



**PERCEPTIONS OF THE CAUSES OF POOR WATER SUPPLY IN THE MAKAUSE
INFORMAL SETTLEMENT IN GERMISTON, EKURHULENI METROPOLITAN
MUNICIPALITY.**



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the degree **Master of Philosophy in Integrated
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ABSTRACT

Water is a basic need and an essential resource for life. The provision of water in informal settlements is generally poorly managed in the whole world. Inadequate access to water supply may result in detrimental environmental health risks and economic impacts. In South Africa, the supply of adequate basic water services is a constitutional human right. Everyone has the right to basic clean water. This research investigated different role players perceptions of the causes of poor water supply at Makause informal settlement located in the City of Ekurhuleni (CoE) Metropolitan Municipality, Gauteng.

The primary aim of the research was to investigate the factors which caused poor water supply and how these affected the lives of the residents of Makause informal settlement. Literature confirmed that the establishment of Makause informal settlement dates back to the apartheid era and is closely linked to de-industrialisation, push and pull factors, rural-urban immigration and closing of mining industries in Germiston. Previous researchers acknowledged the presence of unspecified issues relating to poor water supply services in the informal settlement.

A probability and purposive sampling method was employed with 39 participants comprising of three key role players: community residents, municipality official and community leader. A combination of in-depth interviews, questionnaires and observations were employed to collect data over a period of two months to explore the perceptions of different groups.

Data was analysed using coding, and thematic data analysis where open coding was broken down into smaller categories or classes.

Findings illustrated that people's lives in the community of Makause informal settlement were negatively affected by poor basic services delivery such as inadequate water supply. The causes of these challenges are interconnected and

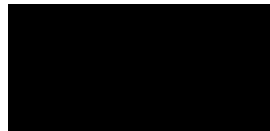
range from illegal connections of water supply by community members, vandalism of infrastructure by the informal settlement dwellers themselves, lack of infrastructure maintenance and management from the municipality side, lack of service delivery, lack of communication and marginalisation. The research recommends that all key stakeholders be involved and work together to implement various programmes such as accelerating the reblocking programme, water conservation awareness campaigns, community participation and partnerships, capacitating of municipality officials, making water funds available and the re-establishing of ward committees.

Keywords: Perceptions, water supply, Makause

DECLARATION – PLAGIARISM

I Themba Gytrene Nkuna declare that “**Perceptions of the causes of poor water supply in the Makause informal settlement in Germiston, Ekurhuleni Metropolitan Municipality**” is my own work and that all the sources that I have used and quoted are all indicated and acknowledged by means of complete references.

1. I further declare that I have not previously submitted this work, or part of it, for examination in another qualification or at any other higher education institution except IIEMSA.
2. This thesis does not contain other person's work which is copied and pasted from the internet, graphics, unless where it is specifically acknowledged that it is being sourced from other researchers. Where other written sources such as direct quotes have been used it would be indicated in italics.



31/10/2023

Student signature _____

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ACRONYMS AND ABBREVIATIONS

CBO	Community Based Organisation
CMA	Catchment Management Agencies
CoE	City of Ekurhuleni
CPR	Civil and Political Rights
DRD	Declaration on the Rights and Development
DWS	Department of Water and Sanitation
DWAF	Department of Water Affairs and Forestry
ESCR	Economic, Social, and Cultural Rights
GDHS	Gauteng Department of Human Settlement
GDP	Gross Domestic Product
ISN	Informal Settlement Network
IWRM	Integrated Water Resource Management
KZN	KwaZulu/Natal
MACODEFO	Makause Community Development Forum
MDGs	Millennium Development Goals
NGO	Non-Governmental Organisations
NDP	National Development Plan
NWRS	National Water resource Strategy
RDP	Reconstruction and Development Programme
SERI	Socio-Economic Rights Institute of South Africa
SDGs	Sustainable Development Goal
STATS SA	Statistics South Africa
UDHR	Universal Declaration of Human Rights
UISP	Upgrading of Informal Settlement Programme
UNDP	United Nations Development Programme
UN-Habitat	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation

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CHAPTER 1: CONTEXTUALISATION OF THE STUDY

1.1. Introduction

There are a range of interconnected factors which cause the establishment of informal settlements in urban areas around the world. These factors differ from country to country and region to region, but include population growth, rural-urban migration, weak governance which result in land speculation and grabbing, lack of affordable housing for the urban poor, underpaid work, discrimination, marginalisation, and economic vulnerability to natural phenomena such as climate change and natural disasters (UN-Habitat, 2015). The information mentioned above is corroborated by Mlambo (2018), who states that people migrate from rural areas to urban areas because of poverty. This led to the establishment of informal settlements in urban areas. Therefore, informal settlements are characterised by lack of service delivery such as poor electricity, sanitation and water supply from municipalities.

Water is a basic need for people's daily activities such as bathing, drinking, cooking etc. The United Nations Sustainable Development Goal 6 (Water and Sanitation) aims to ensure that by 2030 there is availability of safe and healthy basic drinking water for all people including informal settlement dwellers. The water supply sector of all member states must ensure that their infrastructure provides communities with safe drinking water (WHO, 2019).

The supply of clean, safe, and healthy drinking water is a great challenge worldwide, not only in rural areas but also in urban areas particularly in informal settlement. Despite global efforts to improve the supply of safe potable water, many people in the world still drink unsafe and contaminated water (Moe and Rheingas, 2006).

A report by the World Health Organisation (2019) indicates that globally, 2.2 billion people still lack safe drinking water. The water sector has received major attention throughout the world because of the impact it has on the livelihoods and survival of the public. The supply of unsafe water is directly linked to health risks such as

typhoid fever, shigellosis, child malnutrition, and impaired cognitive development of children. The UN report further states that, globally 850 000 people die every year because of issues linked to supply of unsafe water, with Sub-Saharan Africa being affected the most (WHO, 2019).

The provision of water supply services in informal settlements in South Africa is generally poorly managed due to the nature of the unplanned design of such settlements (Muzondi, 2014).

There is still a huge gap of inequalities in access to safely managed water which remains one of the barriers to making urban informal settlements more inclusive and safe areas in which people can live and enjoy the best living conditions (Tumwebaze *et al.*, 2023). In South Africa, informal settlements are often considered to lack (a) physical assets such as the inadequacy of basic services like water supply, sanitation, electricity, roads and drainage, schools, health centres, marketplaces. (b) social characteristics (community sentiment, permanence, or immigration) and (c) legal characteristics (legal tenure rights) (Marutlulle, 2017). United Nations Sustainable Development Goals (SDGs) agenda 2030 provides a new perspective for global monitoring of water, sets targets and indicators which can be used as vehicle towards realizing the SGD 6 which is water and sanitation by 2030.

The main purpose of this research is to investigate different role player's perceptions of the causes of poor water supply in the Makause (Marathon section) informal settlement located in the Ekurhuleni Metropolitan Municipality, South Africa.

1.2. Problem statement

According to Statistics South Africa General Household Survey (2019), the percentage of households with access to an improved source of water has increased since 2002. Contrary to the findings of the report, the supply of safe drinking water to the poor and marginalised residents who live in informal settlement around the world is still poorly managed, Makause informal settlement is no exception to other informal settlements of South Africa (Sinharoy, Pittluck,

and Clasen, 2019). As indicated earlier, in South Africa informal settlements are characterised by poor water supply which is attributed to lack of service delivery such as water supply (Sinharoy, Pittluck and Clasen, 2019). A World Health Organisation (2015) indicates that poor water supply may lead to adverse health risks amongst the community. The researcher had previously observed the residents of Makause informal settlement, particularly women, collecting water in long queues coupled with slow flow rate of taps which subsequently extends till late hours. Women were also being observed collecting water or doing their laundry near a burst pipe on the streets. This may increase their risk of sexual abuse and even exposure to adverse diseases (Fleifel, Martin and Khalid, 2019). In a worst-case scenario, some old people could fail to take their medication due to lack of drinking water.

1.3. Research questions

This research is guided by the following main research question:

What are different stakeholders' perceptions of the causes of poor water supply in the Makause informal settlement?

The significance of knowing different stakeholders' perceptions of the prevailing water supply challenges will assist decision makers to determine how service delivery can be improved in the Makause informal settlement for the betterment of the living conditions of the residents. Since perceptions are often informed by various factors, the research also investigated different factors that are most likely to be of influence on water supply such as failing municipality, infrastructure, poor service delivery, political influence or a change in the political landscape of the municipality.

Sub-questions

- Do political factors, infrastructure and the municipality play a role in poor water supply?
- Are there any causes of poor water supply that are considered prominent by different role players?

1.4. Objectives and rationale

The main purpose of this research was to investigate the causes of poor water supply through the perceptions of different stakeholders in the community of Makause informal settlement including community leaders, residents, and municipality officials in the water directorate of CoE. The research investigated whether the current water supply meets the needs of the residents as stipulated in the national frameworks for municipal indigent policies on water supply for indigent communities like informal settlements.

The objectives of this research are:

- 1.4.1. To identify water supply challenges at Makause informal settlement.
- 1.4.2. To compare different stakeholders' perceptions on the causes of poor water supply issues i.e., the relationship of various causes of poor water supply amongst different stakeholders.
- 1.4.3. To compare the causes of poor water supply from various stakeholders.

1.5. Conclusion

The aim of this chapter was to outline the global context of water supply particularly in informal settlements of South Africa and highlighted the statistic both globally and locally. This chapter has also identified the need which exists for the type of study to be carried out. The next chapter will provide more in-depth information on the case study area, Makause (Marathon) informal settlement.

CHAPTER 2: INTRODUCTION TO THE CASE STUDY

2.1. Introduction

This chapter sets the stage for a better understanding of the Makause (Marathon) informal settlement. The study follows a case study approach. The focus of the case study research is *“the collection and study of multiple forms of evidence, in sufficient detail to achieve understanding”* (Gillham, 2000:19).

2.2. Introducing Makause informal settlement

Germiston used to be a well-established successful mining and industrialisation sector. In the mid-1990s several mines started to close, and this resulted in economic decline and de-industrialisation. Makause informal settlement is one of the communities which was affected by economic decline and de-industrialisation.

Makause is an informal settlement in the City of Ekurhuleni (CoE) Metropolitan Municipality situated about 2km from Germiston town (Primrose) (Figure 1 and 2). It was established in the mid- 1990s after retrenched mine workers from Durban Roodepoort Deep gold mine and some hostel dwellers were evicted from the hostel. After the mine closed, the mine workers occupied the abandoned vacant site (South African Government, 2019).

2.3. Makause informal settlement demographics

In 2016 there were 10,000 people, many of whom have lived there for more than 30 years. Today it is believed that the densely populated informal settlement could be home for more than 30 000 people. It is estimated that Makause could have 6000 households. Makause is divided into sections A, B and C. The study is only focused on section C of Makause which is also known as Marathon. It spreads over approximately 60 hectares and is located on the west of Makause adjacent to Main reef and Pretoria Road. The section C is estimated to have 1500 households. The specified section C falls under ward 93 whereas other sections of the Makause fall under ward 21 under City of Ekurhuleni (CoE) metropolitan demarcation. Residents consider the settlement to be well-located because of the economic opportunities and social amenities in the surrounding suburbs. Section

C Marathon does not enjoy the same benefits as other sections even though they are all informal settlements (Webster, 2015).

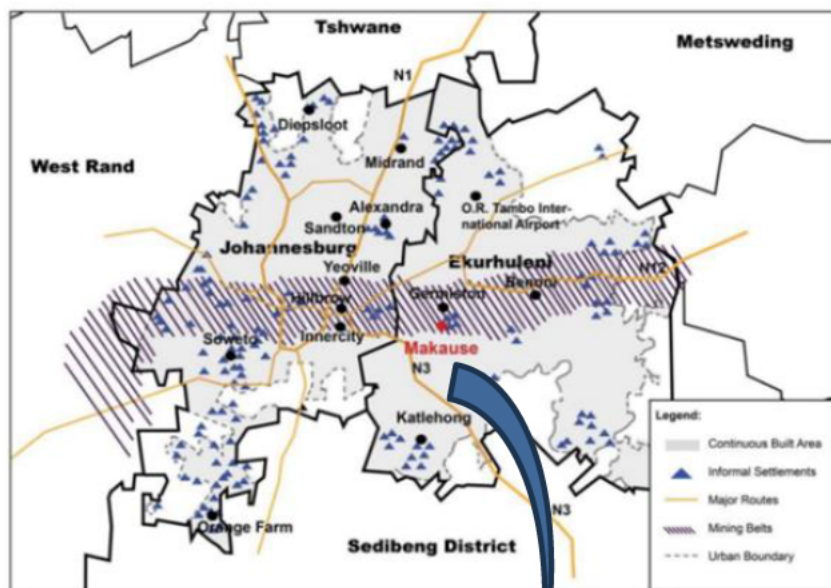


Figure 1: Makause Informal Settlement, Map Data Open Street map, 2023.



Figure 2: Makause Section C (Marathon), Google image, 2023.

2.4. Socio-Economic challenges

2.4.1. Crime

The rate of violent crimes has increased over the years in the informal settlement. There is prevalence in domestic violence, gender-based violence, sexual harassment, rape cases, physical and sexual violence to children due to the negligence of children (South African Government, 2019).

According to the community leader, the area is also home to the illegal miners' groups (The Zama-zamas). These groups often fight amongst themselves for territory of reefs of gold. Gun fights are heard during the day and night and bodies of people are sometimes found dumped on the dumping ground. The violent crime is exacerbated by the fact that the area is inaccessible to police and emergency services due to structural reasons. Community policing forums used to patrol at night where each household would contribute R10 per month towards the patrollers, this routine has since stopped, this contributed to the increased violent crimes.

2.4.2. Poverty

There is an increased proportions of populations in the informal settlement which is affected by urban poverty in South Africa. Several poverty alleviation and economic growth programmes have been initiated in the country to curtail poverty; however, this has been aggravated by inequality, unemployment and macroeconomic policies. The Makause informal settlement is no exception to this universal crisis (Extinction rebellion, 2020).

2.4.3. Electricity

The community of Makause informal settlement has existed for more than 20 years without electricity. This has led to illegal connections of electricity from underground power lines, while other people rely on solar electricity as a survival strategy. The City of Ekurhuleni municipality installed five high mast streetlights in the settlement (Extinction rebellion, 2020).

2.4.4. Eviction and strikes.

Since October 2008 the community has been resisting forced eviction and fighting for permanent residence and in-situ upgrading. A more recent strike which happened was in 2018, the community was fighting for installation of solar panels in their households. Some of the community members have been moved to Tsakane township through the Reconstruction and Development Programme (RDP) programme (Webster, 2015).

2.4.5. Land and housing

According to Statistics South Africa census report (2016), 13,6 percent of people lived in informal settlement in 2016. Therefore, this implied that approximately 1 in 7 households in South Africa lived in informal settlement in their lifetime.

The land where Makause informal settlement exists is privately owned by Rose Acres Development and Harrigan Properties. The informal settlement is considered unlawful by the municipality as it is situated in a mine residue. Therefore, if the informal settlement were to be upgraded and the reblocking process takes place, it must be firstly, bought and transferred to the municipality. The residents do not possess any land rights (Extinction rebellion, 2020).

2.4.6. Water and sanitation

Water issues cannot be separated from sanitation issues. The researcher has observed that there were currently 4 working standpipes out of 15. According to the community leader, in the past an amount of R10 was contributed by each respective household. The community managed to raise R33 000 which saw the installation of 15 standpipes. Representatives from the Informal Settlement Network (ISN) assisted the Makause Community Development Forum (MACODEFO) in installing the taps (Webster, 2015).

The community makes use of latrine toilets as their basic sanitation (Figure 3). According to the community leader this service is outsourced to an external contractor by the CoE. Ablution facilities are placed within a walking distance of 100 metres and a ratio of 1 latrine toilet per 20 households (The South African SDI Alliance, 2023).



Figure 3: Latrine toilets, Nkuna, 2023.

2.4.7. Health and environmental concerns

Diseases commonly reported throughout the settlement are HIV, TB, Diabetes, High Blood Pressure and malnutrition, which put those who are Immune compromised into a greater risk (Extinction rebellion, 2020).

There are no designated property dumping sites. This has led the community to dump household waste everywhere. This has also led to the massive breeding of disease-causing pests such as flies, cockroaches and rats. There are also no formal drainage systems, grey water (Figure 4) was visible on the ground which when exacerbated by rainfall, is a huge problem (Extinction rebellion, 2020).



Figure 4: Grey water, Nkuna, 2023.

It is evident from this chapter that Makause informal settlement is faced with many complex Socio-Economic challenges such as crime, illness/disease, housing challenges, electricity, strikes, water, and sanitation services. According to Pillay (2019) the afore mentioned and diverse Socio-Economic challenges, may hamper the development of the community. The main purpose of this research is to investigate the causes of poor water supply through the perceptions of different stakeholders in the community of Makause informal settlement including community leaders, residents, and municipality official. The next chapter will unpack some of the conceptual literature in more detail.

CHAPTER 3: LITERATURE REVIEW/THEORETICAL FRAMEWORK

3.1. Introduction

This chapter presents the literature review undertaken during the study based on perceptions and water supply services in informal settlements. Publications, government reports and white papers, journals, internet, policy documents, newspaper articles, books, and electronic databases were reviewed.

3.2. Definitions of key concepts used in this study

3.2.1. Informal settlement

United Nations Habitat (2022) defines an informal settlement as *“a contiguous settlement where the inhabitants are characterised as having inadequate housing and basic services. Slums are often not recognised and addressed by the public authorities as an integral or equal part of the city. It is an area which combines to various extents the following characteristics: insecure residential status, inadequate access to safe water, inadequate access to sanitation and other infrastructure, poor structural quality of housing, overcrowding”*.

Slums, informal settlements, squatter camps, shanty towns and favela all mean the same thing. For the purpose of this study, “informal settlement” has been chosen and used as a standard term.

3.2.2. Perception

The word perception originally came from the Latin *Percipio*, which means *“receiving, collecting, the action of taking possession, and apprehension with the mind or senses”* (Ou, 2017).

Weiten (2001:168) defines perception *“as an energetic process in which people organise and interpret the information the senses receive according to their experiences. It is imperative to indicate that environmental factors play a critical role in helping to understand residents' feelings about service delivery and their day-to-day life”*.

Kreitner and Kinicki (1998:156) defined perception as follows “*Perception is a cognitive process that enables us to interpret and understand our surroundings*”. This means that perception may differ from person to person, every person may have a unique meaning to their own environment, which is determined by a person’s experiences, attributes and attitude.

Sudarmadi *et al.* (2001) define perception of an environmental problem “*as recognising it as a problem based on memory and prior experience. People receive signals and stimuli from the social and physical environment around them and use them to build an understanding of that environment*”. Diggs (1991) argues that education, age, experience, and the surroundings influence environmental perceptions.

