the intergovernmental transfer system is also necessary. This could involve incentive-based awards, capacity-building grants, and mandated reporting on the equitable share grant's sectoral allocation. These grants require financial and technical management assistance. However, caveat is in order with respect to the provision of assistance as sometimes, due to the dynamics at municipalities, the lack of will is conflated with lack of skills. It is, therefore, important to ascertain if the challenge requires assistance, perhaps if it is due to lack of skills, or it requires law enforcement or policy implementation, that is, if it is due to perhaps sabotage.

3. Interventions

The sectoral remedies put in place have not sufficiently addressed the underlying, causative reasons contributing to municipal failure, and the interventions carried out thus far have not sufficiently identified the primary elements causing shortcomings in service delivery. There should be more political support for the intervention and improvements made to both the administrators and the provincial authorities. It is, however, important to note that it is one thing to say there should be political support, and having the actual support is something else. Hence, Bäck et al. (2022) observed that politicians can serve as barriers or enablers in the implementation of programmes, thus they need the prerequisites for supporting a particular programme. Moreover, there are currently no statutory or Constitutional mechanisms that allow the Minister to assume responsibility for the operations of municipalities that are unable to meet their legal duties. This suggests that there is limited recourse for municipal residents given these statutory limitations as the relevant department (DWS) should be able to take over when municipalities do not fulfil their Constitutional obligations. As discussed in Chapter One, some of the existing recourse include the Public Protector and the South African Human Rights Commission, albeit these are not specifically water-related departments, thus cannot take over the responsibility of water services.

4. WSA and WSP issues

If the WSA model is to be changed, it is important to preserve its flexibility and avoid prescribing a 'one-size-fits-all' solution. To protect service delivery from internal governance and financial concerns, municipalities may choose to use internal, independent businesses to serve as water service entities. This requires appropriate WSA regulation. This, however, should be the last resort as it is not advisable for a Constitutional right, that is access to water, to be the responsibility of independent businesses.

5. External water services providers

Government should choose the best service delivery mechanisms. The National Treasury should also work hard to improve the laws pertaining to public-private partnerships and supply chain management. Additionally, municipalities ought to have assistance with the planning, acquiring, and continuing administration of public-private partnerships. Although a crucial factor in the value chain of water service provision, Graham et al. (2023) contend that there is not much data to back up the claim that district municipalities or water boards are naturally better at providing water services than local governments. Therefore, water boards and districts should be viewed as a temporary solution rather than the answer to providing water services. Conversely, it is important to consider that the area of specialisation for water boards is water services, therefore, it makes sense if water provision services are not made piecemeals and instead be allocated to the water boards, particularly because the expertise of many municipalities fall short in this regard.

6. Water services provider licencing

An economic regulator is required for water services for the purpose of setting service delivery guidelines and holding WSAs responsible for adhering to them. It should also have the authority to control water pricing, supervise WSAs and WSPs, and issue licenses to qualifying WSPs.

Moreover, as the CHDM systemic challenges include legal, financial, and environmental non-compliance, it is important that CHDM should establish practical and effective mechanisms for addressing this issue. For instance, the CHDM does not seem to adhere to the regulations of the Water Services Act, 1997 that require water supply services to not exceed 200m from the dwelling, given that it was reported that some parts of the municipality rarely have access to water services, other parts have no officially supplied water via pipes, and other households have shared piped water that is more than 200m from the dwelling. This requires urgent attention through effective compliance mechanisms that the municipality needs to develop. The reports about some residents being without water for varying extended periods show that CHDM is in contravention of the Water Services Act, 1997 that requires water services to be "effective enough to ensure that no consumer is without supply for more than seven

full days in any given year" (Department of Water Affairs and Forestry 2001, 2), hence the urgency for the implementation of the compliance mechanisms.

