LESSONS LEARNED FROM COMMUNITY-BASED RESILIENCE STRATEGIES APPLIED TO MITIGATE INCONSISTENT POTABLE WATER SUPPLIES IN A SELECTED VILLAGE IN LEPELLE NKUMPI LOCAL MUNICIPALITY, LIMPOPO PROVINCE, SOUTH AFRICA

by

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DECLARATION

I declare that "*Lessons learnt from community-based resilience strategies applied to mitigate inconsistent potable water supplies in a selected village in Lepelle Nkumpi Local Municipality, Limpopo Province, South Africa"* is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.

3rd March 2025

Signature **Date**

DEDICATION

This study is dedicated to my parents who always encouraged me to further my studies.

My son Katt, you this a motivation to you to walk in my footsteps.

Lastly, to my late grandparents whom I wish they were still alive to see my accomplishments.

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Above all, thanks to Heavenly Father for the protection.

ABSTRACT

The objective of the study was to investigate the mitigation strategies developed by residents of Mashite village in Limpopo Province to build resilience to the ongoing inconsistent potable water supply. The study involved an exploratory qualitative research approach collecting data from 15 participants using a semi-structured interview guide. The study employed an inductive thematic analysis based on face-to-face interviews. The findings of the research indicate that the participants have adopted several resilience strategies including household water storage facilities; sharing of water between households and purchasing water from local vendors. The participants also expressed their frustration with Lepelle-Nkumpi Local Municipality's inability to deliver potable water especially that they are not informed when the potable water supply is on which means that they are unable to fill their water storage facilities. It is recommended that the Municipality communicates appropriately with residents to reduce this frustration.

Key words

Inconsistent potable water supplies, Resilience strategies, Community participation

LIST OF ACRONYMS

DWS	Department: Water and Sanitation
IDP	Integrated Development Plan
IWSP	Indonesian Water and Sanitation Programme
IWRM	Integrated Water Resource Management
SADC	Southern African Development Community
SSA	Sub-Saharan Africa
SDGs	Sustainable Development Goals
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
WSA	Water Services Authority
WSP	Water Service Providers
WHO	World Health Organization

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1.1 INTRODUCTION

According to Statistics South Africa (2016:50), the proportion of Limpopo households with access to potable water has decreased from 83,6% (1,2 million) in 2011 to 80% (1 million) in 2016. However, some of the localised specifics of the experienced potable water challenges in rural communities within Lepelle-Nkumpi Local municipality hidden behind the statistics described above have recently been revealed. These specifics include old or non-functioning taps, decaying or broken water pipes, and an absence of supply as the main causes of inconsistent potable water availability in the municipality (Makalela & Asha, 2019:60). Verbal interactions with locals by the suggested researcher align with the findings of the peer-reviewed papers and also imply that rural people have historically experienced displeasure with the availability of drinkable water.

Notwithstanding the inconsistent supplies of potable water, there is limited evidence relating to community-based strategies that affected residents are implementing to mitigate the challenge. Consequently, this study involved an exploratory investigation into the strategies that rural communities have developed and are implementing to build resilience to the challenges associated with inconsistent potable water supplies. It is anticipated that the insights into community-based resilience strategies may contribute toward developing a more sustainable type of water governance within the area – and possibly beyond.

1.2 STATEMENT OF THE PROBLEM

Notwithstanding the commitments made with regard to water delivery in the Integrated Development Planning (IDP) process in Lepelle-Nkumpi Local municipality, potable water supplies in the rural areas of the municipality remain inconsistent (Makalela & Asha, 2019:56). Alongside community dissatisfaction with potable water service delivery, it is evident that affected residents take proactive steps to build resilience to the potable water challenge. This is because they could not live in affected areas without some mitigation strategy. There is extremely limited peer-reviewed documentation relating to the mitigation strategies being utilised to counter to the inconsistent potable water supply in rural parts of Limpopo Province. Nevertheless, a

knowledge gap relating to resilience in the context of inconsistent potable water supplies in rural Limpopo Province remains.

1.3 MOTIVATION FOR THE STUDY

There is limited peer-reviewed information regarding community agency and resilience in the context of potable water, except for one recent quantitative article by Makalela and Asha (2019) which has been cited above, one qualitative article by Mashabela, Dube, Mollel, Letsoalo and Radingoana (2022) and a mixed methods study by Bazaanah and Mothapo (2023). All three provide insights into the “accessibility and availability of potable water supply in selected communities of Lepelle-Nkumpi local municipality” (Mashabela et al, 2022:1476). The motivation for this study was thus to build on the insights of these studies by undertaking a qualitative study representing the opinions and perspectives of local residents to investigate the mitigation strategies that are being applied by citizens to build resilience to the ongoing inconsistent potable water supplies.

By adopting a qualitative approach, the study has added to the body of knowledge relating to inconsistent potable water supplies in the area within the context of community resilience strategies and inconsistent potable water delivery.

1.4 PURPOSE OF THE STUDY

The purpose of the study was to explore community-based strategies that not only address the immediate inconsistent potable water supplies but also strengthen the resilience of Mashite village to ongoing and future water challenges.

1.4.1. The aim of the study

The aim of the study is to investigate community-based resilience strategies applied to mitigate inconsistent potable water supplies in a selected village in Lepelle Nkumpi Local Municipality. The associated research objectives and questions are described below.

1.4.2. The research objectives

The following research objectives were pursued.

1. To identify resilience strategies being applied in selected communities in the Lepelle-Nkumpi local municipality to mitigate potable water challenges;
2. To determine the efficacy of the resilience strategies at both the community and household levels, and
3. To suggest mechanisms that facilitate potable water mitigation resilience strategies that could be applied within the selected communities and plausibly beyond.

1.4.3. The research questions

The following research questions were applied to gain insights into the abovementioned objectives.

1. What are the resilience strategies being applied in selected communities in the Lepelle-Nkumpi local municipality to mitigate potable water challenges?
2. How effective are the resilience strategies being applied to mitigate the potable water challenges at both the community and household levels?
3. What mechanisms could be applied in the future to use the insights to develop potable water mitigation resilience strategies within the selected communities and plausibly beyond?

1.5 SIGNIFICANCE OF THE STUDY

According to the Constitution of the Republic of South Africa (1996), water is a basic requirement and human right (Fantini, 2020). Numerous water policies stipulate that everyone must have water, yet potable water is inconsistently supplied in the village of Mashite. The study explored the techniques that households have developed to mitigate the inconsistent portable water supply challenge in order to provide insights into the types of resilience that are relevant in this type of rural community.

This study has contributed to the knowledge gap relating to resilience in the context of inconsistent potable water supply and could be of interest to organisations with such issues in the area. The study also provides policymakers with insights – as well as feedback to the community members –regarding inconsistent potable water supply resilience strategies. The study also will highlight the efficacy of some of the mitigation strategies developed by the community to address the problem of inconsistent potable water supply in the Mashite area. In light of the current water crisis in South Africa, the

study could also provide insights that future scholars and stakeholders may use to inform strategies to address access to potable water in the country in the future.