The theory of perceptions originally belonged precisely to the psychology domain, and it dates to ancient philosophers like Plato and Aristotle. These ancient philosophers studied the mind and how it processes information. The theory of perception was later developed and advanced around the 17th century by modern philosophers like John Locke, Immanuel Kant, and David Hume. John Locke and his epistemological community believed in the existence of a physical reality which is separate from our mental realities. Immanuel and Hume primarily studied the relationship between sensory perception and intellectual knowledge (Démuth, 2013).

At the end of the 19th century, thinkers like Hermann von Helmholtz, Gustav Fechner, Ernest Heinrich Weber and Wilhelm Wundt attempted to experimentally verify most psychological and philosophical theories of perception. Today, the theory of perceptions continues to evolve and is an ongoing discussion and endeavour in psychology, philosophy, and science (Démuth, 2013).

The theory of perception consists of:

- **Constructivism:** “*Is the theory which investigates how human beings create systems for meaningfully understanding their worlds and*

experiences". It is based on the idea that people will construct their knowledge and that reality is determined by their own experiences (Raskin, 2002).

- **Realism:** Assumes a certain level of direct or indirect view of things (Démuth, 2013).
- **Direct or naïve realism:** The conviction that one's views are objective and unbiased, whereas the other's views are biased by ideology, self-interest and irrationality (Nasie et al., 2014).
- **Indirect or representative realism:** Asserts that individuals perceive or apprehend representations with the properties that these representations (supposedly) appear to possess. This implies that humans perceive the world indirectly through mental representation or sense data (Wilcox and Katz, 1984).

Perception involves three phases: selection, organisation, and interpretation (Ou, 2017).

Process of perceptions:

Selection

This is the first stage in the process of perception. During the selection stage, the environmental stimuli are converted into meaningful experiences. Multiple stimuli are sent into a person's sensory organs and wait to be processed. There is a lot of information in the world, therefore a person cannot perceive all the information but perceives only a part of information from the environment through selective process. According to Singer (1987), people experience everything in the world not as it is but as the world comes to us through our sensory receptors (Ou, 2017).

Organisation

Organisation is the second stage of perception process. After the information from the outside world is selected, it needs to be organised in specific ways by finding meaningful patterns. During this stage of perception, individuals directly perceive the size, texture, colour and shape of social and physical events or objects. The

process of organisation enables people to structure and impart rationality to their general knowledge concerning other individuals and the social world (Ou, 2017).

Interpretation

This is the third stage in the process of perception. During this stage, once selected stimuli have been categorised into structured and stable patterns, the meaning is attached to the selected stimuli. Different people will give different interpretations to the same stimuli (Ou, 2017).

The two dimensions of perception

There are two dimensions to perception, namely, the physical and psychological dimensions.

The physical dimension of perception

The physical dimension of sensory perceptions in human beings is much the same because all human beings have sense organs. It is how information is gathered (stimuli) through our sense organs (ears, eyes and nose) and converted it into a usable form. The physical dimension of perception also functions in people's acquisition of information or knowledge about the outside world (Ou, 2017).

The psychological dimension of perception

In the psychological dimension, often referred to as cognitive perception, individuals engage in the interpretation and comprehension of sensory information. People's beliefs, cultural backgrounds, values, and attitudes all play a pivotal role in shaping their perception of the external world. Within the psychological dimension, individuals offer individualised interpretations of selected stimuli, imparting a distinctive personal perspective to their perception of the external world (Ou, 2017).

Démuth (2013:12) states that *"when studying the world, you are studying perceptions and ideas that people created, and the world is chiefly the world of perceptions, images or ideas"*.

This study is interested in individual's perceptions of the causes of poor water

supply in the Makause informal settlement.

3.2.3. Water supply

The Water Services Act (108 of 1997) further defines “*basic water supply as the prescribed minimum standard of water supply services necessary for the reliable supply of a sufficient quantity and quality of water to households, including informal households, to support life and personal hygiene*” (Section 1(iii)).

3.3. Global overview of informal settlements and water supply

According to (UN-Habitat, 2022), about 1.7 billion urban dwellers live in informal settlements worldwide. This can be translated as ¼ urban dwellers live or have lived in informal settlements where there is inadequate living, crowded and unsafe housing being severely affected by multiple traumas and various life-threatening risks. It is estimated that the current number will increase by 3 billion by 2030. Rapid urbanisation and population growth become a significant challenge in many countries where legislation, laws and policies are weak. Those countries cannot successfully tackle multiple, complex, and interrelated urban challenges.

According to UN-Habitat (2022) the following countries are amongst the top countries with the highest percentage of the urban populations living in informal settlements: Afghanistan, Angola, Benin, Central African Republic, Chad, Democratic of Congo, Ethiopia, Guinea-Bissau, Liberia, Madagascar, Mauritania, Mozambique, Sao Tome and Principe, Somalia, South Sudan and Sudan.

In Sao Paola, Brazil, 12 million or 30% of the total urban dwellers live in informal settlements. The people in such areas lack primary access to basic infrastructure such as water supply systems. People who live in Informal settlements in Brazil do not have the legal title of the land they live in recognised by the state. Therefore, the obligation to have legal property rights determines the right to essential services. Consequently, it is illegal for the water authority to supply clean drinking water to informal settlements (Hylton and Charles, 2018).

In Namibia, informal settlements are mushrooming on the edges of Windhoek at

an alarming rate due to rapid rural-urban migration. Urban growth is approximately 4.4% per annum, whereas the informal settlement population is growing at a disturbing 9.5% per year. Therefore, Windhoek is challenged to provide safe drinking water to informal settlements. The water management systems in Windhoek to provide water supply is divided into the informal and formal sector. However, access to safe drinking water systems has been rigged to favour formal urban areas (Lewis, Siyambago and Lendelvo, 2018).

Most people who live in informal settlements around the world are generally poor, lack water supply and regularly deal with overcrowded and risky environmental conditions (Adams *et al.*, 2020). The urban informal settlement dwellers are also diverse groups with distinct levels of vulnerability, which is based on their gender, age, ethnicity, race, household structure, migration status and other multilayered factors. The most marginalised populations are migrants, refugees, women, children and elders (UN-Habitat, 2020).

There is often an infrequent or lack of water supply in such areas because informal settlements are outside the main urban central water supply infrastructure. Residents in informal settlement particularly in the Global South do not have private water taps in their yards; conversely, they cannot afford to buy water from private vendors. This means that there is no secondary source of water supply if the municipality does not provide water tankers or JoJo tanks during water interruptions. This implies that if the primary water supply becomes unavailable, they must wait until municipality water returns (Price *et al.*, 2021).

Historically, in South Africa water scarcity has been acute in rural areas. However, of late, trends have been shifting and indicate worsening availability and poor quality of water in urban areas. This is caused by population growth, increasing demand, mismanagement and lack of water treatment facilities (Adams, 2018).

Municipalities cannot cope with the rapidly increasing informal settlements (Dos Santos *et al.*, 2017). Informal settlements in urban areas are inevitable

phenomena. Urbanisation and other factors will always contribute to the burgeoning of informal settlement on the edges of big and small cities (Marutlulle, 2017).

Informal settlements cause negative environmental impacts such as air and water pollution. These impacts of informal settlements are multidimensional and coexist with many other challenges, such as forced eviction, exclusion, safety, electricity, health and exposure to environmental risks which compromise livelihoods, child development, and Socio-Economic Development (Boateng and Adams, 2023).

Gleick (1998) argues that access to essential water is a fundamental human right which is implicitly supported by international law, declarations, and state practices. This implies that irrespective of the living conditions of the informal settlement dwellers, having land rights or not, the residents have the right to access to water supply.

3.3.1. Water as a human right

The 1948 Universal Declaration of Human Rights (UDHR)

The UDHR states that *“Everyone has the right to a standard of living adequate for the health and well-being of him(her)self and his (her) family including housing and medical care and necessary social services”*. The water right is not explicitly mentioned in this article. However, it is embedded in this article (Gleick, 1998).

The 1966 International Covenant on Economic, Social and Cultural Rights (ESCR)

- a) Article 11: *“The States Parties to the present Covenant recognise the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing, and housing, and to the continuous improvement of living conditions. The States Parties will take appropriate steps to ensure the realisation of this right, recognising to this effect the*

essential importance of international co-operation based on free consent.”

- b) Article 12: *“The States Parties to the present Covenant recognise the right of everyone to enjoy the highest attainable standard of physical and mental health”.*

Gleick (1998) argues that even though water is not explicitly mentioned as a human right in Article 11 and 12 of the 1966 International Convention on Economic, Social and Cultural Rights (ESCR). Article 11 recognises the right to the highest standard of living, where there must be adequate food, clothing, and housing. Furthermore, Article 12 recognises the right to enjoyment of the highest standard of living. Therefore, the production of food and clothing requires water. An adequate standard of living cannot be attained without access to water supply. This implies that even though water is not directly mentioned in these two articles, the right to water is indirectly embedded in food and clothing production as virtual water.

The 1966 International Covenant on Civil and Political Rights (CPR)

This multilateral treaty commits nations to respect individual's civil and political rights, including the right to life, freedom of religion, freedom of speech, freedom of assembly, electoral rights and the rights to due process and fair trial.

The Declaration on the Right to Development (DRD)

This is the right to participate in development. This Declaration defines development as *“an a comprehensive economic, social, cultural, and political process, which aims at the constant improvement of the well-being of the entire population and all individuals based on their active, accessible, and meaningful participation in development and the fair distribution of benefits resulting from that place”.*

The United Nations World Health Organization (UN-WHO) recommends minimum water-access standards between 50 and 100 litres of water per person per day to ensure that most basic needs are met so that no health issues may arise. Physical

accessible is prescribed at minimum collection time of 30 minutes within 100 meters of a household (UN General Assembly, 2010).

McCaffrey (1998) indicates that the UN conventions and declarations are legally binding to all member states and can be used in the International Court of Justice. Any ratified member state is compelled to adjust its domestic legislation to be able to be enforced on the ground. However, a state cannot be forced to ratify treaties.

SDG: 6 Water and sanitation

On 25 September 2015, the United Nations General Assembly adopted the 2030 Agenda for Sustainable Development. The fundamental part of the 2030 Agenda is the SDGs, which are aimed at a universal call to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. Nearly all the world's nations agree upon the SDG's. Previously the Millennium Development Goals (MDGs) were adopted in 2000 to reduce poverty and achieve an enhanced standard of living for all. Most countries signed up to the MDGs, but their targets were never met. As a result, the SDGs were introduced in 2015. The SDGs were broadly expanded from the MDGs as one of the mechanisms set by the United Nations to tackle many global interconnected challenges. The SDG 6 states that by 2030, countries must ensure sustainable water and sanitation availability for everyone. South Africa has endorsed a National Development Plan to align itself with the Global SDGs Agenda 2030 (Sinharoy, Pittluck, and Clasen, 2019).

3.4. Water supply in the informal settlements of South Africa

According to reports by the WHO/UNICEF, (2021), half of the urban population of Sub-Saharan Africa, approximately 238 million, live in informal settlements. The inadequate water supply to informal settlements is attributed to the general nature of informal settlements, with their unplanned spatial form resulting in most inhabitants being marginalised from service delivery.

3.4.1. The historical background of the informal settlement patterns in South Africa

The South African pattern of informal settlements is predominantly a legacy of the colonialism era and apartheid government. Urban racial segregation started to evolve between 1910 and the Second World War. White cities were the target of colonial planning initiatives (Strauss, 2019). The Natives Land Act (No. 27 of 1913), also known as the Black Land Act, was passed to prevent overcrowding by the African people in white areas and to prohibit African people from possessing any land. The Natives Land Act laid the foundation for advancing spatial segregation through land dispossession (Strauss, 2019).

Spatial injustice and urban residential segregation signify substantial dimensions in the historical development of the settlement patterns of South Africa's informal settlements. Urban workforce conditions were also improved and controlled by restricting African people's employment in cities but only reserving that for the white working class. The economic and social impacts of the Natives Land Act were far-reaching to the African people. The above drove most of the urban African population to be cheap labourers, paid minimum wage and started the establishment of overcrowded and impoverished informal settlements on the outskirts of cities and towns. During the 1930's, there was a massive sprouting of informal settlements (Strauss, 2019).

The drought between 1970 and 1980 forced the African people who lived in infertile Homelands (Bantustan) to move to urban areas. African people abandoned their barren land, sold their livestock, and went to find work in the mining industries and farms (Parnell, 1993).

The modern cause of informal settlements in urban areas is exacerbated by several factors, such as lack of housing, planning policies from the previous government, housing backlog and the influx of foreigners (both legal and illegal) into South Africa (Marutlulle, 2017).

3.4.2. Water a fundamental Human Right Condition: A South African context

When unpacking water related issues in South Africa, mentioning the country's rainfall pattern is imperative. South Africa is a semi-arid country receiving 450-500mm of rainfall per annum, below the world's 860 mm average per year (Botai *et al.*, 2016). The rainfall pattern is characterised by high annual variability and unpredictability. The above challenges are exacerbated by environmental challenges such as climate change, high evaporation rates and uneven rainfall distribution (Botai *et al.*, 2016). This implies that these natural phenomena have strained the supply of safe drinking water even before it can be distributed for human use.

Water resources must be managed appropriately and maximised to ensure everyone has a share (Department of Water Affairs and Forestry, 1994).

South Africa has suffered several disparities regarding adequate access to water supply under the apartheid regime for many years. Post 1994, the government tried to redress the fundamental issue of iniquity in water supply development (Marutlulle, 2017).

3.4.3. Water governance reforms in South Africa

The Constitution of the Republic of South Africa (Act 108 of 1996)

The Constitution of the Republic of South Africa Act 108 of 1996 and the Bill of Rights is the country's supreme law. Section 27 enshrines the principles of access to sufficient and clean drinking water as fundamental human rights. Therefore, the Constitution becomes an umbrella of all the legislations, rules and policies governing water resources and human rights. Chapter 10 of the South African constitution also highlights the principles governing the country's public administration. These principles include accountability, transparency, and equitable and effective use of resources. Municipalities (Water Service Authorities), following the Water Service Act, Act No. 108 of 1997, are mandated to provide essential water supply services to consumers. This can be translated into local government overseeing the municipality's water services.

Water Supply and Sanitation Policy White Paper (White Paper) 1994

The policy recognises a massive backlog in the country's water services such as RDP houses, structures and institutions. It further outlines the systems and procedures to be put in place and implemented to address and remedy the backlogs. The paper recognises that the lack of essential services such as water supply is a crucial symptom of poverty and under-development. It indicates that providing such services must be part of a coherent development strategy to succeed. This paper further acknowledges that equity is the fundamental challenge to be addressed in the water sector. The paper indicates that the line which divides those with adequate access to water from those without water, it is the same line which divides the rich and poor, the hungry from the well fed, the line of race and the privileged.

Water Services Act (WSA of 1997 (Act 108 of 1997))

Under section 9 (1) of the Water Services Act, the Minister of Water and Sanitation has promulgated regulations relating to compulsory national standards and measures to conserve water. The Act provides a regulatory framework for establishing water boards and other water service providers such as municipalities. Under this Act, a free basic water policy was introduced in 2000 to redress poverty previously experienced by many South Africans. The policy was to be implemented at the municipality level. The policy was introduced to ensure that no one is denied access to basic water supply due to their inability to pay for the service. The policy further states that *"the minimum standard for basic water supply services is a minimum quantity of potable water of 25 litres per person, per day or 6000 litres per household per month, at a minimum flow rate of not less than 10 litres per minute; within 200 metres of a household; and with effectiveness such that no consumer is without a supply for more than seven full days in a year"*.

National Water Policy of 1997

The policy redefines the ownership and allocation of water resources. The policy further declares all water resources within the hydrological cycle, including underground water resources, as public water and that the National Government

(Department of Water and Sanitation (DWS) is the custodian of all water resources.

National Water Act 36 of 1998

The Act focuses on the sustainable utilisation of water resources in a responsible manner by all water users. Its pillars are sustainability and equity. The Act also focuses on promoting integrated management of water resources with the participation of all stakeholders. It recognises that water belongs to everyone and encourages all stakeholders to participate effectively in water management and equitable use. The Act also focuses on establishing a National Water Resource Strategy (NWRS) to set out a national framework to develop, conserve, manage and control water resources within the country.

South Africa has suffered significantly from the inequalities of the past when it comes to the allocation of water in the apartheid regime. The black majority population did not have access to water. The Water Act 54 of 1957, in conjunction with several other discriminatory apartheid policies, were used to deprive black people of the right to potable water (Funke *et al.*, 2007; Claassen, 2013).

Under apartheid, white farmers consumed 95% of water through irrigation, whereas black farmers used the remaining 5%. Therefore, the National Water Act redresses past inequalities (Funke and Jacobs, 2011).

To redress the consequences of past racial and gender discrimination in the use of water resources, the South African government adopted the international approach, the Integrated Water Resource Management (IWRM) through the National Water Act (1998).

The Global Water Partnership (GWP) (2000) defines IWRM as “*a process which promotes the coordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare equitably without compromising the sustainability of vital ecosystems*”.

To ensure sustainable and equitable management of water in South Africa, the country is guided by the following three key policy goals of IWRM, also known as the three 'E's:

- **Social equity:** To ensure that water is allocated and managed equitably

and benefits everyone, including those previously disadvantaged, such as the marginalised groups.

- **Economic efficiency:** To maximise the use of water by all users through efficient and economical water allocation for future social and environmental benefits.
- **Ecological sustainability:** To manage water resources in a manner which considers aquatic ecosystems and preserves them for present and future generations (Meran *et al.*, 2021).

According to Meran *et al.* (2021) the following are the principles of Integrated Water Resource Management (IWRM):

- To integrate water and environmental management such as agriculture and other industries.
- To ensure full participation by all stakeholders, including local communities.
- To build capacity in institutional structures.
- To make information available and the capacity to use it to enhance developments.
- To redefine and strengthen the role of women in water management because women play a critical role in the provision and safeguarding of water.
- To adopt the best existing technologies and practices in the water sector.
- To decentralise water management powers and decision-making to local and regional authorities.

National Water Resource Strategy (NWRS)

This strategy provides the national implementation framework for water, divides the country into 9 Water Management Areas (WMA) and sets guidelines on how Catchment Management Areas (CMA) should be established. It also addresses concerns that the Socio-Economic growth of South Africa will potentially be restricted if water security is not addressed.

National Water and Sanitation Master Plan

This plan is intended to guide the water sector with investment planning for developing water resources and delivering water and sanitation services until 2030 and beyond.

South African case studies

Pan, Armitage, and Van Ryneveld (2015) examined sustainability and equity in the context of sanitation and water supply in the informal settlements of Cape Town. Their research investigated sanitation services policy, including water supply perspectives, priorities, barriers to sustainability and equity in implementation. These factors were then compared with policy documents and municipality records. The study also interviewed scholars, government officials and individuals living in the informal settlement. Some of the key findings of the paper are that there was an inadequate flow of communication between municipality departments, Non-Profit Organisations (NGOs) and residents and there was a lack of coordinated cooperation between government structures (water and sanitation, solid waste, human settlements, roads and stormwater, environmental health). The study states that planning sanitation services in informal settlements requires cooperation from all these departments to be accountable in decision-making (Pan, Armitage, and Van Ryneveld, 2015).