6.4 Further research

While the findings have revealed useful information regarding the obstacles to the implementation of the CHDM water service delivery goals and roles played by the respective stakeholders, further investigation is still required to ensure complete resolution of the problematic areas. For instance, the findings revealed that some of the causes of the non-payment culture of services include the high cost of living and low affordability in light of the high unemployment rate, and continuation of the *toyi-toyi* culture from the refusal to cooperate with the state during apartheid times. In addition to the knowledge of these facts, it is also important to establish feasible solutions for them. This study has made some suggestions to address the unemployment challenge, however, stopping the *toyi-toyi* culture requires further investigation. It is important to understand the motivation for the continuation of this culture long after the official demise of apartheid.

Similarly, the water infrastructure challenges are due to systemic issues (lack of funding) but also due to inappropriate human conduct (theft and vandalism). While suggestions have been made in this regard in terms of how the CHDM could address this challenge, in collaboration with the SAPS, this will not address the root of the problem that needs to be established, that is, what causes, motivates, and sustains the theft and vandalism that seems to be on the rise in many South African communities. This is an area that requires further research.

6.5 Conclusion

This chapter has further unpacked the water supply challenges at CHDM with the view to propose appropriate solutions for some of the challenges such as infrastructure, billing, and performance management. It also underscored the need for rapid resolution of the identified challenges as water services are crucial for investment and job creation. The chapter also builds on the six proposals to improve water service provision by Graham et al. (2023), which are, review of the WSA model; WSA performance and support; interventions; WSA and WSP issues; external water services providers; and water services provider licencing.

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LIST OF APPENDICES

Appendix A: Letter of approval from the Ethics Committee

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

06 November 2023

Dr Thembinkosi Gladden Twalo (222102884)
Grad School of Bus & Leadership
Westville

Dear Dr Twalo,

Protocol reference number: HSSREC/00006090/2023
Project title: Investigating the challenges of the Chris Hani District Municipality's water sector value chain
Degree: Masters

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 30 August 2023 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid until 06 November 2024.
To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

HSSREC is registered with the South African National Health Research Ethics Council (REC-040414-040).

Yours sincerely,

[redacted]

Professor Dipane Hlalele (Chair)

/dd

Appendix B: Letter of approval from the Chris Hani District Municipality

CHRIS HANI
DISTRICT MUNICIPALITY
SUSTAINING & GROWTH THROUGH OUR PEOPLE

OFFICE OF THE MUNICIPAL MANAGER

Tel: 045 808 4686
Fax: 045 808 4629

Private Bag X 7121
QUEENSTOWN, 5320

Email: xmfundisi@chrishanidm.gov.za
Enq:X. Mfundisi

19 JUNE 2023

Att: MR. T. TWALO
: ROMANSLAAGTE VILLAGE

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

With reference to the above-mentioned matter and your request dated 19 June 2023.

Please be advised that your request to conduct research on the following topic: **"Investigating the challenges of the Chris Hani District Municipality's Water Sector Value Chain"** has been approved.

You may contact the Mr. B. Lucando: Senior Manager Water Services Provisioning for any assistance that you may require at blucando@chrishanidm.gov.za 045 808 4777/4717.

We wish you the best of luck in your endeavour.

Kind regards

[redacted]

MR. G. MASHIYI
MUNICIPAL MANAGER

CHRIS HANI DISTRICT MUNICIPALITY
2023 -06- 19
MUNICIPAL MANAGER'S OFFICE
P/BAG X7121 QUEENSTOWN 5320

VISION 2030

Appendix C: Information sheet and consent to participate in research

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

APPLICATION FOR ETHICS APPROVAL
For research with human participants

INFORMED CONSENT RESOURCE TEMPLATE

Note to researchers: Notwithstanding the need for scientific and legal accuracy, every effort should be made to produce a consent document that is as linguistically clear and simple as possible, without omitting important details as outlined below. Certified translated versions will be required once the original version is approved.

There are specific circumstances where witnessed verbal consent might be acceptable, and circumstances where individual informed consent may be waived by HSSREC.

Information Sheet and Consent to Participate in Research

Date: 01 August 2023

Good day

My name is Thembinkosi Twalo, a Masters in Business Administration (MBA) student at the University of KwaZulu Natal's (UKZN's) Graduate School of Business and Leadership (GSB&L).