1.6 DEFINITION OF CONCEPTS

The key concepts applied in this study are defined in the section below.

Community

A community is made up of individuals who live in the same place, are bound by the same rules, customs, and laws, or share rights, privileges, or interests (Matarrita-Cascante, Lee & Nam, 2020:96). Communities can vary greatly in size and scope, ranging from small, tight-knit groups to large, diverse populations. They often come together to support one another, share resources, and work towards common goals, fostering a sense of belonging and mutual connection (Dlamini & Tesfamichael, 2021:2437).

Participation

Participation is understood to mean many things, depending on the context. For some, participation entails taking part in an action or occasion (Burgess, van Diggele, Roberts & Mellis, 2020). The involvement of people in a community in programs to address their problems may also be broadly characterised as participation (Walker, Smigaj & Tani, 2021). People can realise their greatest potential and provide their finest contributions when they participate, which has been characterised as both a means and an aim in the context of growing human skills. According to Arnstein (1969:218), the redistribution of power is known as participation which enables the future inclusion of citizens who are currently excluded from political and economic processes. For this study, the definition by Walker et al (2021) and Arnstein (1969) was used because these types of participation both refer to the way in which communities are, or become, pro-actively involved in decision-making.

Potable Water

Surface and underground sources provide potable water, commonly known as drinking water, which is then treated to satisfy provincial and national standards for consumption (Department: Water and Sanitation (DWS), 1997). Potable water is

defined by Loubser, Chimbanga and Jacobs (2021) as water that is fit for human consumption. This latter definition was applied in the study.

Resilience

Individual resilience has been defined as the capacity to recover from a shock whether the shock be mental, physical, spiritual or emotional (Adeyeye, Gibberd & Chakwizira, 2020). Community resilience is defined as the sustained capacity of communities to resist, adapt to, and recover from adversity (King, Zori, Collins, Lewis, Hack, Dixon & Hart, 2022). According to Logan and Guikema (2020:1540) resilient communities possess several key characteristics including:

- Social cohesion which is inclusive of robust social networks and relationships within the community that contribute to resilience by fostering mutual support, cooperation and trust among residents, and
- Adaptive capacity refers to communities that can adapt to changing circumstances, innovate and implement effective strategies in response to adversity.

It is argued that by nurturing these qualities communities can improve their resilience in the face of adversity and better navigate challenges, ultimately building stronger, more sustainable societies. The latter community definition of resilience was applied in this study.

Water governance

Water governance is a policy or framework that enables governmental institutions to collaborate with other stakeholders and civil society organizations to address water management concerns rather than assigning governmental institutions to carry out the function top-down simply (Jiménez, Saikia, Giné, Avello, Leten, Liss Lymer, Schneider & Ward, 2020). Water governance also denotes a transition from rigorous decision-making processes to more interactive techniques for managing water supply systems (Pahl-Wostl, Knieper, Lukat, Meergans, Schoderer, Schütze, Schweigatz, Dombrowsky, Lenschow & Stein, 2020:27). Therefore, water governance refers to the systems, processes, and institutions through which water resources are managed, allocated, and regulated. It encompasses a wide range of activities, including policy development, planning, implementation, and enforcement, intended to guarantee the

fair and sustainable use of water for various kinds of uses, including industrial, drinking, agriculture, and ecosystem preservation (Di Vaio, Trujillo, D'Amore & Palladino, 2021).

Water scarcity

According to Tzanakakis, Paranychianakis and Angelakis (2020), water scarcity is a circumstance in which water sources in the community become inadequate. Similarly, insufficient freshwater supplies to satisfy local human and environmental needs is referred to as water scarcity (Prins, Etale, Ablo & Thatcher, 2023:1440). Water scarcity can occur for various reasons, including unequal access to water resources, driven by social, economic, and political factors, can result in disparities in water availability and exacerbate shortages, particularly for marginalized communities (Molden, 2020:262).

1.7 OUTLINE OF THE RESEARCH REPORT

This study is structured into five chapters. Chapter One is the background of the study, and it examines the worldwide perspective on delivery of portable water and community and household resilience. The chapter also justifies the need for the study and the contributions that the study is likely to make to government, its allied institutions and the communities at large. The chapter further presents the objectives and anchor questions for each objective, theoretical framework underpinning community resilience on the issues pertaining to the delivery of potable water. This part of the study is very critical as the theory serves as a building block on which the findings of the research are analysed and interpreted. The chapter concludes by outlining the structure of the proposal.

Chapter Two presents the empirical perspectives on delivery of potable water through community participation. The review focused on the major impediments to resilience in the delivery of potable water. The chapter also reviewed development goals that aim to achieve access to quality and sustainable water services.

Chapter Three focuses on the research methodology for the study, it encompasses all facets of carrying out a research project, creating appropriate techniques for gathering data, and comparing various approaches and procedures.

In Chapter Four, the three research objectives of this study are analysed and interpreted in order to give meaning to the qualitative data.

Chapter Five provides a summary overview of the study and key findings. This chapter also includes recommendations and suggestions areas for future research.

1.8 CONCLUSION

This chapter has given a brief overview of Limpopo Province's potable water supplies as well as an introduction to the study. It also presented a problem statement emphasising the importance of looking at community-based resilience strategies developed in order to mitigate inconsistent household potable water supplies. Along with research questions and definitions of key terms, the study also described the objectives it sought to accomplish.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

The aim of this chapter is to provide an overview of the relevance of people being able to access potable water from multiple perspectives at different scales. The perspectives include: sustainability, community participation and technical options to increase access to potable water from international, national and local scales. Prior to these core themes being explored, some background information about potable water is provided.

2.2 THEORETICAL FRAMEWORK

Mancur Olson's seminal work, *The Logic of Collective Action: Public Goods and the Theory of Groups* (1965) defines collective action as an action taken by an individual or collective to further a group's common goals. In other words, it makes sense that people in a group would act to further that goal if all the group's members shared a common interest or goal. Collective action is defined by Vos, Boelens, Venot and Kuper (2020) as activism that takes the shape of political protests and directly confronts the status quo through petition signing or taking part in public rallies.

Additionally, for any public policy – such as a community water and sanitation program – to be successful, self-designed rules are essential to govern how the beneficiaries manage resources from a shared pool without interference from the government (Ananga, Naiga, Agong', Njoh & Vickers, 2021). Therefore, Olson's definition was relevant to the research objectives of this study because it fits well with the agency of community members who have developed their own potable water resilience strategies.

Alongside the theoretical framework – Collective action the Sustainable Development Goals (SDGs) were considered to be the broader context within which the theoretical framework was situated. The SDGs are a set of expectations for the global community that represents a cornerstone of most nation's development plans. There are 17 goals, each with both a target and an indicator. Sustainable Development Goal 6 was considered to be relevant to this study because it includes the human right to fair access to safe and affordable drinking water (WHO/UNICEF Joint Monitoring Programme for water supply sanitation and hygiene, 2023:4). Goal 6 and Target 6.5,

which both relate to Integrated Water Resource Management (IWRM) and Target 6b, which relates to community participation, served as a contextual framework for this study. The combination of the above is adopted for the study because they represent both an international and localised framework for water resource management.