Oskam *et al.* (2021) assessed Socio-Economic inequalities in drinking water use among inhabitants of informal settlements in South Africa. The study used a baseline study for future impact evaluation for informal settlements targeted for upgrading in all nine provinces in South Africa. Multinomial logistic regression analyses, concentration indices, and concentration curves were used to assess Socio-Economic inequalities. The study did not research perception or water supply but examined Socio-Economic disparities regarding access to drinking water. As a data collection method, the study used a household survey using a structured questionnaire. The study indicated that the use of a piped tap in the yard was disproportionately concentrated among households with higher Socio-Economic status in the community.

On the other hand, households with lower Socio-Economic status were compelled to utilise other inferior (less safe and distant above 200 metres) away from drinking water sources. The households of those with higher Socio-Economic status were well positioned next to the water collection points. The study shows substantial economic inequalities in drinking water use among inhabitants of informal settlements in South Africa. The study also indicated that using inferior drinking water sources in informal settlements is considerably associated with the head of the household's age, marital status, education status and employment status.

The role of the City of Ekurhuleni Metropolitan Municipality in supplying water to informal settlement

The City of Ekurhuleni Metropolitan (CoE) council has approved the indigent policy. It is committed to providing six kilolitres of free water supply services per month for registered indigents qualifying in terms of the Council's approved Indigent Policy. Everyone has the right to access sufficient water, and the CoE is committed to realising this right. The CoE will, therefore, provide a basic (free) portion of the water services to poor households (City of Ekurhuleni, 2023). The free primary water supply is in line with the City's Water Services By-law and as set out in the National Norms and Standards for domestic water services registered indigent households (City of Ekurhuleni, 2023). Consumers must abide by the City's Water Conservation and Demand management guidelines as provided in the City Water Service By-laws. The primary (free) portion of the water services is financed using the equitable share from the National Government. All consumers are encouraged to use water sparingly and to report any leaks/water losses/illegal connections to the city as required (City of Ekurhuleni, 2023).

3.5. Conclusion

In conclusion, South Africa has sufficient policies and legislations as instruments to support the supply of adequate safe drinking water to all citizens. South Africa has, on many occasions, been hailed by the international water community for its comprehensive and progressive water policies worldwide (De Kock, 2021). The primary purpose of this research was to investigate the causes of poor water

supply through the perceptions of different stakeholders in the community of Makause informal settlement, including community leaders, residents, and municipality officials. The next chapter will present the research design and methodology for gathering the data.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

4.1. Introduction

This chapter discusses the research design and methodology used for the study. It specifically unpacks, data collection methods, sampling methods and size, interview administration, ethical considerations, reliability and validity of data, analysis methods and study limitations. The chapter also discusses in detail how the methods were chosen and applied.

4.2. Research design

The research undertook a qualitative approach. A qualitative approach is used to gain information about the study area or object through generalised observations and surveys. The study also followed the interpretivism paradigm, which is exploratory. Exploratory research seeks to establish how people cope in their natural environment, and what meaning they give to their actions and what issues concern them (Neuman, 2006). This is a suitable research approach for investigating different people's perceptions of the causes of poor water supply in each situation, such as the Makause informal settlement (Cohen, Manion, and Morrison, 2007).

Creswell (2013:45) upholds the view that *“qualitative research is a process of an understanding based on distinct methodological traditions of inquiry that explore a social or human problem”*.

The research consisted of observations, in-depth interviews, and questionnaires. Thirty-seven informal settlement residents, one municipality official and one community leader participated. A focus group meeting was also planned; however, it did not happen due to the nature of the informal settlement.

4.3. Data collection methods

Before collecting data, the researcher gained entry to the study area through engaging with community leaders and the residents. The purpose of the study

was explained to the community leader who authorised the research by signing all gate keepers' letters. Data collection happened between May and June 2023. Photographs were taken during the fieldwork to support concepts and observations. This is a suitable research approach for investigating different people's perceptions of the causes of poor water supply in each situation, such as the Makause informal settlement (Du Plooy-Cilliers, David and Bezuidenhout, 2014).

The first method of data collection was in the form of fieldwork where an observation sheet was used to examine the state of infrastructure, such as the number of communal taps used for water supply, the presence of communal washing basins, the distance residents cover to go to collect water, damaged infrastructure such as leaks, and strategies used by community members to collect water (Appendix 4 Observation sheet).

The second data collection method was in-depth individual interviews with a community leader to explain the causes of poor water supply in the informal settlement. Semi-structured interviews with community leader and informal conversations were recorded (Appendix 1).

The third method of collecting data was fieldwork consisting of in-depth individual interviews in open-ended questionnaires with 37 male and female residents. A series of questions were used to test various factors believed to inform perceptions of the causes of water supply since they often vary from one individual to the other (Appendix 2).

A focus group discussion (FGD) was also planned as one of the methods of collecting data. This method had to change due to the circumstances in the community. However, the questions did not change. The FGD was no longer appropriate due to the safety concerns of people gathering. Permission was obtained from the supervisor to change the method.

The last method of data collection was a questionnaire completed by one

municipality official.

Mwita (2022) indicates that there are five factors that affect data saturation: pre-determined codes and themes, sample size, relevancy of research subjects (participants), number of research methods and length of data collection sessions. Therefore, when conducting qualitative studies, researchers must consider multiple factors affecting data saturation to achieve data saturation. This will increase the validity of the study.

4.4. Data collection process

Observation

One of the community members accompanied the researcher to walk around the Makause informal settlement. The purpose of this was for the researcher to familiarise himself with the area, to observe how water was collected and to record the condition of the infrastructure. This information was recorded on the observation sheet and later included in the study to substantiate specific findings.

Questionnaires

Questionnaires were emailed to the municipality officials and ward councillors. Initially, they had agreed to an interview. Later, some of the municipality officials pulled out. The gathered information was also coded, incorporated into themes, and later included in the study. Quotes were also extracted from the responses of the municipality official. The ward councillor did not return the questionnaire.

Focus Group Discussion

FGD's were planned but did not take place because of the nature of the informal settlement. The researcher was advised that it was not safe to gather and hold meetings.

Interviews with residents

A few of the residents previously identified by the community leader came to his household to meet with the researcher to answer a series of questions structured

in a sequence. Their answers were written on the questionnaire, and notes were also made. This information was later coded and broken down into themes and quotes later used in the study.

Interviews with a community leader

The interview with the community leader took place for several days. It happened simultaneously while the researcher was collecting data from the residents of the informal settlement. It was in the form of dialogue. The interview was sometimes both formal and informal. The community leader later gained trust from the researcher, and he became comfortable talking about many community dynamics. The community leader interview was recorded. The recorded version was later transcribed into a printed version. This information was later used as quotes in the study and has been incorporated to provide answers on some of the themes in the study.

4.5. Sampling method and size

The participants were pre-selected and informed by the community leader. The community leader knew the informal settlement well. The primary purpose was to select families who had lived in the area for many years and avoid child-headed families with less experience and knowledge about the community. Participants were sampled by selecting residents willing to participate in the research (purposive sampling) who have lived in the informal settlement of Makaue for more than ten years. This was to ensure that the participants knew the social dynamics of the community and could provide comprehensive answers about the perception of the causes of water supply at Makaue informal settlement (Cohen, Manion, and Morrison, 2007). They also had a history of living in the area for a period to discuss any significant changes over time.

A probability and purposive sample method was employed. Babbie (2010:192) defines purposive sampling as *“a type of nonprobability sampling in which the units to be studied are selected based on the researcher’s judgment about which ones will be the most useful or representative”*. A purposive sampling allows the researcher to select information-rich cases (Babbie, 2010). The purposive

approach was based on attributes like expertise and level of leadership in the community. The municipality official had several years in the (CoE) water supply department, whereas the community leader was also knowledgeable about the social dynamics of the Makause informal settlement. Information was collected until data saturation was reached.

4.6. Survey administration

The community leader informed the participants in their community meetings about the research to be conducted. The community leader assigned a committee member to assist the researcher in navigating the informal settlement. The committee member was also responsible for translating the interviews from Zulu, Xitsonga, and Sotho into English.

4.7. Data analysis methods

The researcher employed a qualitative data analysis approach. The researcher employed both deductive and inductive approaches in analysing the data. This means that themes were derived from other literature and combined with the themes obtained from the interviews and questionnaires of the research. The data from questionnaires and interviews were then captured into a spreadsheet and numbered accordingly. Thematic data analysis was used where open coding text in lines, paragraphs or sections from participants was broken down into smaller categories or classes, then later into themes (Ritchie and Lewis, 2011). The researcher manually identified similar, and different patterns from the data collected, then coded them and later grouped them into sub-themes. Some sub-themes that emerged from the data were adequate water supply, improved water supply, taps at home, improved infrastructure, change of political party, more communal taps and increased water pressure. These sub-themes were further grouped into more constructive themes, such as vandalism and illegal connection, water policies and management, marginalisation, lack of communication and inadequate infrastructure maintenance, and they were later discussed in Chapter 6. All the responses were reviewed and grouped into themes for each question asked. The results were then presented in figures where the opinions of the responses differed (Maguire and Delahunt, 2017). Direct quotes from the

participants derived from interviews and questionnaires were used to support an idea. The literature review was used to form part of the philosophical component of the study to confirm or contrast the empirical findings. Qualitative data analysis was employed to analyse case study observation, and graphs were presented.

The recorded audio from the community leader was transcribed into words and grouped into codes and themes (Appendix 1).

4.8. Ethical considerations

Before the commencement of the data collection, a proposal was submitted and approved by the ethics committee of IEMSA. An ethical clearance letter was granted to the researcher. The ethical clearance had consent forms and gatekeepers' letters for all the research participants (Mouton, 2007) (Appendix 5 and 6).

The community leader approved the entry at Makause informal settlement to conduct research. The purpose of the research and the rights of participants were explained, including their right to suffer no harm, confidentiality, self-determination, voluntary participation, and the right to withdraw from the study at any given time. No child was interviewed during the research. The municipality official also read, understood, and signed the consent letter (Babbie, 2010).

No false expectation was created, and the participants were informed that there was no monetary reward. The participants were also informed that this was not an intervention study whereby the community would benefit. However, the outcome of the study will be available to the participants. Sensitive questions relating to culture and religion were avoided. The researcher always upheld the IEMSA ethical principles, such as avoiding plagiarism, fabrication, or data falsification (Cohen, Manion and Morrison, 2017).

4.8.1. Confidentiality

To ensure confidentiality, the names of the participants were never mentioned in the study. Participants were referred to as participant #1. The participants were

also informed that their confidentiality and anonymity were guaranteed. The consent form obtained from IEMSA was read to those who could not read it, and every participant signed it (Appendix 5).

4.8.2. Reliability and validity

Reliability and validity imply that similar results would be obtained when someone were to carry out the same study (Du Plooy-Cilliers, Davis and Bezuidenhout, 2014). The researcher ensured that the study demonstrated consistency and reliability. The researcher tracked precise data collection, analysis, and interpretation methods by providing adequate contextual information about each piece. The researcher ensured credibility in the interviews by interviewing the community leader and responsible people. The researcher also ensured that all methods used could be applied elsewhere and yield similar results by providing adequate details on the site, participants and methods or procedures used to collect data during this study.

4.9. Limitations of the study

There were constraints experienced during conducting the research.

The community leader was unhappy that the researcher referred to the informal settlement as Makause. He wanted the name changed to Marathon (Section C). He argued that even though Makause is old, popular, and adjacent to their informal settlement. Their informal settlement was an extension to Makause, but it is independent of Makause, and they would like to be called Marathon informal settlement as they do not enjoy the same benefits because they do not belong to the exact municipality ward demarcation.

Another setback was that most participants did not know how to write or read. Therefore, they could not comprehend some of the study content even though a translator accompanied the researcher.

Due to the high population of illegal immigrants, some participants did not want to disclose in-depth information due to a lack of trust. Due to the same reasons, language was also a barrier.

Makause informal settlement is a crime-ridden informal settlement; the researcher sometimes heard gunshots while conducting the research. The researcher was advised to always ensure he leaves the area before sunset because of the turf war between the (Zama-Zamas, illegal miners) and robberies. During the study, the research had to halt because of the dead bodies of people found dead due to the illegal mining battle.

In the proposal, focus group interviews were proposed as one of the methods to collect data. This could not happen due to the social dynamics and politics of the informal settlement. Permission was requested to use individual interviews and ask the same questions to individuals instead.

The participants also denied the use of video recordings due to mistrust.

Two CoE officials from the water directorate had promised to participate in the research. When follow-ups were made, the municipality officials could not be found.

The ward councillor also promised to participate in the research. When follow-ups were made, the ward councillor no longer responded to emails and calls.

4.10. Conclusion

This chapter has examined and described the research design and methodology to collect evidence for this study. The primary purpose of this study was to investigate the causes of poor water supply through the perceptions of different stakeholders in the community of Makause informal settlement, including community leaders, residents, and municipality officials. This was achieved through the combination of interviews, questionnaires, and observations. The next chapter will present the findings of the study.

CHAPTER 5: PRESENTATION OF FINDINGS

5.1. Introduction

Chapter five focuses on the analysis of the data collected, in depth- interviews, questionnaires, observations, and informal discussions used to collect data for this research. The responses of the 37 participants, the CoE municipality official and one community leader of the Makause informal settlement who all participated in the study are presented and analysed below. An overview of demographic data such as gender, age group, education level, employment status, household size and number of years residing at Makause informal settlement are shown below (Table 1). This is followed by a presentation of the communities' perceptions of the causes of poor water supply. Their opinions on issues relating to water supply are analysed.

Table 1: Summary of the demographic of participants of Makause informal settlement.

Participants	Gender	Age group	Education level	Employment status	Household size (people)	No. of years at Makause
Participant # 1	F	35-44	Certificate	Unemployed	03	25 years
Participant # 2	F	25-34	Gr. 8-10	Employed	02	18 years
Participant # 3	F	55-64	Gr. 8-10	Unemployed	09	25 years
Participant # 4	M	35-44	Gr.11-12	Unemployed	01	19 years
Participant # 5	F	35-44	Gr.11-12	Employed	02	13 years
Participant # 6	F	35-44	Gr. 8-10	Employed	05	10 years
Participant # 7	F	45-54	Gr. 8-10	Employed	03	15 years
Participant # 8	F	55-64	Primary	Unemployed	05	35 years
Participant # 9	F	55-64	Primary	Unemployed	07	34 years
Participant # 10	F	45-54	Gr. 8-10	Unemployed	05	20 years
Participant # 11	F	35-44	Gr. 8-10	Unemployed	06	11 years
Participant # 12	F	45-54	Gr. 8-10	Employed	04	17 years
Participant # 13	F	65+	Primary	Unemployed	07	36 years
Participant # 14	M	35-44	Gr. 11-12	Employed	03	10 years

Participant # 15	M	45-54	Gr. 8-10	Employed	04	30 years
Participant # 16	M	45-54	Gr.11-12	Unemployed	02	30 years
Participant # 17	F	25-34	Certificate	Unemployed	05	10 years
Participant # 18	F	45-54	Gr. 11-12	Employed	04	39 years
Participant # 19	F	35-44	Gr. 11-12	Unemployed	04	27 years
Participant # 20	M	35-44	Gr. 11-12	Employed	05	28 years
Participant # 21	F	45-54	Gr. 8-10	Employed	02	29 years
Participant # 22	F	45-54	Gr. 8-10	Employed	09	31 years
Participant # 23	M	55-64	Gr. 8-10	Employed	07	19 years
Participant # 24	F	45-54	Gr. 11-12	Employed	06	30 years
Participant # 25	F	55-64	Gr. 11-12	Unemployed	07	35 years
Participant # 26	M	65+	Gr.8-10	Unemployed	02	40 years
Participant # 27	F	55-64	Gr. 8-10	Unemployed	07	30 years
Participant # 28	F	45-54	Gr. 8-10	Unemployed	04	27 years
Participant # 29	F	45-54	Gr. 8-10	Unemployed	05	26 years
Participant # 30	F	65+	Gr. 8-10	Unemployed	05	40 years
Participant # 31	M	35-44	Gr. 8-10	Unemployed	03	13 years
Participant # 32	M	35-44	Gr. 11-12	Employed	05	19 years
Participant # 33	M	45-54	Gr. 8-10	Unemployed	06	30 years

Participant # 34	F	45-54	Gr. 8-10	Unemployed	05	19 years
Participant # 35	F	35-44	Gr 8-10	Unemployed	07	20 years
Participant # 36	F	35-44	Gr. 8-10	Unemployed	04	19 years
Participant # 37	F	45-54	Gr. 8-10	Unemployed	03	29 years

5.1.1. Gender and age group of the participants

Most of the participants in the study were females, as depicted in (Table 1). A few males also participated in the research but as relative to females. Only ten males and 27 females participated out of 37 participants. This could be attributed to the fact that many men were at work when the research was carried out during the week. Where men acted as participants it was either during weekend or when they have returned from work. An interesting finding was that when men were approached, they asked their wives to answer any water-related questions. It is well known and widely reported by UNICEF and WHO (2023) that women and girl children are responsible for fetching water for household usages, such as cooking, cleaning, laundry, and childcare and that women are often viewed as water managers.

Women face inequalities regarding water access, though they are responsible for managing household water supply and storage (Hlahla, 2022). Paul and Das (2020) argue that women play a crucial role in the collection, use and management of water distribution within the family, however, when it comes to developing water management policies and decision making, the interests and experiences of women are overlooked. Women must be involved in development projects such as planning, construction, maintenance, and evaluation to achieve more significant developmental goals for the country's economic growth.

Most participants were over the age of 35, mainly between 45 and 54. Few participants were between 25 and 34 (Table 1). The data confirmed that women and girls of all ages handle household chores that require water.

5.1.2. Education level and employment status of the participants

Most of the participants from this informal settlement did not have a formal academic qualification post -high school (Table 1). Most did not complete matric, they only completed their studies until their Grade ten, followed by those who completed either Grade eleven or twelve. Some have only completed their primary studies, while only two people obtained post-matric studies such as a certificate. Literature suggests that if a community has a high level of illiteracy, it significantly limits them from being employed. Therefore, their chances to participate in the economic growth of the country become restricted (Oldewage-Theron and Slabbert, 2010). A conclusion can be drawn from the evidence gathered that from the literacy rate point of view, at Makause informal settlement, there is a high level of illiteracy, which significantly contributes to poverty in the community.

The most essential means of taking a country out of poverty and its underdeveloped status is the eradication of illiteracy. People with good literacy skills in a country enjoy a higher standard of living. These people will then have better job opportunities and continue to learn new skills to help them in the workplace (Quan-Baffour and Johnson, 2022).

Agesa and Agesa (2019) argue that the high number of dropouts of girls in schools in Kenya was partially an explanation attributed to fetching water/schooling time trade-off amongst girls. Cooper-Vince *et al.* (2017) also signify that due to water insecurity, the school attendance rate in Sub-Saharan Africa is among the lowest in the world. Therefore, this results in children being exposed to high risk for poor educational and economic outcomes. This could imply a high possibility of a correlation between high illiteracy levels and inadequate water supply access. Contrary to that, it could be possible that as soon people are educated and have access to excellent quality life and better jobs, they move out of Makause to live in better places that suit their living and needs.