My contact details are: Tel – [redacted]; Email address: 222062880@stu.ukzn.ac.za

You are being invited to consider participating in a study that involves research about the precarious water provision services that are experienced in many South African communities. While the South African Constitution (1996) notes that, "Everyone has the right to have access to sufficient food and water", there are many factors that compromise the enjoyment of this right. This study seeks to explore a sustainable model that will ensure elimination of these challenges and deliver water services on a more effective and efficient manner.

The aim of this study is to identify the challenges in the water sector that are responsible for the precarious water provision services that are experienced in many South African communities.

The study objectives are to:

- examine the role(s)/function(s) played by the respective institutions/entities/department in the water value chain,
- explore alternative ways of having the roles of the respective stakeholders fulfilled in a sustainable manner, and
- understand and address the obstacles to the implementation of the water service delivery goals as espoused in the National Development Plan (NDP).

The study is expected to enroll ten participants in total as indicated in Table 1.

Table 1: List of potential participants and sample size

Stakeholders	**Sample size**
CHDM Officials	3
Consumers from the 6 local municipalities under CHDM	7
TOTAL	**10**

The study will involve semi-structured interviews with sampled participants in the value chain, i.e., DWS, water boards water service authorities, water-user associations, municipalities, consumers, and wastewater management and treatment entities.
The duration of your participation, if you agree to participate, is expected to be around 45 minutes.

There are no known risks to you as a result of participating in this study. Participation is voluntary and you may discontinue your participation at any time if you experience any discomfort.

Participation does not have material benefits such as remuneration. The only benefit from this study will be the knowledge that will be the output of the research process which will hopefully contribute towards addressing the water challenges in the country.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (HSSREC/00006090/2023).

In the event of any problems or concerns/questions you may contact the researcher at: Tel – [redacted]; Email address: 222062880@stu.ukzn.ac.za or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557- Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Participation in this research is voluntary and you may withdraw participation at any point. You will not incur penalty or loss of any nature should you refuse/withdraw from participation.

You will not incur any costs as a result of your participation in this study.

Your responses to this study will be anonymous. Every effort will be made by the researcher to preserve your confidentiality including the following:
• Giving participants code names or numbers that will appear on all research notes and documents
• Storing the researcher's own notes, interview transcripts, and any other information that could be used to identify participants.

CONSENT

I ……. have been informed about the study entitled 'Investigating the challenges of the Chris Hani District Municipality's water sector value chain' by Thembinkosi Twalo.

I understand the purpose and procedures of the study.

I have been given an opportunity to answer questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

I have been informed about any available compensation or medical treatment if injury occurs to me as a result of study-related procedures.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at: Tel –[redacted]; Email address: 222062880@stu.ukzn.ac.za

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001, Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557 - Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Additional consent, where applicable

I hereby provide consent to:

Audio-record my interview / focus group discussion	YES / NO
Video-record my interview / focus group discussion	YES / NO
Use of my photographs for research purposes	YES / NO

_____ _____

Signature of Participant **Date**

_____ _____

Signature of Witness (Where applicable) **Date**

_____ _____

Signature of Translator (Where applicable) **Date**

Appendix D: Questionnaire (for officials)

Research about

‘Investigating the challenges of the Chris Hani District Municipality’s water sector value chain’

Instructions:

- Please respond to the following questions on page 1 – 5 by filling in your answers on the spaces provided.
- Completing the questionnaire will take about 30 minutes.
- For any questions, kindly contact Dr. Thembinkosi Twalo telephonically at [redacted] or via email: [redacted]
- Please email the completed questionnaire to [redacted] or send it via WhatsApp to [redacted]

Questionnaire (Chris Hani District Officials)

1. Should water be paid for by the consumers? (Please tick the appropriate box)

Yes		No	

2. Why should water services be paid for?

   .....

3. Which reliable and sustainable water provision system is appropriate for Chris Hani District Municipality? [Refer to Appendix 1 on page 6 to see the current system in South Africa]

   .....