2.3 POTABLE WATER: BACKGROUND INFORMATION

Potable water is defined by the World Health Organization (2023) as water that is fit for human consumption – typically for drinking or cooking. Potable water provisioning is also considered to be a basic human right (Grönwall & Danert, 2020). In order to facilitate potable water supplies as a basic human right, the United Nations (UN), governments, water utilities and communities worldwide work to ensure universal access to potable water. Notwithstanding these efforts, challenges such as water scarcity, pollution, inadequate infrastructure and inequitable distribution persist at international, national and local scales (Chitonge, Mokoena & Kongo, 2020:89).

According to a recent United Nations (2024:43) report, a water shortage is considered to be a circumstance in which water supplies in a community become inadequate. Similarly, insufficient potable water supplies to satisfy local human, and environmental needs are referred to as a water shortage (Salehi, 2022:95). Water shortages are now a reality – with a recent UN report estimating that about half of the global population could face increased water shortages by 2030 (UNICEF, 2021:85). Despite access to potable water being one of the goals of the UN2030 Agenda for Sustainable Global Development (Irannezhad, Ahmadi, Liu, Chen, & Matthews, 2022:421) the current water shortage is growing, thus impacting on an increasing number of residential, commercial, industrial, and agricultural water consumers worldwide (Vollmer & Harrison, 2021:125).

2.4 POTABLE WATER: INTERNATIONAL PERSPECTIVES

This follows the United Nations General Assembly's recognition of “the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights” (Eman & Meško, 2020:467).

Sustainability of potable water means effective and holistic management of water resources (Pietz & Zeisler-Vralsted, 2021:234) which provides for the current

generation's water demands without endangering the capacity of future generations to do the same (Hajian & Kashani, 2021:96). Managing water resources sustainably

calls for an interdisciplinary, comprehensive strategy which contains multiple expert components that typically span technical infrastructure provisioning; environmental and ecological modelling; economic planning and cultural sensitivity that reflects the societal context (Mishra, Kumar, Saraswat, Chakraborty & Gautam, 2021:61). In efforts to strive for sustainable potable water supply invariably involves a diverse set of stakeholders at international, national and local scales.

Globally, sustainable potable water refers to giving every individual affordable access to the 20 to 50 liters of water per day that are necessary for life sustenance (Salehi, 2022:82). According to UNESCO (2021:18), 2.2 billion people lack access to drinking water that is properly managed.

As the evidence above indicates, access to sustainable potable water supplies is currently in a sub-optimal state – with access being highly unequal – and is predicted to become more challenging without remedial action. Thus, the multiple demands on water resources reinforce the drive to develop locally relevant strategies to provide sustainable, integrated and holistic potable water management for both current and future generations.

2.4.1. Community participation and potable water (international perspectives)

Community participation is regarded as a lynchpin for achieving most of the SDGs (Shunglu, Köpke, Kanoi, Nissanka, Withanachchi, Gamage, Dissanayake, Kibaroglu, Ünver & Withanachchi, 2022:96). With regard to SDG Goal 6 and target 6.5 which relates to the IWRM framework and achieving sustainable drinking water and sanitation services for everyone by bringing stakeholders from various sectors and geographic areas together. The IWRM framework considers the participation of local communities in water management as an essential component of the process of ensuring that everyone’s needs are addressed in the effort to distribute limited water resources in an equitable manner (Nagata, Shoji, Arima, Otsuka, Kato, Matsubayashi & Omura, 2022:902). As a result, the global community is largely of a consensus that community participation is now a prerequisite for sustainable models focused on the long-term, inclusive distribution of potable water – especially at local scales (Benson, Gain & Giupponi, 2020:679).

Development planners argue that for potable water projects to become effective, equitable and sustainable the host community must be an active partner in both the planning and management of the associated activity (Ananga et al, 2021). For instance, the Indonesian Water and Sanitation Programme (WSP) which the World Bank supported, helped about one million people to gain access to improved water services and sanitation using participatory methods (Odagiri, Cronin, Thomas, Kurniawan, Zainal, Setiabudi, Gnilo, Badloe, Virgiyanti & Nurali, 2020). This success encouraged the Indonesian government to mainstream and scale-up nationwide community-driven approaches to solve the water and sanitation challenges.

2.4.2. Technical issues relating to potable water (international perspectives)

In 2002 the UN Committee on Economic, Social and Cultural Rights adopted its general comment No. 15 on the right to water stating that: “the human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses” which has now been superseded by SDG 6 (Halla, Merino-Saum & Binder, 2022:82). Different countries have their water quality standards based on local regulations, health concerns, and environmental factors. For example, the World Health Organization (WHO) sets global guidelines for drinking water quality which many countries use as operational guidelines (WHO, 2022). Below are some key points that emerged from various technical issues associated with the delivery of potable water which are now recognised globally.

Infrastructure and distribution: By 2050, water is projected to 55% rise in water demand, and around 40% of the world's population will reside in places with extreme water stress (Khilchevskyi & Karamushka, 2020:4). Aging infrastructure, leaky pipes, and inefficient distribution systems can lead to water losses, contamination, and service disruptions. As a consequence, the urgency to equitably address well maintained and appropriate water infrastructure to ensure reliable delivery of potable water is of paramount importance (Daulat, Rokstad, Klein-Paste, Langeveld & Tscheikner-Gratl, 2024:548). Some examples of the challenges associated with appropriate water infrastructure are provided below.

1. **Monitoring and Quality Control.** Ensuring water quality throughout the delivery process requires robust monitoring and quality control measures. Authors highlight the importance of regular testing, surveillance, and

compliance with water quality standards to prevent waterborne diseases and protect public health (Salehi, 2022:102 and Sunitha & Reddy, 2022:41)

2. **Water resource management.** Sustainable management of water resources is crucial for meeting the demand for potable water. Makanda, Nzama and Kanyerere (2022) emphasize the significance of conserving water, efficiency improvements, and integrated water resource management strategies to ensure long-term water availability and resilience to climate change impacts.

3. **Financing and investment.** Adequate financing and investment are necessary to address infrastructure needs and implement technical solutions for delivering potable water. Multiple authors discuss the challenges of securing funding, balancing affordability with service quality, and leveraging public-private partnerships to support water delivery projects (Qadir, Al-Motairi, Tahir & Al-Fagih, 2021).

4. **Emerging technologies**. Multiple authors explore the potential of emerging technologies such as smart water meters, sensor networks and data analytics for improving the efficiency and reliability of water delivery systems. These technologies offer opportunities for real-time monitoring, leak detection, and optimization of water distribution processes (Curto, Franzitta & Guercio, 2021:678).

5. **Cross-Border Cooperation**: In regions where water resources are shared across international boundaries, various literature highlights the importance of cross-border cooperation and collaboration. Addressing technical issues related to transboundary water management requires coordination among neighbouring countries, shared data and information, and joint infrastructure projects (World Health Organization and United Nations Children's Fund, 2021).