Just over half of the participants from this informal settlement are unemployed (Table 1), with 20 participants recorded as unemployed and 17 registered as employed. Notably, participants who showed prominent levels of illiteracy might

also have fallen among those unemployed. In 2023, the official unemployment rate in South Africa was recorded at 32.9%, which ranks as one of the highest in the world (STATSSA, 2019). The influx of foreigners and South Africans who move from other provinces to large cities to look for employment adds to the high unemployment rate. As a result, the unemployed labour force resorts to informal economic activities to ensure survival (Mthiyane, Wissink and Chiwawa, 2022). To measure poverty is extraordinarily complex, as indicated before. However, to see it is an easy task. There is a correlation between unemployment and illiteracy. Therefore, the two can be used to measure poverty (Mkhize *et al.*, 2023).

This evidence can allude to the Makause informal settlement being a poverty-stricken community. This implies that because the unemployment rate is exceedingly high, it can be concluded that the community members cannot support themselves or seek other alternatives to access clean drinking water, such as buying bottled water from vendors. The order of the day is to put food on the table daily. The impacts of unemployment have an extremely negative influence on the well-being of people, such as poverty and hardship, strained relationships, poorer health, personality change and housing stress (Boyce *et al.*, 2015; McClelland, 2000).

5.1.3. Household size and the number of years residing at Makause informal settlement

At Makause informal settlement, the average household size was five individuals per household. The range of household sizes varied, with the smallest home accommodating a single family member while the largest housed up to nine family members, as depicted in Table 1. Notably, in cases where the household size was more significant, it was often due to the presence of tenants. The size of households bears significance, as it directly correlates with the number of individuals dependent on the water supply and therefore impacted by water shortages. Most of the participants interviewed have lived in the Makause informal settlement for over 20 years (Table 1).

Many of the people interviewed could, therefore, provide tangible insights into the social complexity of the community. For example, participants who had lived in

the community for more than 30 years had witnessed when the first standpipes were installed. Therefore, they also saw the deterioration of infrastructure, such as taps. This group of participants are likely to be the same group, which indicated that the water supply situation is currently deplorable in the community compared to when they first moved into the informal settlement. The longer they have lived in the informal settlement, the more knowledge and experience they have about their community (Table 1).

5.1.4. Where did the participants originally come from?

Most of the Makause informal settlement participants have migrated from the Eastern Cape (EC), KwaZulu-Natal (KZN), Limpopo and within Gauteng, respectively (Figure 5). Some participants are also migrants from the neighbouring countries, Lesotho and Zimbabwe. This evidence can be attributed to rural-urban migration of both South Africans and immigrants, which are caused by several push factors, including political uncertainty, limited economic opportunity, poor health and educational facilities and poor security and pull factors, which are better employment opportunities, better political climate and better health facilities (Mlambo, 2018).

In 2001, South Africa adopted the indigent policy to provide free essential services to poorer households. Under the indigent policy, municipalities were tasked to identify impoverished families that would receive benefits such as water, sanitation, and electricity for free or at subsidised rates. The data indicates that the highest number of people migrated from EC Province. EC is regarded as the poorest province in GDP per capita. The result of this situation is that debilitating poverty in EC and Limpopo is the most significant challenge. EC has the broadest coverage of registered indigent households, comprising 44% of all households in that province (STATSSA, 2019). People who migrate from that province to look for greener pastures in Gauteng reside in places like Makause informal settlement.

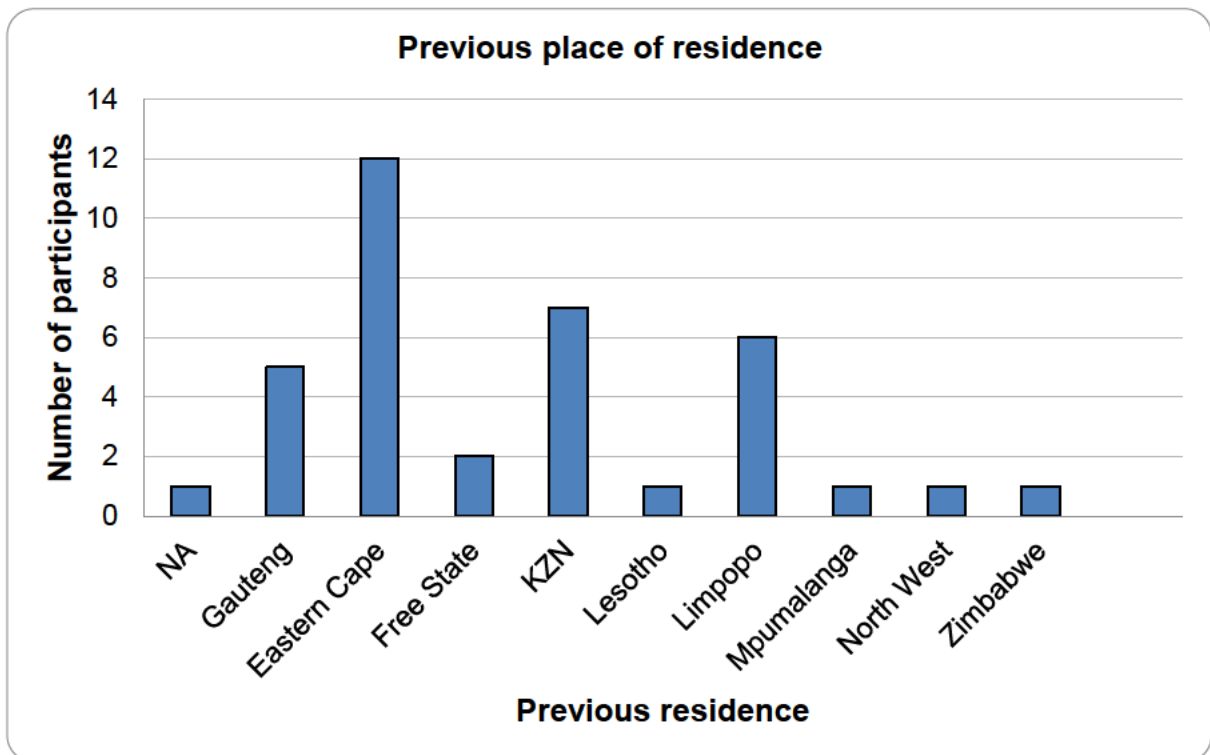


Figure 5: Previous residential area before settling at Makause informal settlement.

5.1.5. Current water supply relative to past water supply situation

Most of the residents interviewed were of the view that not much has changed in terms of the status of water supply over the years since they moved to Makause informal settlement, while some of the residents were of the view that the situation has improved (Figure 6).

Participant # 1 said, *"Water supply has remained poor because of dry taps sometimes"*. This participant has stayed at Makause for 25 years.

Participant # 3 stated, *"Water supply has always been poor because we share very few taps in the informal settlement"*.

Participant # 27 indicated, *"Water supply was poor; it has always been poor. We have never had enough water"*.

Participant # 30 suggested, *"The water supply has always been in bad conditions. I have never seen any improvement."*

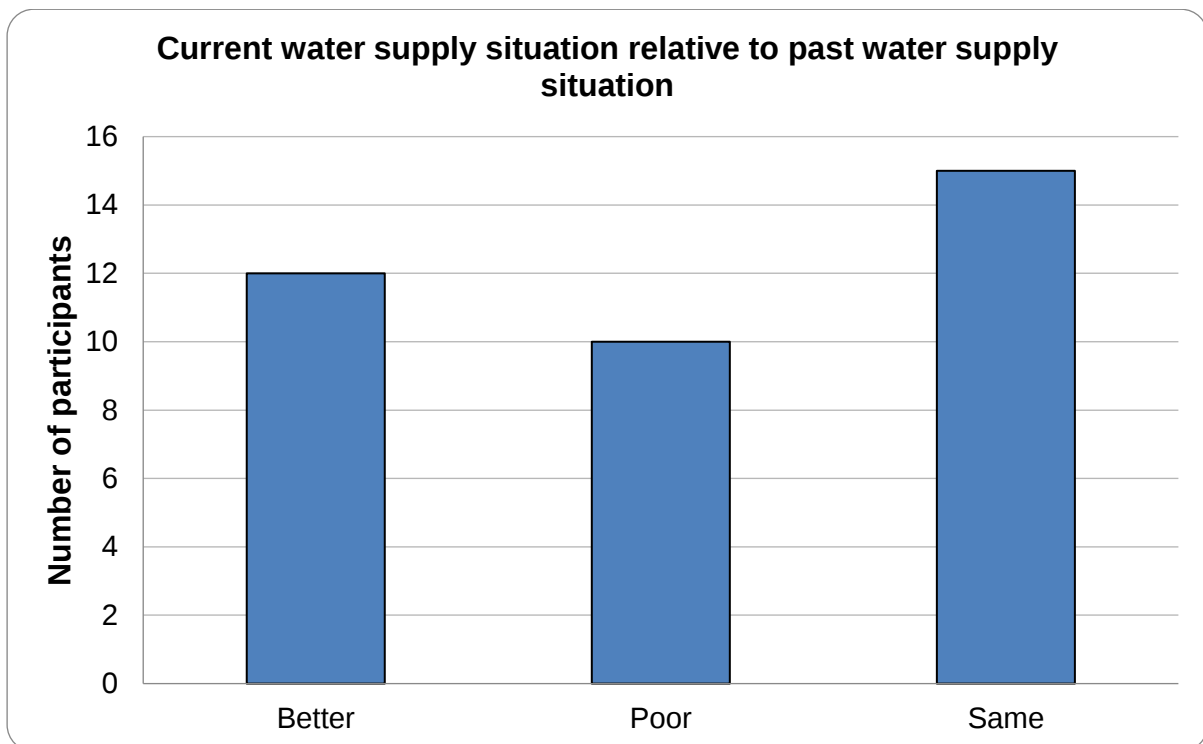


Figure 6: Current state of water supply relative to past water supply.

5.1.6. State of water supply, infrastructure taps and laundry basins.

The participants mentioned that they had never had communal laundry basins, and most of the taps in the community were broken (Figure 7). Most of the participants also believe that community leaders are responsible for infrastructure maintenance and, to a lesser extent, government. The community of Makause is not paying for water and is unwilling to. Only one participant indicated he was willing to pay for water should the supply be improved. The group stated they were reluctant to pay for water services and were well informed that they were entitled to the free basic water supply. Participant # 10 indicated, *"I cannot pay for water services even if the service improved because people who live in informal settlements do not pay for water services"*.

Participant # 18 stated, *"We don't have laundry basins, and taps are also broken"*. When the participants were asked how they report infrastructure damage, most believed that infrastructure damage should be reported to community leaders and that the same community leaders are responsible for infrastructure maintenance because the municipality does nothing about it. One specific participant indicated that the relationship between community leaders and the municipality is not a

healthy one.

Participant # 36 indicated, *"It is the community leadership, there is no maintenance at all from municipality because of this torn relationship between the community leaders and municipality. It is unclear why the relationship is sour"*.

Participant 34 # stated, *"We report to community leaders for any problem we have however, there is no maintenance which takes place here. Hence, many broken taps leak and lose a lot of water at night"*.

Participant # 31 stated, *"Community leaders and ward councillors, but we know nothing will happen"*.



Figure 7: Broken and leaking taps, Nkuna, 2023.

5.1.7. Distance to the source of water supply (communal standpipes)

The water source for the community is predominantly communal taps, in the form of standpipes, which are up to 500m away from their homes (Figure 8). Some people collect water from communal taps less than 500m away, and others from their neighbours. Only a few people collect water from fixtures in their homes.

Even those with standpipes in their yards still walk long distances because water does not come from their home taps. The findings indicate that there was no compliance with the South African indigent policy, which states that every person is entitled to 25 litres of water per day accessed within walking distance not exceeding 200m from their home and that no one should go for more than seven days in a year without water. The findings of the study also indicate non-compliance by the municipality in terms of the minutes which community members spend on queues as indicated previously. The problem of inadequate water supply needs to be addressed as outlined in the legislative frameworks of service delivery in South Africa. Failure to provide adequate basic services negatively impacts the health and social well-being of communities of the informal settlement dwellers.

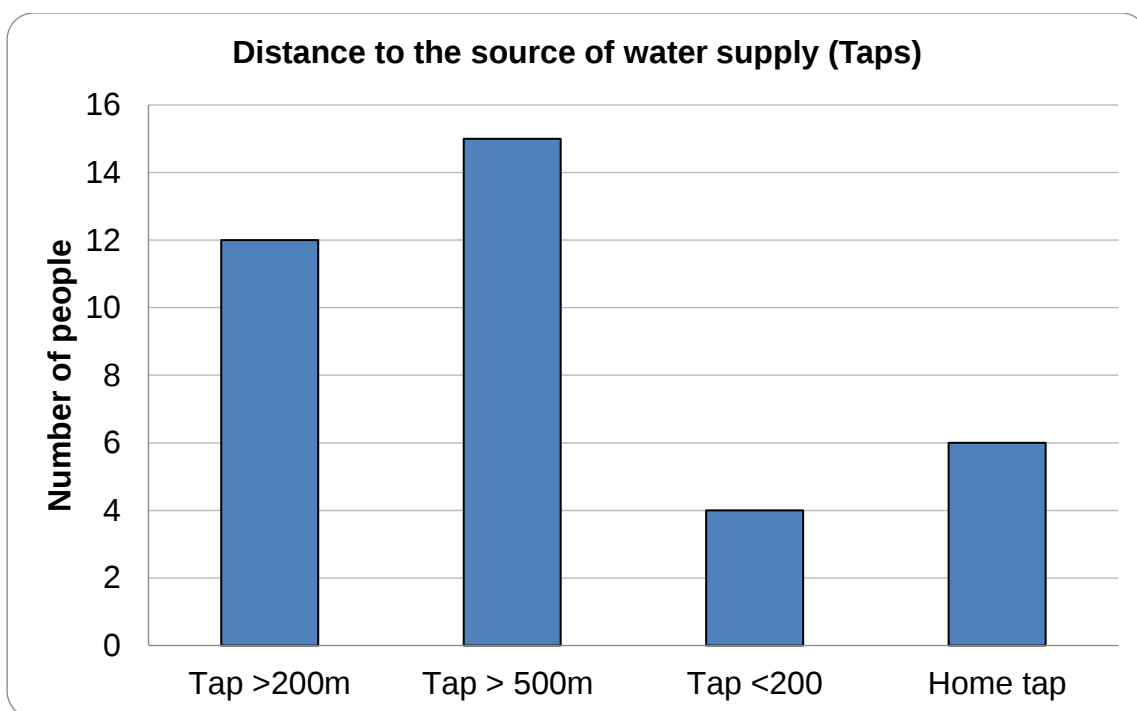


Figure 8: Walking distance to source of water point.

From the findings, the community members indicated that the community installed the current community taps with the help of the Informal Settlement Network (ISN). These findings suggest there was a lack of implementation and non-compliance from the CoE municipalities. The consequences of non-compliance regarding the National Framework for Municipal Indigent Policy are unclear.

This is what the community leader indicated when asked about the state of the water supply at Makause informal settlement.

"The way in which it came about that we ended up having communal taps is that some years, I led a huge strike, where we got the sponsor of six buses, I mobilised the community and we went to Johannesburg central to picket. After that, the municipality came to address us to end the strike. After several engagements with the municipality and other Non-Governmental Organisation, an Organisation called the Informal Settlement Network agreed that they could assist us in installing standpipes. They wanted the community to contribute a little so that they could add to it. Indeed, each household contributed R10- and we were able to raise R33 000. Then, the ISN installed 15 taps. We continued to have water and there was no problem. The population kept increasing here and the taps started to break down. Of late, drug abusers and unemployed youth have discovered the selling of copper taps. This has also contributed to stealing and selling many taps in scrap yards. This area is poverty-stricken. Many people do not work here; hence, you see the Zama Zamas every time you visit. Today, we are sitting with only four working taps. The current state of the water supply at Makause is bad, as people must collect water at night. There are many factors which cause this challenge. It is not a single factor but a multilayered factor. The water supply is poor because of vandalised infrastructure (i.e., pipes and taps). Only four communal taps serve approximately 3,000 people, resulting in long queues at night. Illegal connections into residents' households also cause the pressure to be low. The reticulation system, which feeds the informal settlement, is connected to the industrial system, which uses more water. During the day, when the industries use a lot of water, it creates less pressure, resulting in no water in the informal settlement. The municipality is not maintaining infrastructure. Political parties are not assisting the community in any way, and the relationship is not good; hence, there is less flow of information. Water challenges are reported to the chairperson of the community, who then reports to the ward councillor. The supply of water is generally less than the demand. The expectation from the municipality is that we are not asking for too much. If the municipality can repair the broken taps and increase the number of taps, we would

also like the municipality to increase the pressure for us as we live in a high-lying area. This will limit the queues, and people will not have to collect water at night. We have seen people murdered during the night through robbery, etc. I cannot confirm if they were indeed collecting water. But women are indeed in danger".

5. 1.8. What does poor water supply mean to the residents of Makause informal settlement?

When the residents were asked how they define poor water supply, they mainly mentioned inconsistent water supply, collecting water at night, high demand and low supply, very few taps and inadequate supply caused by infrastructure issues. According to their definitions, residents related this to their living situation in the informal settlement (Table 2).

Table 2: Perceived poor water supply definition.

Participants	Illustrative Quotes
Participant # 2	<i>"Few working taps are available for many people, drinking water which is not healthy and clean".</i>
Participant # 7	<i>"The fact that sometimes we do go for up to four days without water. That is poor water supply. Now that even people who pay for water services go for many hours without water, for us it becomes worse".</i>
Participant # 15	<i>"Collecting water at night in a dangerous place with so many gun fights at night".</i>
Participant # 17	<i>"Poor supply is when there is a low supply of water whereas the demand is very high".</i>

Participant # 18	<i>"The situation we are in right now, like going for days without water or when water is only available at night".</i>
Participant # 24	<i>"The conditions in which we are here. It is poor water supply, like when we go for days 1-3 without water".</i>
Participant # 25	<i>"It is when the water provided is inadequate to meet the community's demands like what is happening now".</i>
Participant # 28	<i>"It's when we have a shortage of water, taps being broken, when water becomes available there are a lot of leaks, collecting water at night and where girls and women have to walk long distances to collect water".</i>
Participant # 34	<i>"Collecting water at night in a dangerous place like this informal settlement where we sometimes wake up and find bodies of Zama-Zamas (illegal miners). And going for days without water, having to walk a long distance to collect water and the pressure is very slow. To me, that is poor water supply".</i>
Participant # 36	<i>"The situation where it takes 2-3 days without a drop of water. Can you imagine those who have small children. What do they go through? And when this water is finally back, everyone wants it. The queue is long, and the flow rate is slow. We stand in those queues until very late."</i>

5.1.9. Water supply challenges

The participants in the study were asked what they thought the main challenges with water supply were in their community (Figure 9). Many responded that the main challenge was water shortage. This means that the water supply is insufficient to meet their daily needs and requirements. Other challenges included poor collection, poor service delivery and lack of water relating to various elements such as structural challenges. These are later analysed in this study. The negative aspects of water supply were mainly attributed to collecting water at night, inconsistent water supply, containing water far from home, broken taps, and illegal connections. Collecting water at night was a significant concern. This is because the level of violent crime is paramount in the informal settlement.