4. What is the difference between the provision of water services in Chris Hani District Municipality and other municipalities that you know of?

   .....

5. Specify the municipalities referred to in question 4.

   .....

6. What is the difference between the provision of water services in South Africa and other countries that you know of?

   .....

7. Specify the countries referred to in question 6.

   .....

8. How has your municipality contributed to the water successes experienced in the municipal area?

   .....

9. How has your municipality contributed to the water challenges experienced in the municipal area?

   .....

10. What role(s) does your municipality play in the water value chain?

    .....

11. Can your roles/functions be fulfilled/performed by another entity/department? (Yes/No)

    .....

12. Please explain your reasoning for your answer in question 11.

    .....

13. If the services rendered by your municipality were to be removed, what would the water value chain lose?

    .....

14. What can your municipality do differently to ensure sustainable water supply in the municipal area?

    .....

15. In the table below, please assess the performance of the stakeholders in the South African water value chain:

Entity	**Performing satisfactorily (Yes / No / I don't know)**	**Why?** *** If the given response is 'Yes' or 'No'**
Department of Water and Sanitation		
Water boards		
Water service authorities		
Water-user associations		
Municipalities		
Consumers (households)		
Consumers (industries)		
Wastewater management and treatment entities		
Other (specify)		
Other (specify)		
Other (specify)		

16. In the table below, please suggest the stakeholders in the South African water value chain that should be removed and how their functions should be replaced:

Entity	**To be removed (Yes / No / I don't know)**	**How will its current functions be replaced?**
Department of Water and Sanitation		
Water boards		
Water service authorities		
Water-user associations		
Municipalities		
Consumers (households)		
Consumers (industries)		
Wastewater management and treatment entities		
Other (specify)		
Other (specify)		
Other (specify)		

17. In the table below, please suggest the stakeholders in the South African water value chain that require improvement and how you think they can be improved?

Entity	**To be improved (Yes / No / I don't know)**	**How can they be improved?**
Department of Water and Sanitation		
Water boards		
Water service authorities		
Water-user associations		
Municipalities		
Consumers (households)		
Consumers (industries)		
Wastewater management and treatment entities		
Other (specify)		
Other (specify)		
Other (specify)		

18. Any other comments

……

Thank you for your responses, much appreciated.

Appendix 1: South African Water System Value Chain

Steps	Activity	Responsible entity / being
1	Water catchment and distribution to Water Boards and Water Service Authorities	Department of Water and Sanitation
2	Payment by Water Boards and Water Service Authorities	Water Boards and Water Service Authorities
3	Bulk water treatment and distribution to Commercial buyers (e.g., mines, farms) and Municipalities	Water Boards and Water Service Authorities
4	Payment by Commercial buyers (e.g., mines, farms) and Municipalities	
5	Storage (e.g. municipal reservoirs)	Municipalities
6	Local water management and regulation	Water User Associations
7	Distribution by municipalities to households and businesses	Municipalities
8	Consumption by households and businesses	Households and businesses
9	Payment by households and businesses	
10	Wastewater treatment by Municipalities and/or Wastewater Management and Treatment Entities	Municipalities and/or Wastewater Management and Treatment Entities
11	Distribution to municipalities, water boards and water service authorities	Municipalities and/or Wastewater Management and Treatment Entities
12	Water purification and distribution by Municipalities, Water Boards and Water Service Authorities	Municipalities, Water Boards and Water Service Authorities
13	Payment by consumers (households and businesses)	Consumers (households and businesses)

Appendix E: Questionnaire (for consumers)

Research about

‘Investigating the challenges of the Chris Hani District Municipality’s water sector value chain’

Instructions:

- Please respond to the following questions on page 1 – 4 by filling in your answers on the spaces provided.
- Completing the questionnaire will take about 30 minutes.
- For any questions, kindly contact Dr. Thembinkosi Twalo telephonically at 0[redacted] or via email:[redacted]
- Please email the completed questionnaire to [redacted] or send it via WhatsApp to [redacted]

Questionnaire (Chris Hani Water Consumers)

1. Should water be paid for by the consumers? (Please tick the appropriate box)

Yes		No	

2. Why should water services be paid for?

……

3. Do you consistently pay for the water you consume? (Please tick the appropriate box)

Yes		No	

4. What is your understanding of the causes of the non-payment culture by some water consumers at Chris Hani District Municipality?