6. **Community engagement and capacity building.** Multiple authors emphasise that engaging local communities and building their capacity to participate in water management processes is necessary to make sure that water supply systems are sustainable (Nelson, Drabarek, Jenkins, Negin & Abimbola, 2021).

Overall, the literature stresses the multidimensional nature of technical issues surrounding the delivery of potable water internationally, emphasizing the importance of integrated approaches, innovation and collaboration to address – and facilitate sustainable delivery of – these issues effectively.

2.5 POTABLE WATER: SUB-SAHARAN AFRICA

Worldwide about 2.2 billion people experience water scarcity every year (World Health Organization, 2023). It has been estimated that 57%of people in sub-Saharan Africa (SSA) have access to reliable, fully functional – and readily available – potable water (Thomas, Channon, Bain, Nyamai & Wright, 2020).

The Southern African Development Community (SADC) has long recognised the importance of addressing potable water issues as a critical component of regional development and cooperation planning. The SADC promotes cooperation among its member states to address common water challenges and achieve sustainable management of shared water resources. The organisation also facilitates dialogue, information sharing and joint initiatives to improve access to potable water and sanitation across the region (Malemba, Chiumya, Anyanwu & Camkin, 2024).

The SADC also emphasizes the regional adoption of Integrated Water Resource Management principles to ensure the equitable and sustainable utilization of water resources. This approach considers social, economic and environmental factors in water management decision-making, aiming to balance competing water demands and promote resilience to climate change (Dirwai, Kanda, Senzanje & Busari, 2021).

2.6 POTABLE WATER: SOUTH AFRICA

Since access to water is a fundamental human right, the Republic of South Africa's Constitution (1996) mandates that the government make sure that every South African has access to these services (Fantini, 2020). Municipalities, which are the smallest governmental entities, are responsible for delivering essential services and promoting growth in the areas under their jurisdiction (Republic of South Africa, 2000). In South Africa, there are fifteen water boards, the largest of which are Overberg Water in the Western Cape, Rand Water in Gauteng, and Umgeni Water in KwaZulu-Natal (Breen & Gillanders, 2024:124). The main duty of a water board is to provide water services, including bulk potable water and wastewater, to other local water service organizations

in their service areas. On the other side, Water Boards, municipalities, and the Department of Water Affairs are in charge of regional bulk water distribution (Department of Water Affairs, 2024:142-157). South Africa has a comprehensive legislative and policy framework for water management, including the National Water Act and the Water Services Act. These laws aim to ensure equitable access to water resources, promote sustainable water use, and protect water quality. However, implementation and enforcement of these regulations face challenges such as limited resources, capacity constraints, and institutional fragmentation (Edokpayi, Enitan-Folami, Adeeyo, Durowoju, Jegede & Odiyo, 2020:191-193).

The reality is the country faces significant challenges regarding the provision of potable water to its population. While significant progress has been made in improving access to potable water in South Africa since the end of apartheid, disparities persist, particularly between urban and rural areas. Many rural communities still lack access to reliable sources of clean water, relying on unsafe sources such as rivers or communal taps (Chitonge et al, 2020:212). In rural municipalities, there are numerous obstacles to maintaining the supply of potable water (Abrams, Carden, Teta & Wågsæther, 2021).

According to National Water Act (1998) of South Africa, achieving sustainable water use for the benefit of all citizens is the goal of water resource management and, it is argued, without public participation, the goal cannot be achieved (Department of Water Affairs, 2024:32). In the past traditional chiefs were primarily in charge of managing the country's water resources. The royal council's customs and cultural traditions served as the basis for this duty (Hopkins, 2020:36).

The management and provision of water then fell under the control of Water Services Authorities (WSA) and other governmental organizations such as the Department of Water and Sanitation (Pilusa & Kanyane, 2020:1589). Since the democratic shift, efforts to supply South Africa equitably with water became enshrined within the Water Services Act, No. 108 (1997), which is founded on the concepts of social justice articulated through citizen participation in the management of water resources. The Act makes the case that individuals must participate in water resource management because water is significant to all people and the geospatial context of water is a localised phenomenon.

Parallel with the Act is the Municipal System Act (2000) which mandates community involvement in the IDP's content and the procedures used to design and apply that content (Nel & Masilela, 2020:36). As a result, the government and its affiliated water institutions should work with the community to implement interventions meant to enhance water service delivery. In this way, since neither the government, the corporate sector, nor the general public are capable of managing water successfully on their own, it requires cooperative management and decision-making. The changes in water governance since the democratic shift have thus, in principle, placed the involvement of local people in the delivery of potable water as a cornerstone of the governance process intended to be beneficial for the broader community members. Although it is crucial to maintain the sustainability of rural water supply and management, community involvement is not without flaws.

In summary, addressing the challenges related to potable water in South Africa requires a multi-faceted approach that combines infrastructure development, water quality management, climate resilience, governance reform, community involvement, and sustainable financing. By addressing these issues comprehensively, South Africa can work towards achieving universal access to safe and reliable drinking water for all its citizens.

2.7 POTABLE WATER: LIMPOPO PROVINCE

According to the Constitution of South Africa, local governments (Metro, Local, or District Municipalities) serve as WSAs and frequently also as Water Service Providers (WSPs) for all towns within their regions of jurisdiction and are responsible for providing water services. Municipalities are thus responsible for providing homes with potable water as part of their mandate.

According to Statistics South Africa (2023:134-135), the proportion of Limpopo households with access to potable water has generally improved from 70.2% in 2016 to 74.3% in 2022. One of the poorer municipalities, the Vhembe District Municipality, uses river water for household and agricultural needs. Water supply is their joint responsibility, together with the technical personnel or management. According to a study by (Rankoana, 2023:256), the provincial government and district municipality

failed to maintain the efficiency of rural water systems because they did not offer enough ongoing support.

However, some of the localised specifics of the experienced potable water challenges in rural communities within Lepelle-Nkumpi Local Municipality hidden behind the statistics have recently been revealed. These specifics include old or non-functioning taps, decaying or broken water pipes and an absence of supply as the main causes of inconsistent potable water availability in the municipality (Makalela & Asha, 2019:11). Verbal interactions with local community members by the proposed researcher dovetail with the findings of the peer-reviewed paper and also suggest that people within the community have historically experienced dissatisfaction with inconsistent potable water supplies.

Sekhukhune District Municipality, which is responsible for water services in Moutse, recognise that water scarcity has been a challenge for villagers for many years due to the drought: “The municipality said that in 2019 water shortages were aggravated when the Mkhombo Dam — a major water source for the area — started silting up [and] those [residents] who can, buy water from private water tankers and boreholes in people’s yards” (Mafata, 2022). The same newspaper report goes on to state that “residents in the neighbouring Driefontein, Moutse West pay between R200 and R300 per week for about 250 litres of water in order for them to cook and bath”.