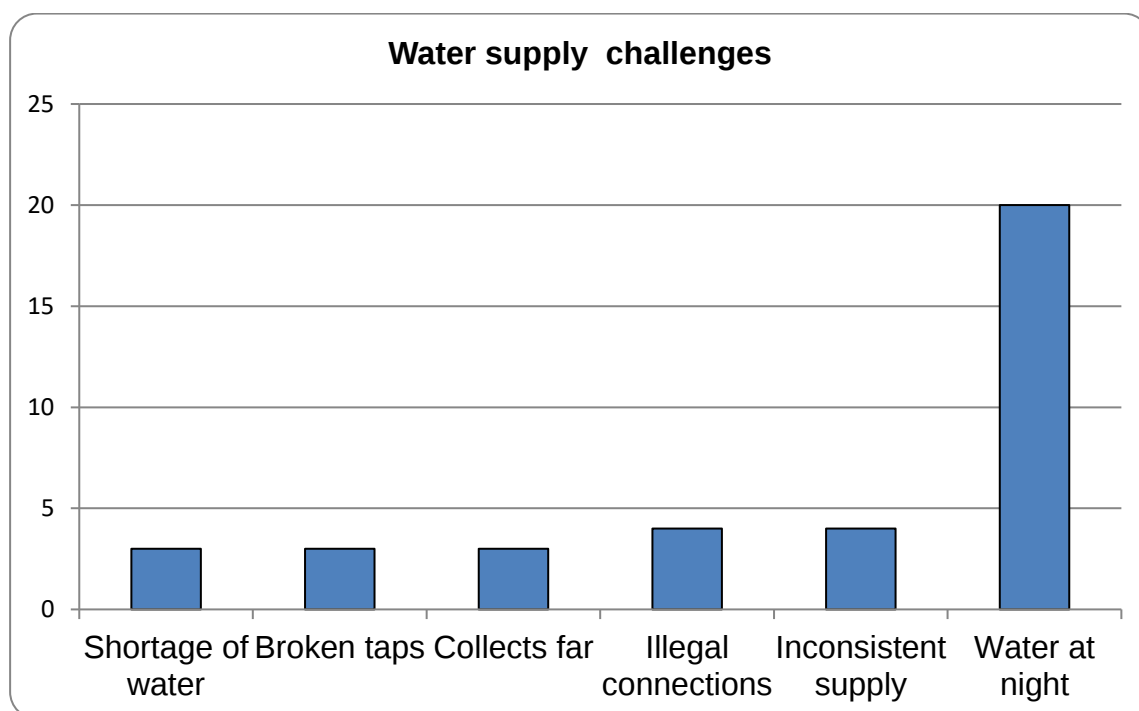


Figure 9: Opinion on the challenges of water supply at Makause.

5.1.10. Causes of poor water supply

The participants identified the leading cause of poor water supply at Makause informal settlement as vandalism of infrastructure (Figure 10). Most communal taps that are supposed to supply the community with water are broken, making it difficult for the community to easily access water. Another major cause of poor water supply is illegal connections of water, where some residents have tampered

with the main pipelines that supply water in the community and illegally connecting pipes to directly give their homes water. This impacts the water pressure at the communal taps and causes the water not to reach some community areas, eventually resulting in many leaks.

Participant # 1 had a different view; however, when asked for their opinion this was the participant's response *"When the taps don't have water, they are left open, then when the water comes back, water just runs all over the place and be wasted. We lose a lot of water because of running taps"*.

The participant acknowledges a water problem, but the community makes things worse by leaving taps open and wasting water. The participant believes that the community does not have a sense of ownership in the infrastructure of the society, which is meant to benefit them.

Participant # 4 stated, *"Some people have illegally installed the pipes in their yard. Therefore, that prevents water from channeling to other areas, especially high-lying areas in the informal settlement."*

Participant # 11 indicated, *"Some community leaders charged the residents of this informal settlement R1500 to install taps in their yards. This has resulted in low pressure in the system. Therefore, other community leaders are unhappy with this because they never agreed"*.

The participants acknowledge a poor water supply; however, some wrongdoings come from the community, such as vandalism and illegal connections.

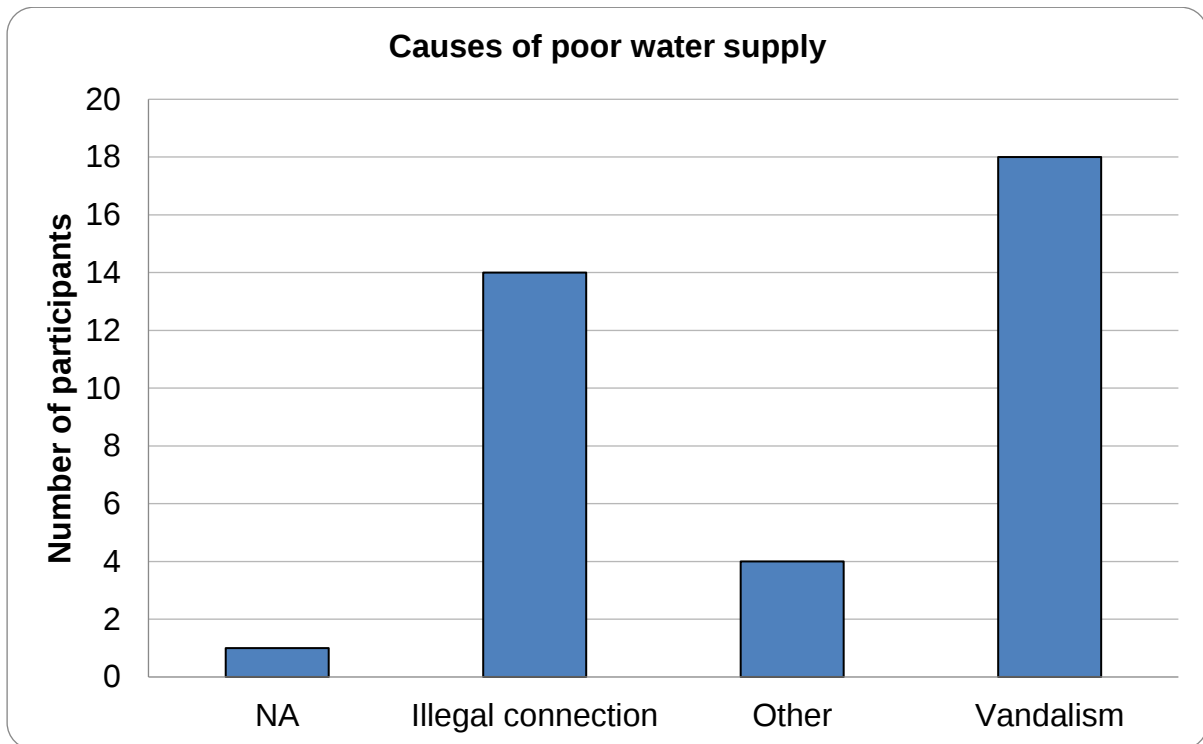


Figure 10: Causes of poor water supply.

5.1.11. Effects of poor water supply

The poor water supply affects residents in various ways, primarily by disrupting daily routines, including preparing food (cooking), bathing and cleaning, and prioritising collecting water as it is not always available. Poor water supply also impacts the residents' health as they cannot take their daily medication due to lack of water. Poor water supply can also lead to other diseases like cholera due to poor hygiene, as people cannot wash their hands after using restrooms and preparing food. To a smaller extent, other reasons, such as missing work and learners being late for school, amongst others, were also mentioned.

Participant # 30 Indicated that *"Everyone is affected. Kids are also affected. They arrive late at school with low self-esteem, without food in their stomachs and a proper bath. The disease can spread easily as we use latrine toilets. And some of us here in the community are on chronic medication and must take medication at specific times. We are unable to do so because of lack of water."*

Participant # 37 alluded that *"It affects us so badly. It means we can't cook, bath, drink, and other essentials. Children also arrive late at school or even skip school*

if we go for days without it. We cannot wash our hands after using the latrine toilets in that way we may get sick".

5.1.12. Improvement of water supply due to change of political party in power.

Very few residents indicated that the change in a political party in the past resulted in improved water supply. In contrast, most of the residents believed that the changes in the political party had no impact on the water challenges they had been experiencing (Figure 11).

When interviewed on the above, participant # 37 responded: *"I don't think so. There is no relationship between community leaders and the ward councillors. So, there is no flow of information between the community and the municipality. We are excluded from the entire community of Ekurhuleni Metropolitan Municipality"*. The participant believes that the community is marginalised and, as a result, critical information is not appropriately disseminated. These concepts are discussed further later in details.

Participant # 34 indicated, *"We do not have a good relationship with political leaders because they cannot benefit anything here. We are all poor people; some people do not have IDs, so they do not vote. As a result, politicians are very interested in people where they benefit something"*.

Participant # 5 complained by indicating, *"No, it doesn't change. Even if the political party changes, we are still neglected"*.

Participant # 11 criticised, *"Yes, we are affected because when there is a new political party in power, a ward councillor does show up and address us, but it all ends in empty promises every time"*.

Participant 7 # critiqued that by saying, *"Not; however, we have had a promise from the politicians who said they were going to give us street pipes which will last, but it has never happened"*.

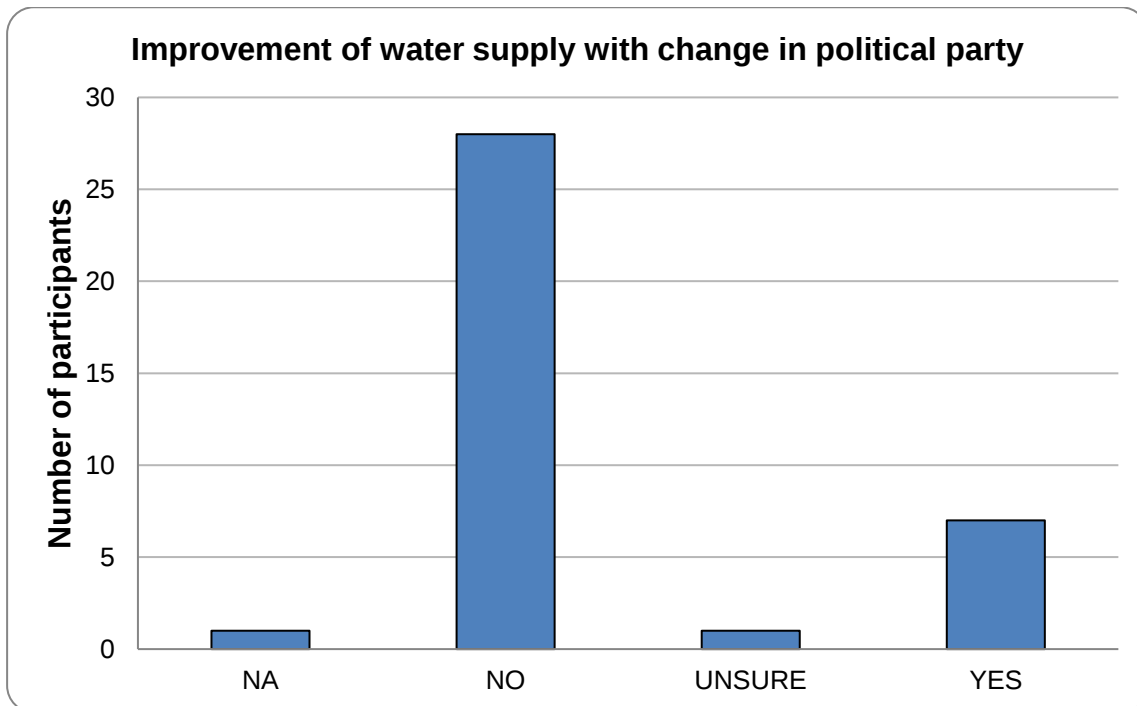


Figure 11: Improvement of water supply with change of political party.

5.1.13. Positive aspect of water supply

According to the residents, the positive aspect of the water supply is that they have access to clean and healthy water even though it is not constant (Figure 12). However, some residents do not see any positive aspects of the water supply.

Participant # 12 indicated, *"The positive side of this, I think, is that water comes out clean when it is available. That is a good thing. And that I don't remember when we had no water for more than seven days or maybe we are heading there."*

On the contrary, Participant # 16 had a different view: *"We appreciate that we do get water. We got used to the fact that the municipality does nothing for us, but now the situation has worsened"*.

On the other hand, some residents indicated that they see nothing positive regarding the water supply at Makause informal settlement.

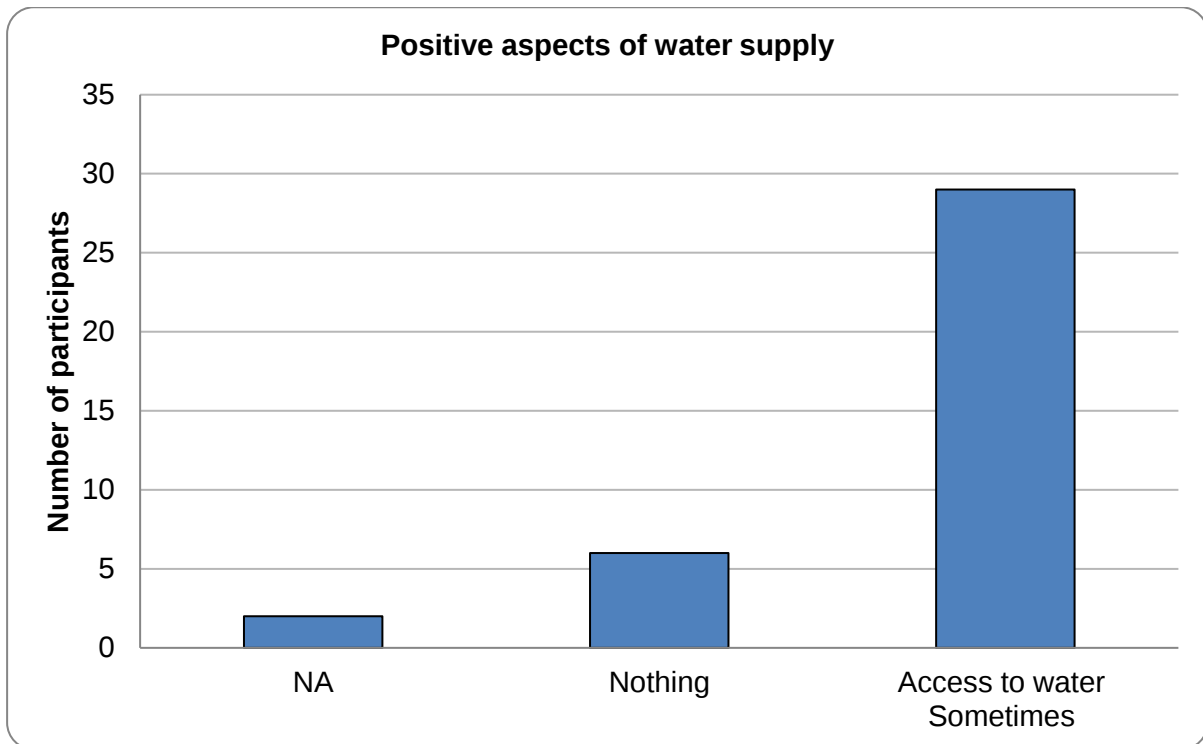


Figure 12: Positive aspect of water supply.

5.1.14. Clean or healthy water

When the residents were asked if the water was clean and healthy to drink, most participants believed that the water was clean and healthy. Very few residents thought the water might be unsafe for consumption because of water disease outbreaks such as Cholera, which was prevalent in Gauteng during the study. Other residents were unsure (Figure 13).

Participant # 10 indicated, *"My family and I have never had any water-related illness. Hence, I say the water is clean."*

On the other hand, other participants had a different view, as Participant # 37 indicated, *"Yes, we have never heard of an incident where a person is sick from drinking water from the tap. Well, I cannot say it won't happen. These days, anything is possible. We had Covid-19 before, then most recently, as we speak in Hammanskraal, people have cholera, so we are also not immune to that".*

When the research was being conducted, there was a cholera outbreak in Pretoria Hammanskraal, and people died. The community of Makause was aware of such unfortunate occurrences.

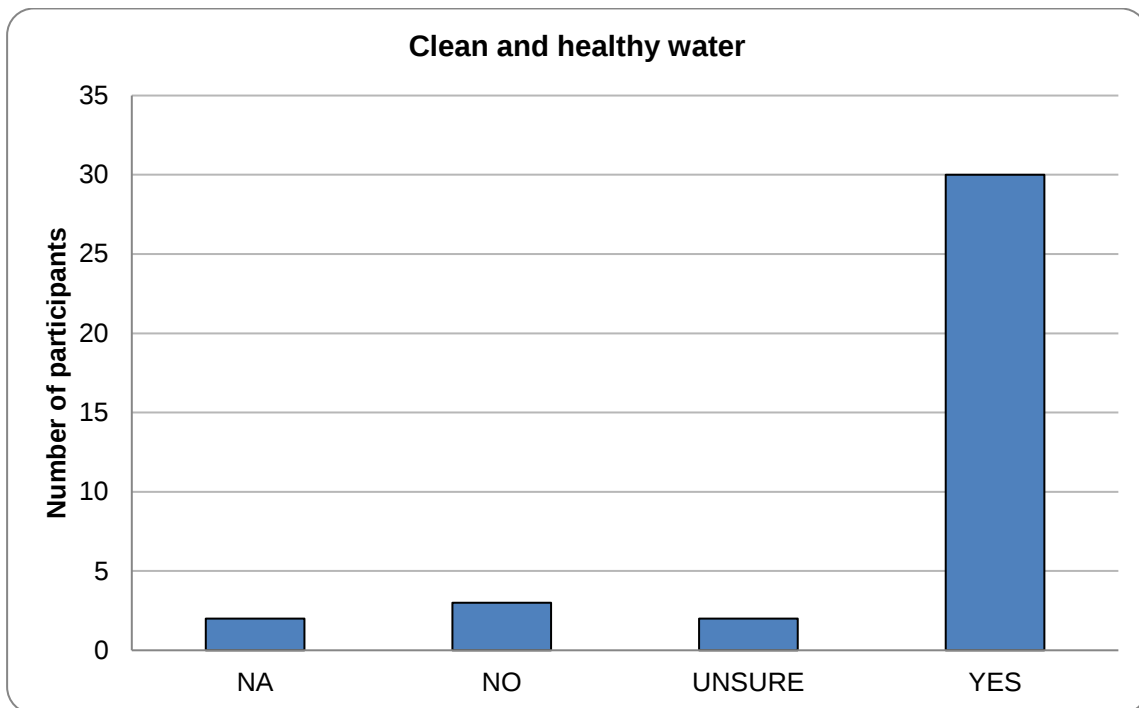


Figure 13: How clean or healthy is the water to drink?