……

5. How do you contribute (if at all) towards the successful delivery of water services in your community?

……

6. How do you contribute (if at all) towards the poor delivery of water services in your community?

……..

7. What is the difference between the provision of water services in Chris Hani District Municipality and other municipalities that you know of?

……

8. Specify the municipalities referred to in question 7

……

9. What is the difference between the provision of water services in South Africa and other countries that you know of?

……

10. Specify the countries referred to in question 9

……

11. Which reliable and sustainable water provision system is appropriate for Chris Hani District Municipality? [Refer to Appendix 1 on page 6 to see the current system in South Africa]

    .....

12. In the table below, please assess the performance of the stakeholders in the South African water value chain:

Entity	**Performing satisfactorily (Yes / No / I don't know)**	**Why (If the given response is 'Yes' or 'No')?**
Department of Water and Sanitation		
Water boards		
Water service authorities		
Water-user associations		
Municipalities		
Consumers (households)		
Consumers (industries)		
Wastewater management and treatment entities		
Other (specify)		
Other (specify)		
Other (specify)		

13. In the table below, please suggest the stakeholders in the South African water value chain that should be removed and how their functions should be replaced:

Entity	**To be removed (Yes / No / I don't know)**	**How will its current functions be replaced?**
Department of Water and Sanitation		
Water boards		
Water service authorities		
Water-user associations		
Municipalities		
Consumers (households)		
Consumers (industries)		
Wastewater management and treatment entities		
Other (specify)		
Other (specify)		
Other (specify)		

14. In the table below, please suggest the stakeholders in the South African water value chain that require improvement and how you think they can be improved?

Entity	**To be improved (Yes / No / I don't know)**	**How can they be improved?**
Department of Water and Sanitation		
Water boards		
Water service authorities		
Water-user associations		
Municipalities		
Consumers (households)		
Consumers (industries)		
Wastewater management and treatment entities		
Other (specify)		
Other (specify)		
Other (specify)		

15. What could be done to address the problem of unreliable water supply in your in your area?

    ……

16. Any other comments

    ……

Thank you for your responses, much appreciated.

Appendix 1: South African Water System Value Chain

Steps	Activity	Responsible entity / being
1	Water catchment and distribution to Water Boards and Water Service Authorities	Department of Water and Sanitation
2	Payment by Water Boards and Water Service Authorities	Water Boards and Water Service Authorities
3	Bulk water treatment and distribution to Commercial buyers (e.g., mines, farms) and Municipalities	Water Boards and Water Service Authorities
4	Payment by Commercial buyers (e.g., mines, farms) and Municipalities	
5	Storage (e.g. municipal reservoirs)	Municipalities
6	Local water management and regulation	Water User Associations
7	Distribution by municipalities to households and businesses	Municipalities
8	Consumption by households and businesses	Households and businesses
9	Payment by households and businesses	
10	Wastewater treatment by Municipalities and/or Wastewater Management and Treatment Entities	Municipalities and/or Wastewater Management and Treatment Entities
11	Distribution to municipalities, water boards and water service authorities	Municipalities and/or Wastewater Management and Treatment Entities
12	Water purification and distribution by Municipalities, Water Boards and Water Service Authorities	Municipalities, Water Boards and Water Service Authorities
13	Payment by consumers (households and businesses)	Consumers (households and businesses)

Appendix F: Turnitin report

Student Name: Thembinkosi Twalo

Student number: 222102884

MBA Dissertation

ORIGINALITY REPORT

7%	7%	1%	0%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

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5	www.dwaf.gov.za Internet Source	<1%
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