Therefore, the water shortages in the district also affect the residents economically. According to the Lepelle-Nkumpi Local Municipality (IDP) (2021:102), in the district, almost 80% of homes are classified as "indigent," meaning they earn less than R1,500 per month. These households are expected to receive basic utilities like water for free. The problem of water supply and water management has persisted for a long time in the rural areas of Lepelle-Nkumpi Local Municipality. The provision of basic water in the district recorded the lowest increase of 1.6% while 6.7% still rely on unsafe sources of water (Statistics South Africa, 2023:147). Politicians promise residents that if they vote for them, they will provide running water and improve water service delivery. Unfortunately, after the elections, the citizens still protest about the shortage of potable water and poor service delivery.

2.8 RESILIENCE: COMMUNITY AND HOUSEHOLD LEVEL

The notion of resilience refers to how well a society is prepared to respond to shocks through coping mechanisms (Chaigneau, Coulthard, Daw, Szaboova, Camfield, Chapin, Gasper, Gurney, Hicks, Ibrahim, James, Jones, Matthews, McQuistan, Reyers & Brown, 2022:289). Households do what they can to be resilient in the face of inconsistent water supplies (Lebu, Lee, Salzberg & Bauza, 2024). In SSA multiple strategies such as implementing rainwater harvesting techniques, organising water conservation campaigns and establishing community-managed water supply systems have been documented to describe how both households and communities make diverse efforts to innovatively adapt to experienced water shortfalls (Venkataramanan, Collins, Clark, Yeam, Nowakowski & Young, 2020). The measures are intended to help reduce the effects of the inconsistency of potable water supplies that people experience.

Consequently, this study involved an exploratory investigation into the strategies that rural communities have developed and are implementing to build resilience to the challenges associated with inconsistent potable water supplies. It is anticipated that the insights into community-based resilience strategies may contribute toward developing a more sustainable type of water governance within the area — and possibly beyond. The South African water situation has been made worse by both ageing infrastructure and population growth, necessitating the adoption of stringent measures by the citizens.

Although it is crucial to maintain the sustainability of rural water supply and management, community involvement is not without flaws (Mdendemi, 2019:44). Mdendemi's study highlights the issue of community members' lack of ownership and also revealed that residents failed to hold themselves accountable and believed that the government and donors owned the water projects. Villagers believed that even if water systems were manipulated, such as stealing water facilities and equipment the stolen property belonged to the government and not to them. Additionally, passive engagement has an impact on the rise in community involvement. People are informed about upcoming events and past occurrences. Thus, despite the laudable intentions of the legislated Water Acts that consider community participation in the water

governance process, socioeconomic dynamics on the ground may adversely affect the outcomes.

Water security is an essential component of livelihood strategies and thus household security (Bishoge, 2021:897-898). Water security represents a bridge between ‘natural’, ‘physical’, ‘financial’, ‘human’ and ‘social’ assets of a household or community (Kumar, Kumar, Kumari, Kumari, Kumari & Mishra, 2023:130). Studies reveal that people frequently exercise their agency and develop ways to protect themselves against vulnerability and risk as well as to assure the security of their access to water and means of subsistence when institutions do not adequately address family and community needs and expectations. Such coping mechanisms might include individual and/or collective mitigation strategies, such as drilling boreholes in homes and communities, purchasing water from vendors, storing water and excavating shallow wells (Dery, Bisung, Dickin & Dyer, 2019:10) and/or service delivery protests (Breen & Gillanders, 2024:133).

Potable water storage options include using smaller containers or electric pumps attached to overhead storage tanks to gather water whenever the municipal supply becomes available (Prins et al, 2023:1442) and rainwater harvesting (Lebek & Krueger, 2023). These water tanks have a capacity that can range from 2500 to 5,000 litres. Although rainwater collection is thought to supplement water supplies during water shortages, the right steps must be taken to guarantee that homes obtain less contaminated water (García-Ávila, Guanoquiza-Suárez, Guzmán-Galarza, Cabello-Torres & Valdiviezo-Gonzales, 2023).

When the supply of potable water is inconsistent households also resort to purchasing drinking water from commercial water vendors. Tankers and small containers of potable water are available from these sellers. The group of people who purchase water from the vendors cannot be categorized as either wealthy or impoverished (Aina, Thiam & Dinar, 2023).

Another resilience strategy that is applied across South Africa is the use of ground water (Cobbing, 2020:1149). However, ground water supplies may come with disadvantages – the first of which is the cost is unreachable for most marginalised households (Aina et al, 2023) and the second is water quality (Masindi & Foteinis, 2021). For instance, E. coli bacteria contaminated 33% of the water in borehole

deposits close to the rural communities of Vhembe (Sekgobela, Murei, Khabo-Mmekoa & Momba, 2023). Likewise, a different indicated that ten public schools in the Giyani area of Limpopo were affected by contaminated water (Mudzielwana, Gitari, Akinyemi, Talabi & Ndungu, 2020).

2.9 CONCLUSION

This chapter presented a literature review of other authors' views on the topic of potable water supply from an international perspective to Limpopo province. The chapter further unpacked the theoretical framework that was aligned with SDG Goal 6 on collective actions. The review also focused on resilience at both the household and community levels. The next chapter is the methodology of the study.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter presents a description of the research methodology used for this study. The description provides an overview of the research techniques used to achieve the study's objectives. This is followed by information relating to information about the participants who took part in the study, the selection criteria that were used to pick them and how sampling was carried out. The adopted procedures for the data collecting and analysis processes are then described.

3.2 RESEARCH DESIGN

Researchers collect and analyse data using design techniques and procedures (Bob-Milliar, 2020). The approach adopted in this study was an exploratory design. According to Makri and Neely (2021), exploratory research aims to shed light on a phenomenon's manifestation and helps to understand it holistically. Creswell (2019:44) explains that exploratory designs are “a versatile research strategy that enables examination of all aspects of the subject under investigation [and] is committed to bringing new knowledge" about the phenomenon being researched. Based on the above statements, an exploratory research approach was believed to be suitable for the focus of this study.

3.3 RESEARCH METHODOLOGY

Research methodology can be referred to as the procedures that a researcher follows in the course of carrying out research and the methods implemented to collect and analyse data (Tomaszewski, Zarestky & Gonzalez, 2020). In this study, a qualitative research technique was applied. According to Levitt, Morrill, Collins and Rizo (2021), any research whose conclusions are not reached by quantitative or statistical metrics is referred to as qualitative research. Mouton also argues that qualitative research findings are typically designed to produce findings related to the participants’ lived experiences such as emotions, political sentiments, cultural phenomena, behaviours, feelings, and/or interactions with different groups. The methodological approach that was adopted is summarised below in Table 3.1.