5.1.15. The satisfaction levels of the residents

Rating scales are everywhere and date back to the mid-1800s and were later developed and improved in 1910 by E.L. Thorndike. Rating scales appear on surveys, applications for athletic club memberships, student evaluation of teaching forms at colleges and universities, product surveys following online purchases, and the automated telephone satisfaction question following a conversation with an airline customer service representative.

Martin-Fuentes, Mellinas and Parra-Lopez (2021) used rating scales to review the satisfaction of customers on online and effects on hotel scoring and competitiveness. The findings are that ratings scales do produce meaningful results.

A rating scale is a set of categories designed to elicit information about a quantitative or a qualitative attribute. Typical examples are the Likert scale and 1-10 rating scales in which a person selects the number that reflects the perceived quality of a product or satisfaction (Rodriguez, 2016).

The participants in this study were asked to rate their satisfaction with the water supply at Makause informal settlement on a scale of 1- 10:

- 1: Represented extremely poor satisfaction.
- 2: Represented very poor satisfaction.
- 3: Represented poor.
- 4: Represented below average.
- 5: Represented average satisfaction (Fair).
- 6: Represented above average.
- 7: Represented (good) or high satisfaction.
- 8: Represented: very satisfying.
- 9: Represented (excellent) satisfying.
- 10: Represented extremely satisfactory (Rodriguez, 2016).

Most residents rated the state of water supply either a three, which was poor or four, which was below average (Figure 14). None of the residents ranked their satisfaction above six, which was high satisfaction. The evidence shows how unsatisfied the participants were about the water supply in the Makause informal settlement.

Participant #35 indicated that *"I would give them a 3 (poor) because the situation we are faced with is poor water supply, an example is that we go for 2-3 days without water, municipality has never sent water tankers here. You must have big containers to store water until it comes back. Otherwise, your life stops"*.

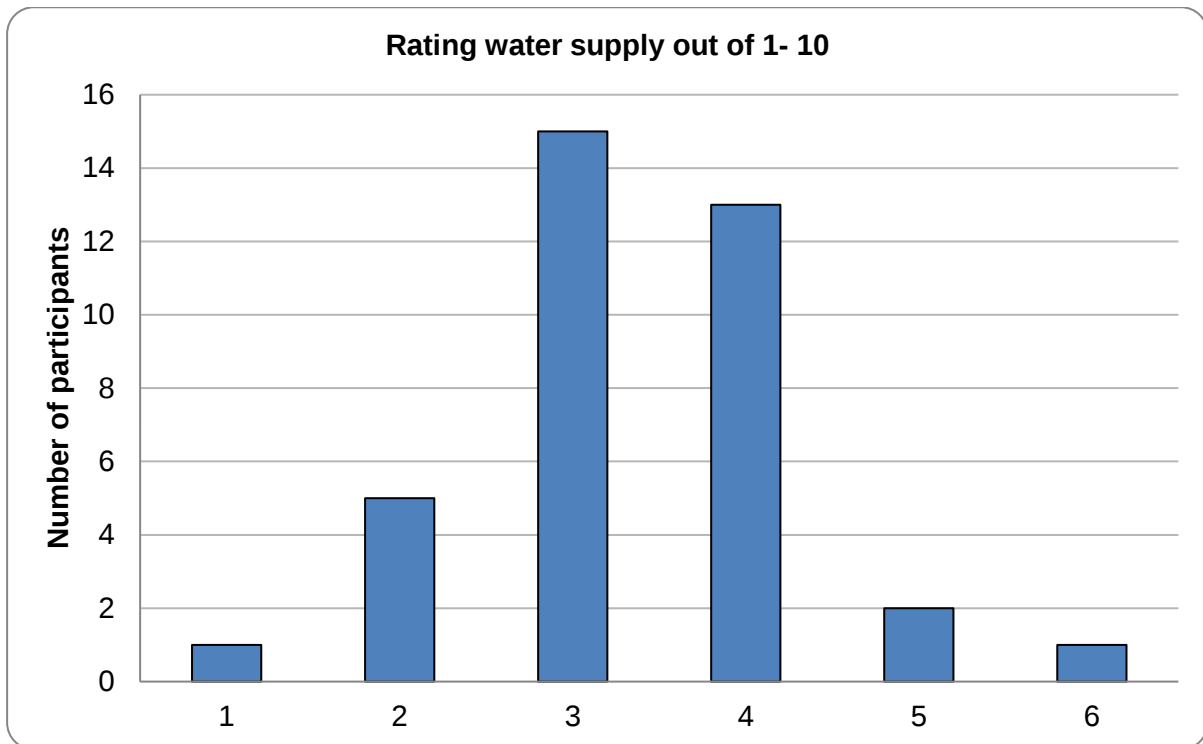


Figure 14: Rating water supply 1-10 scale.

5.1.16. Expectations of future water supply

The expected future changes in water supply by the residents of Makause informal settlement primarily include having water always, improved water supply, having taps at home, improved infrastructure, change of political party, more communal taps, and increased water pressure (Figure 15). Another question arises regarding communities having fixtures in their yards: who will pay for this water, and will a meter be installed? Where can the line be drawn around expectations of the community and being sensitive to their needs? The district also has no legal right to the yards they occupy. How will this problem be addressed? Again, communities' expectations need to be re-evaluated whether their expectations are realistic. It must be understood that even though South Africa is closing the gap in terms of water supply, not everyone can have water in their yard.

Participant # 35 indicated, *"We need more taps, we need laundry basins, we also need some kind of drainage system to collect water on the grounds. There is polluted smelling water all over the place"*.

Participant 37 # indicated that *"We want to see every household with a tap and running water. Same as our neighbours in Primrose residents. Why do they have water while we don't have any? Are we different to them?"*.

Primrose is not an informal settlement but a well-designed old suburb that borders Makause informal settlement. It has full municipal services such as streetlights, electricity, water supply, sanitation services and waste collection.

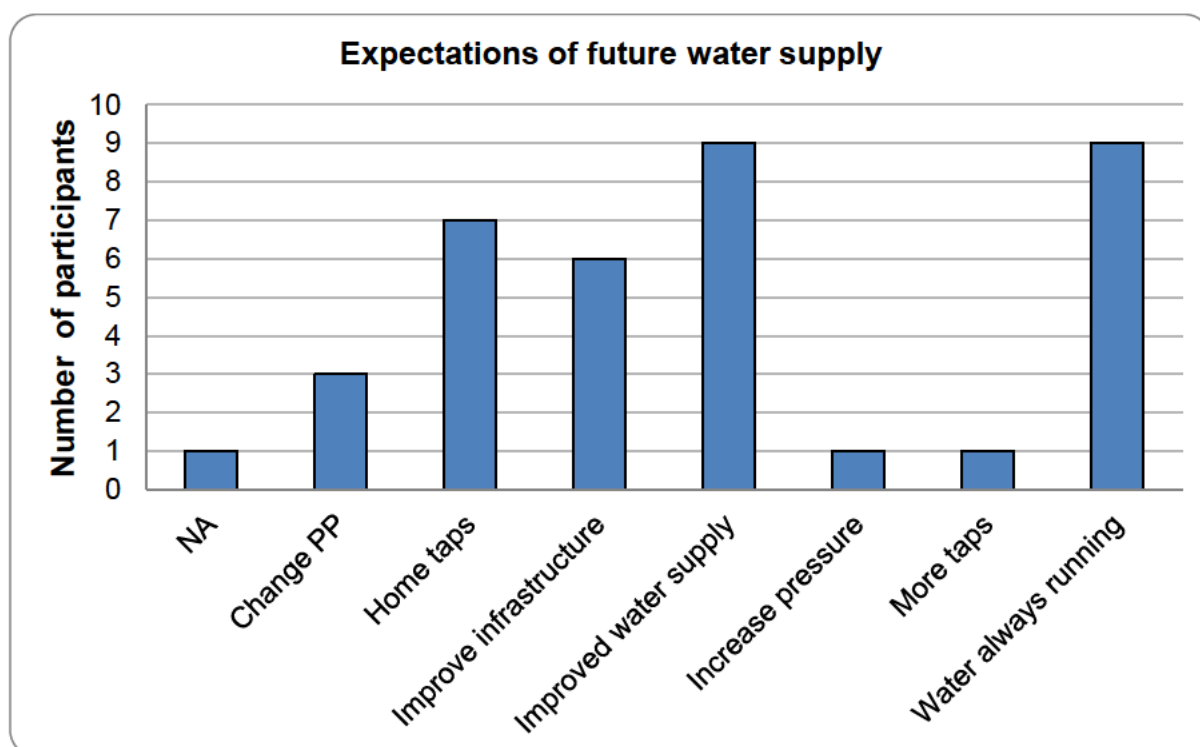


Figure 15: Expected future change to water supply.

5.1.17. Water supply challenges at Makause informal settlement from the CoE municipality official's perceptions

One municipality official agreed to complete a questionnaire. The official indicated that *"The community needs to be educated about peaceful protests so that water infrastructure, such as standing pipes and tanks would not be vandalised. The water challenges experienced by the community are because of vandalism and failure to report leaks and infrastructure damage"*.

When the official was asked to describe the state of water supply in the neighbourhood of Makause, the official indicated that *"There were a lot of complex challenges relating to water supply. There are many complex challenges*

including awareness of conserving water, Importance of supplying clean water using water tanker, peaceful protest with vandalising structures including standpipes and tanks supplied". This showed that the municipality was aware of the community challenges regarding the water supply.

When the official was asked to rank water supply challenges in order, the official said that.

- "1. we have a challenge with JoJo tanks, and standpipe taps get vandalised.*
- 2. Regular protests pose risks to service providers.*
- 3. Skyrocketing prices from service providers.*
- 4. non-reporting of broken/leaking tanks or taps whenever they are present/installed".*

Some of these challenges the municipality officials mentioned speak directly to the difficulties outlined by the Makause informal settlement participants.

The municipality official was further asked about the role of Ekurhuleni municipality in water supply in informal settlements. The CoE official indicated that *"Ekurhuleni maintains its water blue and green drop Certification programme status by identifying informal settlements within its borders, appoints service providers with sound knowledge of supplying clean water as per laid standard and liaise with indunas within those communities for stats and service records".*

When the official was asked if a change in the political party responsible for the municipality would affect the water supply in Makause informal settlement, he responded that he could not speak about political parties in his position: *"My knowledge of political handovers and stuff like that does not capacitate me to elaborate on this matter".*

The CoE official was asked if informal settlements pay for water services and who is responsible for repairing water supply infrastructure in their community. The official indicated that *"Ekurhuleni operational teams don't have boundaries regarding repairing water supplying network, they repair any situation regarded*

as wasteful water, payment issues question requires revenue personnels".

When asked about what was a positive aspect of water supply from the municipality side in the Makause informal settlement? The official responded, *"Seeing those beautiful smiles of those living in the aftereffects of apartheid receiving a basic commodity that was supposed to be free, but it cost head and feet".*

The official was asked if there was anything that the municipality expected from the residents, and the official responded, *"Nothing at all. We provide minimum service delivery for free".*

Regarding what can be improved to water supply going forward in the Makause informal settlement, the official responded: *"We can improve once we get reports from ward councillors that there are repairs that need to be done. In terms of meters and taps in their yards, I think it lies with the city of Ekurhuleni's spatial planning, and people must own the land. So, if you look at the design of Makause, it is densely populated, and you can't tell who lives where and where is the boundary of the land. There must be a clear flow of information between the residents, their ward committee and the municipality. When there is any water outage, the municipality dispatches water tankers where needed".*

Two more municipality officials from the water directorate had initially shown interest in participating in the research. The officials were later unavailable for an interview.

Similarly, the ward councillors had shown interest in participating in the research, but later, the councillor was not available to answer the questions. A questionnaire was then emailed to the councillor, but the councillor never emailed back the questionnaire and later was not responding to emails.

5.1.18. Observations

The researcher conducted some field observations during the study, and the following was recorded.

- In terms of infrastructure, there were about 15 communal taps. More than ten were just broken standing taps, which were not working. There were no communal washing basins. During the day, there was no water, just containers waiting for water collection. Only four taps seem to be in good condition.
- The broken taps seemed to leak when water was present, as they were tied with elastic bands to prevent further leakage.
- On the day when water was present during the day, it took about eleven minutes to fill up a 25-litre jerry can/ container.
- The communal taps didn't have meters installed.
- There was a long queue of about ten people at the water collection points and more than 30 containers when water was coming out.
- People used jerry cans to collect water using a hose pipe connected to the taps.
- There was a smooth process of water collection. The first container or jerry can which arrives is placed in front so the owner can collect water.
- Individuals, encompassing both girls and boys, women, and a limited number of men, resort to wheelbarrows to travel significant distances to fetch water.



Figure 16: Containers and buckets waiting to collect water at night as indicated previously the by community leader, Nkuna, 2023.



Figure 17: Slow flow rate of water during the day as indicated on the observations, Nkuna, 2023.

5.2. Conclusion

This chapter presented the study's main findings, supported by the evidence suggesting that water supply challenges exist in Makause informal settlement. Water supply challenges include collecting water at night, inconsistent water supply, collecting water far from home, broken taps, and illegal connections. The next chapter will discuss in detail the causes of these challenges, which are interconnected and range from unlawful connection of water supply by community members, vandalism of infrastructure by the informal settlement dwellers themselves, lack of infrastructure maintenance and management from the municipality's side, lack of service delivery, lack of communication and marginalisation.

CHAPTER 6: DISCUSSIONS

6.1. Introduction

This chapter summarises and aim to deliberate on the complexity of the water supply challenges which emanated from all role players in the Makause informal settlement. According to the evidence gathered, the supply of clean drinking water at the Makause informal settlement is performed within a very complex environment. The supply if clean drinking water is faced with numerous influencing and complex factors such as vandalism and illegal connection, water policies and management, marginalisation, lack of communication and inadequate infrastructure maintenance. These challenges are a result of all the key stakeholders involved and are not one sided. Therefore, it is worth noting that the complexity of the supply of clean drinking water at Makause informal settlement cannot be resolved by addressing a single facet (Figure 18).

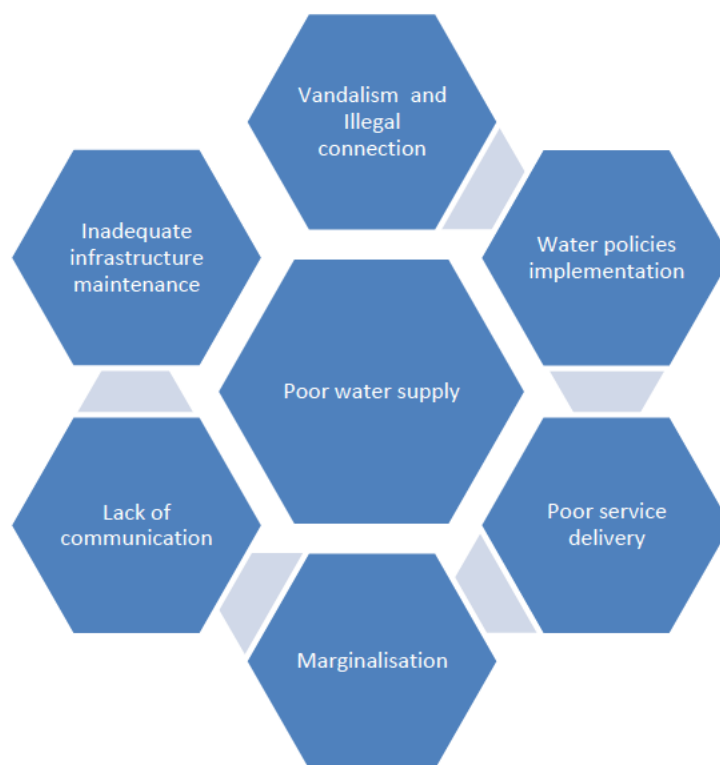


Figure 18: Interconnectedness of water supply challenges in the Makause informal settlement.

6.1.1. Poor water supply

When the residents of Makause informal settlement were asked about the

challenges they face regarding water supply in the community, poor water supply, shortage of water or inadequate water supply were the main water challenges raised by the participants. These three terms are used interchangeably to mean insufficient water supply.

Participant # 4 indicated that *“About the challenge of water shortage in the community of Marathon (Makause), nothing is being done for many years. This problem keeps escalating day by day”*.

Participant # 5 indicated that *“Water shortage continues for days”*.

Participant # 6 stated that *“The problem is due to the poor water services delivery from the municipality’s side”*.

Participant # 8 Stated that *“The biggest challenge is the water shortage when we want it. This situation is very depressing.”*

Kekana *et al.* (2023) state that poor accessibility or lack of accessibility and availability of safe drinking water in the informal settlement of South Africa is a significant challenge and an environmental injustice. Oskam *et al.* (2021) also indicate that poor water supply in informal settlements of South Africa is closely related to Socio-Economic inequalities amongst the inhabitants of informal settlements in South Africa. According to STATSSA (Figure 19), only 88.2% of the total population of South Africa enjoys excellent access to safe and healthy drinking water. This indicates that a lot of work needs to be done to improve these injustices and inequalities. 15% of the total population still relies on communal unsafe drinking water. It is this 15% where the community of Makause falls in.

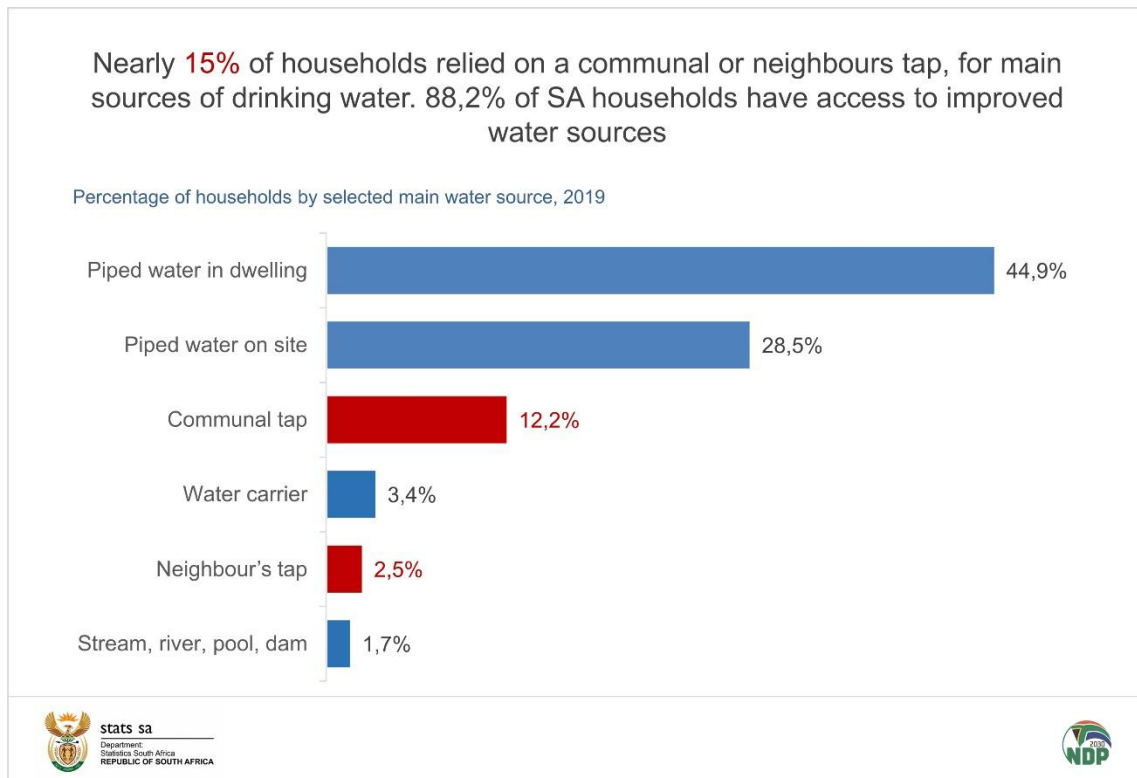


Figure 19: Population affected by water supply in South Africa (STATSSA, 2019).

6.1.2. Vandalism of water infrastructure and illegal connection of water

In the history of South Africa, law enforcement agencies have paid minimal attention to environmental crimes such as water theft, and the punishment is not taken seriously. Therefore, it does not deter the perpetrators from committing the same offence repeatedly without punitive measures (Felbab-Brown, 2017).

The findings indicate that the Makause informal settlement has a high unemployment and drug abuse rate. Copper taps are resistant to corrosion, robust and suitable as communal taps as they last long. Copper taps are expensive materials and copper and brass fittings are subject to theft due to their value in the scrap metal market. Residents suspect that the taps are being sold to scrap yards by drug users; therefore, copper and brass should be avoided in areas where this might be a problem. To solve this problem, the taps have been replaced by plastic taps, which are not durable as they have been designed to have a concise life span. This has led to so many broken taps which need maintenance. Indigent communities such as Makause informal settlement must take ownership of their water supply infrastructure and should find ways to protect

them.

Segato, Mattioli and Capello (2020) indicate that corruption, such as petty bribes to government officials, falsifying meter readings, avoiding disconnections, and concealing illegal connections, plays a significant role in water theft. The growing demand for water supply also enhances these corrupt practices. The cumulative impact of water theft can potentially jeopardise water sustainability and security in the Makause informal settlement and in South Africa.

6.1.3. Water policies implementation

Representatives from the water directorate of CoE were reluctant to provide answers to the water supply situation in the Makause informal settlement. The interviewed official seems to shift most of the causes of problems to the residents. However, he acknowledged that an improvement can be made from the municipality side. This could suggest that more shortcomings might be concealed from the municipality side. If there was nothing to hide, the officials and ward councillors would be present to provide answers. It seems that the implementation of the indigent community policy is not well controlled by the informal settlement inhabitants and the CoE. There are no effective measures for the continuity and maintenance of this service delivery and infrastructure. It is also evident through the findings that there are no monitoring programs and projects to ensure water accessibility in the informal settlements of Makause. Hofstetter, Bolding and Van Koppen (2020) indicate that in South Africa there is a lack of accountability regarding implementing water service delivery and policies. This is also applicable to Makause's informal settlement.

6.1.4. Poor service delivery

Under Section 152 of the South African Constitution (1996) local government is the heartbeat of primary service delivery. According to the White Paper on Local Government (1998), municipalities must ensure all citizens have access to a minimum level of services. This is based on the principles crucial to effective and efficient service delivery, which are the following: accountability of services, affordability of services, good quality of products and services, and value for money.

The evidence gathered from the community of Makause indicates that CoE might not have appropriate and applicable structures to assist in building and sustaining capacity on the ground in water supply service delivery particularly in informal settlements. Furthermore, there is relatively no configuration in place to help to build and sustain a good capacity that will facilitate quality operational schemes and good maintenance services to create effective and efficient service delivery pathways for the marginalised communities like the informal settlements. Masiya, Davids and Mangai (2019) argue that South Africa faces municipal service delivery challenges. These challenges have increased service delivery protests and, eventually, increased violence. Nkomo (2017) also argues that the protests can be attributed to organisational failure to provide satisfactory essential services. On the other hand, it would seem unfair to acknowledge that policies are put in place at national, provincial and municipality levels to address service delivery. However, the most significant challenge lies with the implementation of such policies.

6.1.5. Marginalisation

One of the structural challenges evident in the community of Makause is a broad spectrum of marginalisation. Marginalised societies, such as informal settlement dwellers worldwide, face various deprivations and constraints at individual, institutional, economic and technological levels. This is predominantly a social phenomenon by which a minority or sub-group is excluded, and their needs are ignored (Jagtap, 2019).

The concept of marginal man and marginality was first introduced by Robert Park (1928) who defined Marginalisation as “*a symbol that refers to processes by which individuals beyond groups are kept at or pushed beyond the edges of society. The term may also be used to refer to those individuals or groups who are marginalised*”. This is indeed the same case in the community of Makause informal settlement. The implications of marginalisation are physical, psychological and emotional health. These consequences may include feelings of anger, anxiety, fear, depression, self-blame, sadness, stress and isolation, which may lead to protests, riots and crimes (Holdo and Bengtsson, 2020). The

above mentioned occurrences could happen to Makause informal settlement. The latest protest which took place in the informal settlement, happened six years ago and was all about water, electricity and housing (Makause everyday settlement residents embark on a service delivery protest-SABC, 2016).

Development in marginalised communities is crucial. Enabling political participation by marginalised communities can strengthen the state's social cohesion, accountability and help to achieve democratic governance. Fair political representation of marginalised communities can stimulate wide-ranging-appeal policies that increase development potential (UNDP, 2010).

6.1.6. Lack of communication

Lack of effective communication often creates a gap between the local government and the residents they serve, which cascades into flare-ups in service delivery protests (President Ramaphosa, 2021).

In his weekly newsletter, President Ramaphosa (2021) surmises, *"When people are deprived of the basic services without proper explanation of why this has happened or how it is being fixed, it erodes public confidence in local government. Sometimes people think that the only way to get the attention of those tasked with providing services is through violent protest"*.

One of the significant challenges in communication is the lack of knowledge by the community residents that the provincial government serves. This leaves communities in a state of frustration and misunderstanding when it comes to the delivery of services (Steyn, 2016).

The Local Government: Municipal Systems Act 32 of 2000 outlines various tools to be used by municipalities when communicating with stakeholders. These communication tools are local newspapers and radio broadcasts in the official languages used by the local communities.

An organised community would have a functioning ward committee under normal circumstances. The ward committee normally disseminates information and communicates the community's concerns with the ward councillor, who then raises it with the municipality. In the Makause informal settlement, this is not happening. This is evident because the residents are unaware of the flow of

information and the responsibility of their community leaders. This needs to be clarified for the community. This study's findings indicated a lack of communication between CoE and the community, NGOs and other partners, similar to what Pan, Armitage, and Van Ryneveld (2015) found in their study. Today, using social media to disseminate information, such as service delivery interruption by the government, is prevalent. This communication channel can be effective during a crisis like water interruption (Graham, Avery and Park, 2015). In marginalised communities like Makause informal settlement, it should be tested to see if it works effectively so that the marginalised are included. The use of radio and television also requires electricity. Therefore, it might be ineffective because of the lack of electricity.

6.1.7. Inadequate infrastructure maintenance

South African municipalities need better infrastructure management and maintenance, but are themselves hampered by challenges such as a lack of funding capacity, poor planning and oversight, lack of By-laws, grant dependency and corruption. Therefore, as a result, this often leads to increased service protests, destruction of public property, interruption of services and loss of confidence in municipal administrations (Mazele and Amoah, 2022).

According to Patience and Nel (2021), many challenges relating to infrastructure management hamper the CoE's ability to provide sustainable service delivery for economic growth and development. These challenges range from lack of adequate asset registers, backlogs, lack of risk management frameworks, lack of human skills, lack of political oversight and capacity and lack of budget. Patience and Nel (2021) indicate that there is a waste of money in the CoE, and sometimes, money is transferred from other programmes to projects that are not budgeted and intended for.

Infrastructure is sometimes left to deteriorate because politicians are interested in building new infrastructure rather than looking after what they already have. The abovementioned information correlates with the study's findings at Makause informal settlement, where community leaders have indicated that they report

broken taps, still, nothing gets done from the municipality side. Community residents confirm this information because they have never seen any maintenance being done in the area. Some community members lived there for 40 years without noticing significant changes done by the municipality.

6.2. Conclusion

The above illustrations showed that the causes of poor water supply are multidimensional and interconnected rather than a single aspect. These factors are diverse and complex in nature. They need a multilateral approach where intergovernmental departments, Non-Governmental Organisations (NGOs), decision-makers and various stakeholders come together to address them.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1. Introduction

The study aimed to investigate the causes of poor water supply through the perceptions of different stakeholders in the community of Makause informal settlement, including community leaders, residents, and municipality officials. This chapter discusses how the main questions and objectives were answered and attained. The chapter further discusses the conclusion and recommendations that decision makers, the residents, community leaders, other partners, NGOs and the CoE can come together and implement to address and possibly resolve the water supply challenges at Makause informal settlement.

7.2. Answering the research questions

7.2.1. Do political factors, infrastructure and the municipality play a role in poor water supply?

It was evident that from the findings, interviews and observations the water supply infrastructure at Makause informal settlement is damaged. This in turn leads to poor water supply. From the perceptions of the residents and community leader of the community, factors like change in the political landscape in the municipality council has no impact on their water supply. This is because the community sees themselves as the ignored and forgotten community which is marginalised. The findings could hold true because the ward councillor and the municipality did not want to be interviewed to let the researcher know their side of the story. It could be true that they have neglected the community.

7.2.2. Are there any causes of poor water supply that are considered prominent by different role players?

It has been highlighted in the findings that there were many factors which caused poor water supply in the community, such as lack of infrastructure maintenance from the municipality side. From the resident's side vandalism and illegal connections of water were prominent. The community leader and the municipality

official also identified vandalism and broken infrastructure as a common denominator of the causes of poor water supply. This implies that it is true that vandalism of water infrastructure, damaged infrastructure and illegal connection of water are the main causes of poor water supply.

7.3. Research objectives

7.3.1. To identify water supply challenges at Makause informal settlement

In terms of water supply challenges, the following were identified: poor water collection, poor service delivery and collecting water at night, inconsistent water supply, collecting water far from home, broken taps, illegal connections and vandalism. Collecting water at night was the most significant concern, particularly for women. This is because the level of violent crime was high in the informal settlement.

7.3.2. To compare different stakeholders' perceptions on the causes of poor water supply issues i.e., the relationship of various causes of poor water supply amongst different stakeholders

The findings indicate that the various stakeholders; community leader, residents of the informal settlement and municipality official had both different and similar views on the causes of poor water supply and the other challenges which are associated with poor water supply. The municipality official suggested that the community was predominantly responsible for the causes of poor water supply whereas the community acknowledged that they also contributed to the issue at hand through vandalism, illegal connections and leaving taps running, but also cited infrastructure and supply challenges from the municipality side.

7.3.3. To compare the causes of poor water supply from various stakeholders

It has been indicated in the previous chapters that according to the evidence gathered from all participants, the supply of clean water at the Makause informal

settlement is executed under a very complex environment, which faces numerous influencing and complex factors such as vandalism and illegal connection, water policies and management, marginalisation, lack of communication and inadequate infrastructure maintenance.

7.4. Conclusion of the research

The research investigated whether the current water supply at Makause informal settlement meets the needs of the residents as stipulated in the national framework for municipal indigent policies on water supply for impoverished communities like informal settlements.

It is apparent from the research findings that the legacy of apartheid policies fundamentally distorted and affected the spatial spanning of cities. This led to many African people settling in informal settlements with poor service delivery.

- It has also been indicated in the study that the establishment of Informal settlements is a direct consequence of colonialism and apartheid laws, such as the Native Land Act of 1913, which aimed to regulate land acquisition by Black people.
- These Institutionalised racial residential segregation laws did not allow black people to settle in urban centres.
- It has been found that the modern-day pattern of informal settlement mushrooming in urban areas is due to the rural-urban migration within South Africa and illegal immigration from neighbouring countries because of the pull factors in South Africa and push elements within their government- of origin.
- It has also been indicated that post-apartheid South Africa implemented many measures to redress past inequalities. This includes policies, financial provisions, human resources, legislation, environmental laws, and water institutions.
- Even though the South African government has tried to introduce programmes to redress past mistakes, it cannot cope with overpopulation, service delivery and promoting economic development. These challenges

are then exacerbated by corruption, mismanagement, lack of planning, and lack of skills in the government sector.

- It has also been indicated in the previous chapters that South African policies on water management and supply have proved to be one of the best in the world, and the country is hailed by many countries and the UN for that. Therefore, there is no doubt that there are good policies on water management. However, the implementation part is the problem.
- It has been found that informal settlement communities are marginalised and vulnerable; they lack essential service delivery such as water, electricity, sanitation, and necessary refuse disposal.
- This study has also revealed that even though the informal settlement dwellers of Makause are asserting that inadequate water supply is a huge challenge and pointing their fingers towards the municipality, the community members themselves are not innocent in this regard because some of the residents have connected water illegally in their yards and vandalise their water infrastructures. Community members do not take ownership of their infrastructure.
- According to the national indigent policy, the primary water supply facility is an infrastructure necessary to supply twenty-five litres of potable water per person per day provided within 200 metres of a household and with a minimum flow of 10 litres per minute in the case of communal water points.
- The study revealed that in terms of implementing this policy, the CoE seem to contradict this policy. Therefore, urgent intervention is required to address this challenge.
- Previously, the study revealed that according to the national framework for municipal indigent policies, basic water supply service must provide water for at least 350 days per year and not be interrupted for more than 48 consecutive hours per incident. Should that happen, such interruption should be communicated, and alternative options should be provided, such as water tankers or JoJo tanks.
- The research findings have also revealed that this has yet to happen; this implies non-compliance by the CoE municipality on the stated policy. Therefore, there should be an interim intervention to address these issues.

- The indigent policies must be managed in a controlled environment; destitute communities like Makause informal settlement must be educated and conscientious that the municipality only provides minimum service level agreements and that not everyone will have standing taps in their yards.

The Makause informal settlement has previously taken the CoE to the Johannesburg High Court for the application of the Upgrading of Informal Settlements Programme (UISP). The upgrading or reblocking programme aims to benefit the Makause informal settlement in access to adequate housing provision and essential services such as water supply. This has never yielded any results and has been moving slowly until today. The community has approached Socio-Economic Rights Institute of South Africa (SERI) to assist them. SERI is currently negotiating with CoE to install solar energy panels at Makause while the community waits for reblocking and upgrading (SERI, 2018).

7.5. Questions for future research

The following study is recommended for future research regarding the field's unanswered questions or unresolved problems.

7.5.1. What are the coping measures/mechanisms during water shortages in Makause informal settlement?

7.5.2. What are the health impacts of lack of water at Makause informal settlement?

7.5.3. Investigate the extent of household water storage, health risks, and quality after being collected in Makause informal settlements.

7.5.4. Time spent on household chores (fetching water)/schooling time trade-off amongst girls and the impacts on education.

7.6. Recommendations

7.6.1. Accelerate the reblocking programme of the Makause informal settlement and reduce the RDP backlog

The reblocking or upgrading process involves transforming of informal settlement into sustainable and integrated neighbourhood so that residents can have access to social facilities which promote safety, sports, health and space and access to municipality services such as water, sanitation electricity and waste collection (Brelsford *et al.*,2019: Isandla Institute, 2019).

Slums or informal settlement transformation is the SDG number 11: Sustainable cities and communities. It aims to progressively deliver the right to adequate housing in slums and informal settlements as part of everyone's right to a good standard of living.

The National Upgrading of Informal Settlement Programme (UISP) is fundamentally intended to improve the living conditions of the residents in informal settlement. The UISP has three main objectives namely: health security, tenure security and empowerment. It is therefore, recommended that the CoE should accelerate its reblocking programme.

The benefits of reblocking and upgrading of informal settlements are access to:

- Water supply (taps).
- Electricity and flood lights.
- Better roads which promote accessibility to the settlement.
- Public transport.
- Playgrounds for children.
- Community space.
- Reduced fire hazards,
- Secured tenure and
- Better waste collection (Brelsford *et al.*,2019).

CoE is currently upgrading 119 informal settlements, of which Makause is one of the informal settlements to be upgraded. The upgrading process has been going

on since 2016 in other parts of the informal settlement; however, it needs to be accelerated to reach different sections of the Makause informal settlement. Since the residents of Makause informal settlement do not have tenure rights for their households, CoE must buy the land and obtain tenure rights. This will be the first step towards reblocking the informal settlement. The research findings indicate that the residents of the Makause informal settlement have lived there for many years. This implies that the residents would prefer to live in that area as it is near all amenities, and they desire improvement of service delivery (CoE, 2023).

It is also recommended that the CoE accelerate the RDP programme and develop strategies to reduce the housing backlog.

The Reconstruction and Development Programme (RDP) was implemented to redress Socio-Economic challenges left as a legacy by the apartheid government. There is currently a considerable backlog throughout the country on the RDP programme. RDP houses come with basic-level service agreements such as water supply, sanitation, refuse removal, primary energy, and housing assistance. If this programme can be accelerated in the CoE, the community of Makause could benefit from it. Even though the South African government has provided numerous households with the RDP houses throughout the country, there is still a huge demand for RDP houses particularly in Gauteng Province being the economic hub of the country. The Gauteng Department of Human Settlement (GDHS) indicates that between 2018/2019, there was a backlog of over 600 000 homes, of which 203 361 houses are in the CoE (Mashwama, Thwala and Aigbavboa, 2018).

7.6.2. Make water infrastructure management fund available and capacitate municipality officials

It has been previously indicated that mismanagement of funds by the CoE has been experienced, where funds are syphoned to be spent on new infrastructure, which senior managers and politicians have yet to necessarily budget for. Such mismanagement can be avoided by setting aside funds for water infrastructure management and maintenance (Patience and Nel, 2021).

Municipality officials seem to be not fully equipped or capacitated to implement water supply policies, such as the indigent policy, dealing with infrastructure maintenance and management of infrastructure on the ground particularly in informal settlements. Some of these challenges result in many municipalities failing to obtain a clean or unqualified audit opinion from the Auditor General of the country (Patience and Nel, 2021).

A significant finding is that municipality outsources water supply to private vendors in the Makause informal settlements, this could be an indication of lack of knowledge or lack of capacity to supply water in such areas. Such arrangement could be prone to abuse and corruption by both parties, the beneficiaries and the municipality officials, because of a lack of control over them (Patience and Nel, 2021).

If the municipality officials are capacitated, there would be considerable change and development in the community and the entire metropolitan municipality. Availability of funds will ensure that more water infrastructures like taps are erected. Therefore, additional water taps will improve the safety of women and girl children by not having to walk long distances to collect water. This could also curb the collection of water at night by women.