Table 3.1. Summary of the methodological approach

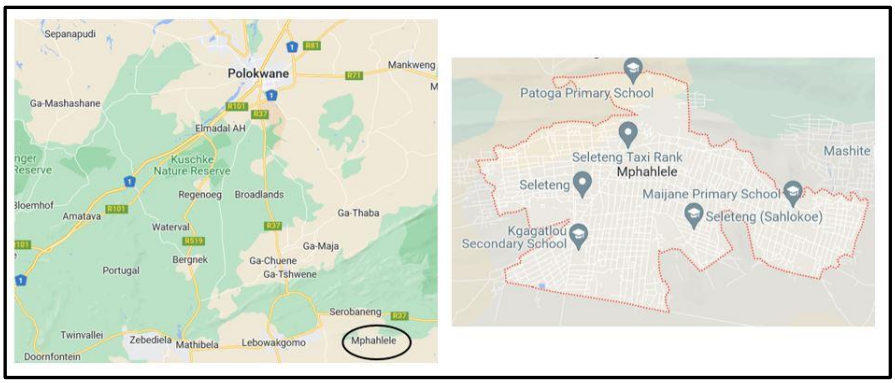
Steps	Description
Research paradigm	— Interpretivist
Design	— Semi-structured interview guide — Open-ended questions — probed further during the interview process — recorded/observed the body language of participants
Primary data collection process	— Face-to-face semi-structured interviews — Recorded electronically — Made notes, including body language — Probed further as required
Preparation for analysis	— Transcribed into English and back translated — Cross-referencing notes/body language with the transcription process
Analysis step 1: coding	— Clustered similar statements/recollections — Identified anomalies. — Cross-referenced notes/body language within the context of the clustering process
Analysis step 2: development of themes	— Based on the above, developed/identified themes
Trustworthiness	— Four components of trustworthiness: Credibility, transferability, dependability and confirmability (see above)
Bias	— Avoided bias on all processes of data collection

Author's contribution

Khoa, Hung and Brahmi (2023:191) also argue that qualitative research is characterised by the collection of non-standardised data, the investigation of subjective meaning and the incorporation of dual realities. Participants thus have the opportunity to expand and enrich the researcher's awareness of the social environment, especially by demonstrating why individuals act the way they do and how events surrounding them influence their perception/s of what is happening around them (Englander & Morley, 2023). The participants' feelings, subjective experiences, emotions, and opinions were the focus of the research – hence a qualitative approach was deemed appropriate.

3.3 STUDY AREA

The selected area of the study is a rural area named Mashite village in the Ga-Mphahlele region. The Mashite village is located on the Eastern side of the Lepelle River Catchment in Lepelle-Nkumpi Local Municipality, Limpopo Province. The village is approximately 25 kilometres from Lebowakgomo and 65,4 kilometres from Polokwane via the R37 road. A map of the area is provided below, Figure 3.1.



https://www.google.com/maps/place/Mphahlele/data=!4m2!3m1!1s0x1ec13c914e327c23:0x766a4025894e55c2?sa=X&ved=2ahUKEwjM0MHOx8b7AhUHbsAKHT23C2gQ8gF6BAgJEAE

Figure 3.1 Map of the study area (Mphahlele village)

Mashite village covers an area of approximately 78 square kilometres, with residents who are predominately Pedi people (Census Report South Africa,2022). The village falls under the jurisdiction of the Mphahlele Tribal Authority.

3.4 POPULATION

A population is the total number of entities, including objects, things or individuals that are the subject of a study (Khoa et al, 2023:194). The population represents the broader target group to which the research results are applicable. Furthermore, the target population is the specific group that the researcher aims to study and make inferences about. To make sure that the research findings are pertinent and useful to the intended group, it is crucial to precisely define the target population. Mashite village had a population of 10.524 people with 1478 households (Census Report South Africa, 2022)

3.5 SAMPLING METHODS AND SAMPLE SIZE

More often than not it is impractical to study the whole population for research purposes, so a sample is considered a pragmatic compromise. Sampling is a technique used to derive a representative – and logistically realistic – a segment of the targeted population by selecting and undertaking research with a smaller proportion of the overall population (McDermott, 2023). Thus, a sample is a representative subset of the overall population that the researcher intends to investigate (Cobern & Adams, 2020). For this study fifteen (15) participants from Mashite village in Lepelle-Nkumpi Local Municipality were selected.

The study used a sampling method to choose participants representing the total population. Preliminary conversations with the individuals were conducted to assess the levels of knowledge and to ensure that selected informants fit the needs of the study. Probability and non-probability sampling are methods used in scientific research (Pace, 2021:4). The study used the non-probability, purposive sampling procedure. In non-probability sampling participants are chosen based on non-random criteria, which means not every category of person within the population has a possibility of being involved in the study (Cornesse, Blom, Dutwin, Krosnick, De Leeuw, Legleye, Pasek, Pennay, Phillips, Sakshaug, Struminskaya & Wenz, 2020:6). Purposive sampling is premised on the notion that the sampled participants have sufficient knowledge and understanding of the situation the study is interested in (Cornesse et al, 2020:9). Consequently, the key informant participants from Mashite village including traditional leaders, civic leaders, community-based institutions and adults were purposefully sampled because of their knowledge and/or experience of inconsistent potable water supplies and associated resilience strategies.

3.6 DATA COLLECTION

The term data collection methods refers to techniques for locating sources of raw data that can be analytically combined to produce research conclusions (Bingham, 2023). Thus, data-gathering technologies serve as a means to collect the data required for the study. Qualitative data is collected using are non-numerical data sets. Legitimate data includes handwritten observations and / or text, electronically recorded accounts of the interviews, photographs and observations of the body language of participating respondents (Fine, Torre, Oswald & Avory, 2021:352). For this study, the data

collected was narrative data augmented by notes of observations made by the researcher during the data collection process. The venue used for collecting data was the Mashite community hall and some at participants' home to allow the researcher to observe how they store the water and take pictures.

The narrative data was obtained through semi-structured, individual interviews with the participants. Semi-structured interviews are interviews that pose a series of questions that are open-ended and customised according to the focus of the research. According to Kekeya (2021:32), applying an open-ended approach provides the study with in-depth data because participants are not limited to a predetermined set of closed questions which limits the scope of the answers. Instead, participants are free to express their thoughts when responding to the questions. In addition, semi-structured interviews are proposed because they have a logical flow and may be modified using the probing technique as necessary during the interview sessions. In order to prepare for the interviews, the researcher developed a semi-structured interview guide to use during the interviews.

Semi-structured interviews also have the benefit of a high response rate and the ability to of the interviewer to probe the interviewees further on relevant topics (Jain, 2021:544). However, as Fine et al (2021:354) note, semi-structured interviews are time-consuming. The semi-structured interviews were undertaken in Sepedi and English and augmented by notes documented by the researcher relating to non-verbal communication between the participants and the researcher which added further depth to the research process.

Due to the study's exploratory nature, the semi-structured interviews represented an appropriate option which represented a pragmatic approach to collecting data on community-based resilience strategies employed to address potable water supply shortages.