7.6.3. Water conservation awareness and education

The CoE needs to develop water conservation awareness programmes to educate residents of Makause informal settlements on water management, utilisation, development, and conservation. These programmes will equip the residents with a better understanding of the water cycle and impart knowledge, skills, and values within the community to contribute to positive attitudinal change towards water use. Programmes which can be implemented include the UNICEF WASH Programme (Water, Sanitation and Hygiene) aimed at helping children and the community at large to survive. CoE can partner with the Department of Basic Education, Department of Health, and private NGOs to implement all WASH programme aspects.

The WASH programme is also aimed at building commitment and capacity among key stakeholders. WASH stakeholder are school educators, community

members, service providers who drive behavioural change, good hygiene and sanitation and water conservation education in marginalised and vulnerable communities like informal settlement.

Water conservation awareness programmes will assist the CoE in achieving the objectives of the National Development Plan and SDGs while conserving a lot of water lost through leaks, vandalism, and illegal connections. CoE can also partner with government entities such as Rand Water Water Wise Education Team, which is mandated to deliver water conservation education, including education on vandalism in communities. According to Rand Water Water Use Efficiency Index (WUEI), Makause informal settlement is flagged as an area which has supply constraint. This is opportunity for both institutions. WUEI is an index which measures the use of water in an area by monitoring meters and compare it with the number of households and human population in an area. The data then uses GPS to pinpoint such areas and present it on maps (Rand Water Ekurhuleni WUEI, 2023).

7.6.4. Revitalise ward committees in the Makause informal settlement

Ward committees must be re-established in Makause informal settlement in terms of Sections 73 and 74 of the Local Government: Municipal Structures Act (1998). The ward committee is delegated powers and duties by the municipality. The Makause informal settlement currently needs to have distinct ward committees. The obligations and functions of the ward committees are:

- To increase the participation of residents in municipal decision-making, as they are a direct and have unique link with the municipality council.
- Ward committees are representative of the local ward and are not politically aligned.
- The ward committees must be involved in matters such as the Integrated Development Planning Process, municipal performance management, the annual budget, council projects and other vital activities and programmes, as these all-impact local people.
- The ward committee must be able to identify and initiate programmes to improve people's lives in their ward.

- Ward committee should be able to support the councillor in dispute resolutions, providing information about municipal operations.
- They should monitor the municipality's performance and raise issues of concern to the local ward, such as water supply.
- Finally, it can help with community awareness campaigns, e.g., waste, water conservation and sewage, and payment of fees, as members know their local communities and their needs.

It is envisaged that by re-establishing ward committees, service delivery can be improved using continuous improvement and monitoring. Communication and information sharing with the community can be enhanced.

7.6.5. Public participation and stakeholder partnership

The National Water Act of (1998) principles are Sustainability, Equity, and Efficiency. These principles recognise the need to ensure the participation of stakeholders and users in decisions that affect them. According to the White Paper on Local Government (1998) municipalities must necessitate the active involvement of their citizens.

Public participation is *“an open, accountable process through which individuals and groups within selected communities can exchange views and influence decision-making”* (Bagui, 2013). It is a democratic process of engaging people, deciding, planning and actively developing and operating services that affect their lives. There is a need by the CoE municipality to promote and facilitate public participation in the Makause informal settlement. When the participants from Makause informal settlement were asked if a change in the city's political landscape would ever affect the water supply in their area, majority indicated “no” as their answer. Many participants complained that their informal settlement is never considered or taken seriously regarding issues that concern them.

It is therefore envisioned that public participation will promote the values of good governance and human rights as a fundamental right of all people to participate in the governance systems.

People can participate as individuals, interest groups or established Community-Based Organisations (CBOs).

Women in the CoE and the community of Makause must be supported and be given a chance to participate in higher roles and decision-making which involve water supply services. It has been indicated before that literature demonstrates that women are household water managers and are responsible for its collection and storage. If nations are to achieve Sustainable Development Goal Number 5, *“to realise gender equality and empower all women and girls”* then women need greater involvement. In that case, the disparities between men and women in water supply must be revisited. This will require the transformation of gender relations and the active participation of both men and women in the water supply sector decision-making processes.

7.7. Conclusion

In conclusion, Makause informal settlement, like many informal settlements worldwide and in South Africa, faces a substantial Socio-Economic challenge of access to adequate water supply. The causes of these challenges are interconnected and range from illegal water supply connections by community members, vandalism and theft of infrastructure by the informal settlement dwellers themselves, lack of infrastructure maintenance and management from the municipality side, lack of service delivery, lack of communication and marginalisation. Water is a human right, as enshrined in the South African constitution. South Africa is also a democratic country which safeguards the implementation of the constitutional rights of its citizens. South Africa has well-written policies that govern its citizens' water utilisation, including the vulnerable, marginalised groups and previously disadvantaged communities. The officials bestowed with the responsibility to implement these policies on the ground must be able to do so without failure.

It is hoped that the CoE will close the gaps and be able to work with Makause informal settlement members in the future to address and resolve the water shortage challenges currently being experienced.

The researcher is fulfilled that the main objective of this research was achieved.

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APPENDICES

Appendix 1 Community leader Interview



Community Leader Interview

The purpose of this interview is to gather information on residents' perceptions on the causes of poor water supply in Makause informal settlement. The data collected will be used for a Master of Philosophy in Integrated water management. The research is aimed to investigate different stakeholder's perceptions on the causes of poor water supply in the community. The interviewee has a right to stop the interview at any point when he/she feels uncomfortable, and the identity as well as the information given will be kept confidential and destroyed after use by the researcher. There will be no rewards, incentives, and favours whatsoever for taking part in the research.

Date:

Interviewer: Themba Nkuna

1. Water supply related Questions

1.1 Can you describe the state of water supply in the community of Makause

.....
.....

1.2. Can you please identify in order of priority the causes of poor water supply and how they affect the community?

.....
.....
.....
.....

3.3. How is the condition of the infrastructure i.e., taps and pipelines through which you get your water from?

.....
.....
.....
.....

1.4. What role do political parties play in service delivery such as water supply in the community?

.....
.....
.....
.....

1.5. Can you describe the process in which residents report water supply challenges in the community?

.....
.....
.....
.....

1.6. How does the community of Makause access water from the municipality?

.....
.....
.....

1.7. Is the currently method of water supply meeting the needs of the community?

.....
.....

1.8. How would you like to access water from the municipality?

.....
.....
.....
.....

1.9. Would you like to the community of Makause to pay for water services?.....

1.10. What is a positive aspect of water supply from the municipality side?

.....
.....
.....

4.10. What is the negative aspect about water supply from municipality side?

.....
.....

Appendix 2 Residents questionnaires



RESIDENT QUESTIONNAIRE

The purpose of this questionnaire is to gather information on residents' perceptions on the causes of poor water supply in Makause informal settlement. The data collected will be used for a Master of Philosophy in Integrated water management. The research is aimed to investigate different stakeholder's perceptions on the causes of poor water supply in the community. The interviewee has a right to stop the interview at any point when he/she feels uncomfortable, and the identity as well as the information given will be kept confidential and destroyed after use by the researcher. There will be no rewards, incentives, and favours whatsoever for taking part in the research.

Date:

Interviewer: Themba Nkuna

1. PERSONAL INFORMATION

1.1. Male Female Age Group

18-24

25-34

35-44

45-54

55-64

65+

2. Level of education:

2.1 Primary

2.2 Secondary: Grade 8 – 10 Grade 11 – 12.....

2.3 Tertiary: PhD..... Masters..... Honours..... Degree..... Diploma.....
Certificate...

2.4 Other

3. Demographic

3.1 How long have you been living at Makause.....

3.2. Where did you live before Makause?.....

3.3. Are you or your husband/wife employed? Yes.... No....

3.4. How many people do you live with in the same household?

4. Water supply related Questions

4.1. According to your understanding what are the main challenges of water supply in your community?.....

.....

4.2. Can you please describe the causes of poor water supply in the community?

.....

4.3. How does poor water supply affect your livelihood?

.....

4.4. Has a change in political party in the municipality affected water supply in your area?

.....

4.5. When you first moved in Makause how was the state of water supply?

Same.....

Better.....

How.....

Poor.....

How.....

.....

.....

4.6. Where do you currently collect water from?.....

4.7. What is the state of water supply infrastructure taps, laundry basins etc.?

.....

.....

.....

4.8. Who is responsible for infrastructure maintenance such as taps pipes and basins and when was the last time this happened?.....

.....

.....

4.9. Do you pay for water?.....

4.10. Would you like to pay for water services if the service improves?.....

4.11. What is a positive aspect of water supply in the area?

.....

.....

.....

4.12. What is the negative aspect about water supply in the area?

.....

.....

.....

4.13. Do you think your water is clean and healthy to drink?

.....

.....

.....

.....

4.14. In your world what is poor water supply?

.....

.....

.....

.....

4.15. In a scale between 1-10 rate the state of water supply in Makause

.....

.....

.....

.....

4.16. Describe how you would like to see change in water supply chain in your area?

.....

.....

.....

Appendix 3 Municipality official questionnaires



MUNICIPALITY OFFICIALS INTERVIEW

The purpose of this interview is to gather information on residents' perceptions on the causes of poor water supply in Makause informal settlement. The data collected will be used for a Master of Philosophy in Integrated water management. The research is aimed to investigate different stakeholder's perceptions on the causes of poor water supply in the community. The interviewee has a right to stop the interview at any point when he/she feels uncomfortable, and the identity as well as the information given will be kept confidential and destroyed after use by the researcher. There will be no rewards, incentives, and favours whatsoever for taking part in the research.

Date:

Interviewer: Themba Nkuna

1. Water supply related Questions

1.1 Can you describe the state of water supply in the community of Makause?

.....
.....

1.2. Can you please identify in order of priority the challenges faced by the municipality in supplying water the Makause informal settlement?

.....
.....
.....
.....

3.3. What is the role of Ekurhuleni municipality when it comes to water supply in informal settlements?

.....
.....
.....
.....

1.4. How will a change in political party responsible for the municipality affect water supply in Makause informal settlement?

.....
.....
.....
.....

1.5. Do informal settlements pay for water services and who is responsible for repairing water supply infrastructure in their community?

.....
.....
.....
.....

1.6. If informal settlements do not pay for water services where does the revenue to supply and maintenance of water infrastructure generated from?

.....
.....
.....

1.7. Is there anything that can be changed to better the supply of water? If yes How?

.....
.....

1.8. Is there any policy or guidelines document from Ekurhuleni which give guidance in water supply to informal settlement?

.....
.....
.....
.....

1.9. What is it that is expected by municipality from the residents of informal settlement when you provide clean water to them?.....

.....
.....

.....

1.10. What is a positive aspect of water supply from the municipality side?

.....

.....

.....

4.10. What is the negative aspect about water supply from municipality side and what needs to be improved, can you install taps and meters in their yards?

.....

.....

.....

Appendix 4 Observation sheet

OBSERVATION SHEET (To be completed by the researcher)



Observation	Comment
1. Water supply	How many standing taps and their condition in the settlement?
2. Taps	Do taps have running water?

3. Taps	Leaking? Water efficient/ flow rate?
4. Leaking taps	Yes/No and how many?
5. Do the taps have a water meter?	Yes/No

6. Water Collection Point	Is there a queue Yes /No?
7. How many people are in the queue?	For how long?
8. is there any wastage of water?	Yes/No

9. What do people use to collect water?	Hose pipe, Jerry cans, Containers etc.?
10. Is there any conflict or it's a smooth process?	Yes/No
11. Anything of interest you can record?	

Appendix 5 Consent form for participants



Explanatory information sheet and consent form for participants

To whom it may concern,

My name is Themba Gytrene Nkuna and I am a student at IEMSA. I am currently conducting research under the supervision of Linda Downsborough. The main purpose of this research is to investigate the causes of poor water supply through perceptions of different stakeholders in the community of Makause informal settlement including community leaders, residence, and municipality officials. I hope that this research will enhance our understanding around the complexity of water supply systems in informal settlement and how they can be shaped better to improve the quality of life in informal settlements.

I would like to invite you to participate in my study. To explain to you what your participation in my study will involve, I have formulated questions that I will try to fully answer so that you can make an informed decision about whether or not to participate. If you have any additional questions that you feel are not addressed or explained in this information sheet, please do not hesitate to ask me for more information. Once you have read and understood all the information contained in this sheet and are willing to participate, please complete and sign the consent form below.

What will I be doing if I participate in your study?

I would like to invite you to participate in this research as I believe you can assist in helping to identifying some of the root causes of poor water supply in the

Makause informal settlement and how they affect the community. If you decide to participate in this research, I would like you to provide answers in a form of questionnaire.

You can decide whether to participate in this research. If you decide to participate, you can choose to withdraw at any time or to decide not to answer interview questions.

Are there any risks/ or discomforts involved in participating in this study?

Whether or not you decide to participate in this research, there will be no negative impact on you. There are no direct risks or benefits to you if you participate in this study. You might, however, indirectly find that it is helpful to talk about your experiences of poor water supply. If you find at any stage that you are not comfortable with the line of questioning, you may withdraw or refrain from participating.

Do I have to participate in the study?

- Your inclusion in this study is completely voluntary.
- If you do not wish to participate in this study, you have every right not to do so.
- Even if you agree to participate in this study, you may withdraw at any time without having to provide an explanation for your decision.

Will my identity be protected?

I promise to protect your identity. I will not use your name in any research summaries to come out of this research and I will also make sure that any other details are disguised so that nobody will be able to identify you. I would like to ask your permission to record the interviews, but only my supervisor, I, and a

professional transcriber (who will sign a confidentiality agreement) will have access to these recordings. Nobody else, including anybody at IIIEMSA, will have access to your interview information. I would like to use quotes when I discuss the findings of the research, but I will not use any recognisable information in these quotes that can be linked to you.

What will happen to the information that participants provide?

Once I have finished all interviews, I will write summaries to be included in my research report, which is a requirement to complete my MASTER OF PHILOSOPHY IN INTEGRATED WATER MANAGEMENT degree. You may ask me to send you a summary of the research if you are interested in the final outcome of the study.

What happens if I have more questions about the study?

Please feel free to contact me or my supervisor should you have any questions or concerns about this research, or if there is anything you need to know before you decide whether or not to participate.

You should not agree to participate unless you are completely comfortable with the procedures followed.

My contact details are as follows:

Themba Nkuna

[REDACTED]

[REDACTED]

The contact details of my supervisor are as follows:

Linda Downsborough

[REDACTED]

[REDACTED]

Consent form for participants

I, _____, agree to participate in the research conducted by Themba Gytrene Nkuna. The main purpose of this research is to investigate the causes of poor water supply through perceptions of different stakeholders in the community of Makause informal settlement including community leaders, residence, and municipality officials.

This research has been explained to me and I understand what participation in this research will involve. I understand that:

- I agree to be interviewed for this research.
- My confidentiality will be ensured. My name and personal details will be kept private.
- My participation in this research is voluntary and I have the right to withdraw from the research at any time. There will be no repercussions should I choose to withdraw from the research.
- I may choose not to answer any of the questions that are asked during the research interview.

I may be quoted directly when the research is published, but my identity will be protected.	
Signature	Date

Appendix 6 Gatekeepers letter/ Request to conduct research.



Gatekeepers letter/ Request to conduct research

Dear Sir/Madam

I am writing to ask your permission to conduct research at your Makause Informal Settlement.

My name is Themba Nkuna, a Master of Philosophy in Integrated Water Management student at the IIEMSA a brand of the Independent Institute of Education (IIE). The research I wish to conduct for my Masters dissertation is titled "Perceptions of the causes of poor water supply at Makause informal settlement, Ekurhuleni Metropolitan Municipality".

The aim of this study is to investigate the causes of poor water supply through perceptions of different stakeholders in the community of Makause informal settlement including community leaders, residents and municipality officials. The project consists of interviews in the form of questionnaires and structured observations. Community leaders, residents and municipality officials will be interviewed. The collection of data will last for three months in the community of Makause. The data collected will be analysed and confidential. The names of the participants will be protected.

Yours sincerely

Student: Themba Nkuna

Supervisor: Linda Downsborough

Themba Nkuna

Digitally signed by Themba Nkuna
DN: cn=Themba Nkuna,
email=themba.nkuna@iie.ac.za, o=IIE,
ou=IIE, c=ZA

My contact details are as follows:

Themba Nkuna

[Redacted contact details]

The contact details of my supervisor are as follows:

Linda Downsborough

[Redacted contact details]

Appendix 7 Ethical clearance letter

Data Classification - Business General



Our Ref: M. 411122
Enquiries: research@iie.ac.za

18 November 2022



Approval of Proposal and Ethics Clearance for Master of Philosophy in Integrated Water Management



Student name: Themba Nkuna
Student number: [REDACTED]
Brand and campus: IIE MSA



Dear Themba,

Thank you for submitting and presenting your proposal titled:

Perceptions on the causes of poor water supply at Makause informal settlement, Ekurhuleni Metropolitan Municipality.



We are pleased to inform you that the Research and Postgraduate Studies Committee considered and approved your research proposal. Once the conditions below have been met to the satisfaction of your supervisor you may proceed with the next phase of your research.

The required revisions should be attended to under the guidance and to the satisfaction of your supervisor, who is requested to notify the Programme Manager in writing that the changes have been made to their satisfaction.

We are confident that the proposed changes will improve the quality of your work and will assist you in navigating the process to successful completion.

The changes that are required before you proceed are as follows:

- Firstly, to include a review of current peer reviewed literature focusing on the key constructs around perceptions and water supply management within an informal settlement.
- Secondly, clarify, within a refined context, the research design, methodology, population, and sampling strategy, in context of the research purpose and objectives.

The recording of the panel discussion will be made available to engage with the observations and recommendations presented by panel members.



The study has been granted ethics clearance. This means that you are allowed to conduct research once you have addressed all the feedback from the panel and completed both your literature review and methodology chapters. If any changes are made to the methodology and data collection instrument which changes focus of the study or the data collection approach you must inform the IIE Ethics Committee.

The Committee confirms that Linda Downsborough, has been appointed as your supervisor.

If you have any questions, please feel free to contact your programme team or supervisor directly.

All the best with your research.

Yours sincerely,

Dr WH Engelbrecht
Dean Research and Postgraduate Studies



Appendix 8 Language editing confirmation letter



Exalt – Excel - Exceed

Dear Themba Nkuna

26 October 2023

Thesis language editing confirmation

I am writing to confirm that proofreading and language editing on your thesis has been completed. As an experienced editor, I have carefully reviewed your document to ensure that it is free from errors and meets the highest standards of academic writing. During the editing process, the thesis was reviewed line by line, checking for spelling, grammar, punctuation, and syntax errors and reviewed for clarity and coherence. Improvements were suggested where necessary to ensure that your ideas are presented in the most effective way possible.

Thank you for choosing our editing service and wish you all the best in your academic endeavours.

Sincerely,

Dr Claudia Sigamoney PhD
(IPMF, PEG)
NLP and Life Coach
Academic
Researcher
Business Mentor

Consulting and New Business Development Services

Company Reg No.: 2014/021878/07

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