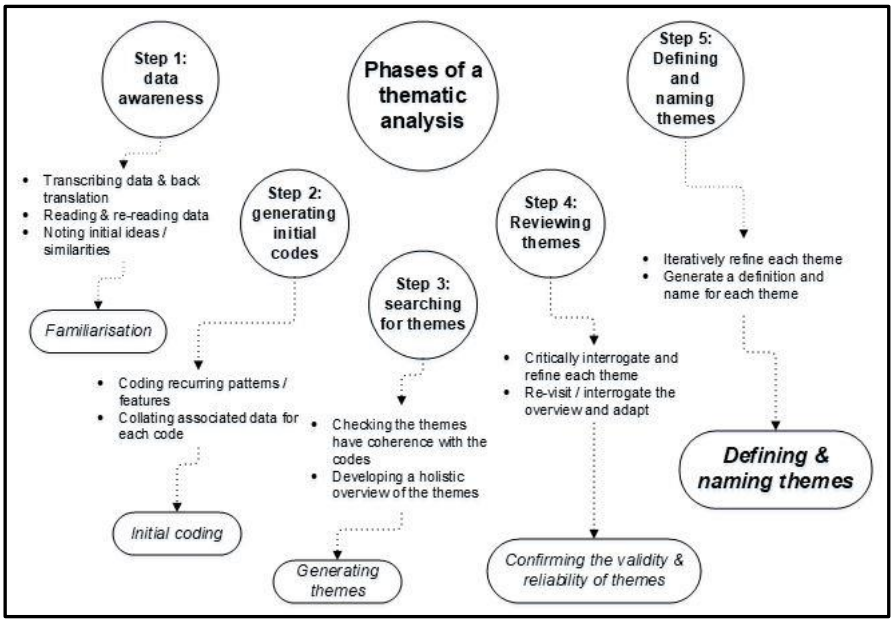
3.7 DATA ANALYSIS

Data analysis is the process by which collected data is organised and transformed so that one can derive analytical information from it (Bingham, 2023). Qualitative data analysis aims to understand, extract meaning and develop themes about the phenomenon being studied. For the exploratory research, data was systematically

interrogated using an inductive thematic content analysis. An inductive approach to the thematic analysis was adopted for this study. The inductive approach enabled the researcher to begin the data analysis without *a priori* assumptions about the type of themes that would emerge because the research was exploratory (Thompson, 2022:1413).

A thematic content analysis is a qualitative method that requires the researcher to categorise the raw data into coded data – with each code being like for like material that is contained within the data – and then identifying themes, or patterns, from within the coded material (Braun & Clarke, 2022:7). The study used a narrative data analysis approach.

A thematic content analysis primarily relies upon the verbal responses from participants and the subsequent restructuring of narratives and/or stories that were provided. The context is provided by the discrete incremental insights into both the diversity and the similarities of the participants' responses gained during the overall data analysis process (Wiltshire & Ronkainen, 2021). The narrative data is often augmented by referring to the respondents' body language that is recorded using written notes during the interviews (Liebenberg, Jamal & Ikeda, 2020:19). In other words, a thematic content analysis of narrative data is a synthesis of primary qualitative data into a holistic representation of the stories and/or narratives presented by participants. A summary of analysis undertaken is provided below, Figure 3.2.



Author's contribution, adapted from Bingham (2023)

Figure 3.2 Summary of the data analysis process

The steps that were undertaken during the thematic analysis of the recorded narratives for this study included the researcher becoming familiar with the raw data (the narratives and body language of the participants), generating the initial codes (coding) and initial theme development prior to critical verification of the themes by both the researcher and the participants.

3.7.1. Data awareness

Qualitative researchers have to take responsibility for reliability and validity by implementing verification strategies that are integral and self-correcting during the conduct of inquiry itself (Irwin, 2008:51). Data was collected in both the local language (Sepedi) and English as preferred by the participants. The researcher translated the Sepedi versions into English and then had the data back-translated into Sepedi by an independent research assistant as part of the transcription process. Back-translation – sometimes referred to as reverse translation – is a quality assurance technique designed to verify the efficacy and accuracy of the initial translation which entails translating the content back into the original language before comparing it to the source text (Qoyyimah, 2023).

During the transcription process the researcher started becoming familiar with the narratives representing the raw data. Once the transcription process was complete, the researcher read through the transcribed notes several times and cross-referenced the narratives with the notes made during the semi-structured interviews. This step aimed to ensure that the researcher is familiar with the raw data before beginning the coding.

3.7.2. Generating the initial codes

Coding can be explained as the process of naming or labelling the data, categories, and properties. Similarly, coding means reading through the text, remembering the engagement with participants, and identifying similar statements which can be negative, positive, confusing or any other patterned form of response (Skjott Linneberg & Korsgaard, 2019:265).

The first step of coding is to become familiar with the raw data followed by gradually interpreting the data by clustering the text into similar words or phrases (Braun & Clarke, 2022:7). The researcher then develops and applies codes using meaningful titles with open coding to organize raw data and try to make sense of it. The second step was to create categories from the initial list of clusters and then sort them into categories based on how different the codes were related. This process enabled the researcher to transform the multiple codes into larger categories of more substantive codes.

3.7.3. Searching for themes

A theme is typically one or two words that accurately describe what the cluster of codes represents (Kiger & Varpio, 2020:849). Examining the connections between various codes and ranking them according to how well they can tell the data's narrative is the first step in developing themes. Next, the researcher looked for similarities and differences between the codes and grouped them into themes. When categorised in this way, a collection of codes that may convincingly depict a phenomenon might be called a theme. Themes thus reflect significant pieces of information relating to the focus of the study.

3.7.4. Reviewing of themes

Once the initial themes were developed, the researcher began a verification process. It was anticipated that feedback from the community participants would be a critical step in this process, and logistical arrangements were made for the verification with participants during the initial semi-structured interviews.

3.7.5. Defining and naming themes

During the verification process the themes were given a name. The names were then critically refined with independent researchers until an appropriate name and definition were developed. In this instance, four themes were identified which are describe below, Chapter Four.

3.8 TRUSTWORTHINESS: RELIABILITY, VALIDITY AND OBJECTIVITY

Reliability is the degree to which the same outcomes may be obtained with the same tools repeatedly (Babbie, 2020:158). Thus, if the research has been undertaken in a reliable manner another researcher can use the same approach and produce comparable findings. Research reliability is defined as the ability of research methods to consistently produce the same results across time (Mellinger & Hanson, 2021). However, both reliability and validity have been critiqued when applied in a qualitative research context by, for example, Lincoln and Guba (1985), who introduced the notion of ’trustworthiness’ as an additional indicator. To ensure validity of the study, the researcher returned to the key informants with summaries of the findings to ask them to verify if the data truly represents their perspectives.

The degree to which the research process and the conclusions of a qualitative study may be believed is referred to as trustworthiness. Similarly, trustworthiness is one technique researchers can apply to reassure themselves and others that their research findings are credible (Kyngäs, Kääriäinen & Elo, 2020:44). Trustworthiness has four components: credibility, transferability, confirmability and dependability which are summarised below.

The degree of confidence the qualitative researcher has in the accuracy of the study's conclusions is referred to as credibility. This amounts to ‘How do you know that your findings are true and accurate?’ (Wood, Sebar & Vecchio, 2020:458). Triangulation is one technique that can be retrospectively applied to estimate the degree of confidence

there is in a study (Bans-Akutey, & Tiimub, 2021:5). Therefore, the researcher triangulated the findings using multiple methods including interviews, observation of body language and probing.

Transferability is required in order to improve the likelihood that the outcomes of a research study's conclusions can apply to other situations and / or with other populations (Stahl & King, 2020:27). However, researchers can establish that results based on the interpretation of the data are likely to be transferable, but they cannot prove it with absolute certainty.

Confirmability is the degree of objectivity in the research study's conclusions (Kyngäs et al, 2020:46). Stated differently, this indicates that the results are derived from participant responses, rather than any researcher bias or personal objectives (Creswell & Poth, 2016:22).

Reliability is the extent to which the study could be repeated by other researchers with comparable outcomes (Janis, 2022:44). As such, this means that another researcher can undertake similar research within a similar context. An inquiry audit, which requires a third party to evaluate and scrutinise the research process and data analysis to ensure that the results are reliable can be used by a qualitative researcher. Therefore, to ensure reliability of the study the researcher used a standardised procedure (interview guide) for collecting data across all the participants and filed all the notes and materials used during data collection in a secure location to create an audit trail.

3.9 BIAS

Bias is commonly understood to be any influence that distorts the results of a study (Bergen & Labonté, 2020:788). Design bias happens when the construction of the research focus is discretely affected by the researcher's preferences and /or belief systems rather than striving to achieve optimal research outcomes (McSweeney, 2021:1065). Therefore, the researcher avoided bias during the processes of designing, collecting and analysing data by ensuring that all participants were asked the same questions in the same way and that the questions do not imply a particular answer

3.10 ETHICAL CONSIDERATIONS

(Moriña, 2021:1560) maintains that ethical considerations are integral to studies because they assist in avoiding participant mistreatment; minimizing risk to participants and protecting participants and the general public's respect and trust. The participants were involved in this study voluntarily. Consequently, no participants were compelled to partake in this study and were free to withdraw at any time during the study's progress. The broader ethical context of the study is summarised below, Table 3.2.

Table 3.2. The ethical process adopted in the study

Phases	Ethical protocol	Comments
Pre-data collection	Approval from the University of Limpopo's Turfloop and Research Ethics Committee (TREC) granted	Ethical clearance number: TREC/1573/2023: PG. See Appendix A
	Approval from relevant gatekeeping organisation granted	Permission from Mphahlele Traditional Authority to undertake the research. See Appendix C
	Informed consent from respondents in English and local languages granted	All participants had the purpose of the research and why they were invited to participate explained to them in the language of their preference. All participants voluntarily signed an Informed Consent form
During data collection	Harm	Participants were made aware that they could discontinue participation in the study at any time.
	Confidentiality	The research did not collect any identifying information of participants
	Anonymity	The research did not collect any identifying information of participants
Post-data collection	After care of participants	In this instance support was offered, but not requested
	Protection of collected data	All data was stored in a secure location
	Confidentiality	The participants' names were not cited in future reports
	Anonymity	The participants' names were not cited in future reports
Throughout	Respect, dignity and standard of care	Participants were made aware that they could discontinue participation in the study at any time.

Author's contribution

The ethical protocols that were observed for this study are provided below.

- **Research procedure**. Before undertaking the study, approval was sought from, and conferred by, the University of Limpopo's Turfloop Research and Ethics Committee (TREC) – Appendix A.
- **Permission.** Permission from a gatekeeping organisation was also received. In this instance, this included the Ga-Mphahlele Tribal Council (Appendix C).

- **Informed consent from participants**. The steps involved in acquiring consent from participants included consent being freely (voluntarily) provided; that the participants understood individuals understood what was being requested and that the participants were sufficiently competent to consent. This means that to participate in the research project the participants were fully informed about the study, understood the nature of the research and their role in the study and that they had the freedom to accept or reject the offer to participate at any point during the research process (Taquette & Borges da Matta Souza, 2022). In this study all of the steps outlined above were followed which included the participants being given the consent letter to sign before the interviews started.
- **Protection from harm.** Throughout the data collection procedure for this research, the researcher ensured that the rights to protection of the participants were upheld. Hammett, Jackson and Bramley (2022:585) argue that the most fundamental ethical precept is to cause no damage. No participants experienced physical, emotional, or psychological harm in this study. As a result, this study protected the participants from any harm and anonymity by not disclosing their names and instead used pseudonyms. Thus, the participants were referred to as *Participant 1, Participant 2* and so forth in order to ensure their identity remains anonymous.
- **Confidentiality.** A password-protected computer secured all confidential records, particularly communication records. Before conducting interviews, the researcher gave participants an information sheet outlining the focus of the research and a consent form. The participants' confidentiality was preserved throughout the investigation. In addition, participants were informed of the research's findings during feedback sessions arranged after the study was complete.

By following the procedure described above the researcher was able to undertake the study in an ethical manner.

3.11 CONCLUSION

This chapter described the procedures or techniques that were used to identify, select, process and analyse the data collected to determine the efficacy of the resilience strategies applied at the household and community level.

CHAPTER 4: RESULTS AND DISCUSSION OF FINDINGS

4.1 INTRODUCTION

In this chapter the data that was collected in the Mashite village in Lepelle-Nkumpi Local Municipality, Limpopo province, are presented, analysed and interpreted. The analysis was guided by the research questions, the interview guide designed for the study and the qualitative design which included a thematic content analysis. The study targeted key informants from the study area and included village residents, civic leaders and traditional leaders. Interested and affected parties were purposefully identified as participants to provide perspectives of their experiences and understandings about the resilience strategies that are applied in the context of inconsistent potable water supply in the area. Prior to presenting the findings the aim of the research and associated research questions are repeated for ease of reference.

The aim of this study was to undertake an exploratory, qualitative investigation into the mitigation strategies that have been designed and implemented within selected communities in the Lepelle-Nkumpi Local Municipality to build resilience to the potable water challenges that the residents experience. The associated research questions are provided below.

1. What are the resilience strategies being applied in selected communities in the Lepelle-Nkumpi Local Municipality to mitigate potable water challenges?
2. How effective are the resilience strategies being applied to mitigate the potable water challenges at both the community and household levels?
3. What mechanisms could be applied in the future to use the insights to develop potable water mitigation resilience strategies within the selected communities and plausibly beyond?

In the following sections, each objective is addressed through the methods adopted for the analysis of the data collected for the study. The study used a thematic content analysis as well as Microsoft Excel when interrogating empirical information in the qualitative analysis. The researcher followed the process of thematic analysis that was described in Chapter Three – familiarisation, coding, generating themes, reviewing themes and defining themes which are summarised below.

- For familiarisation of the raw data the researcher first translated and back-translated the narratives before scrutinising the interviews and notes multiple times in order to begin identifying patterns of similarity within the data.
- The second step was developing the codes which are features of the raw data that appear to be of significance and meaningful. Concomitantly, generating codes involves extracting meaning from the data (Byrne, 2022:1575). The researcher generated codes by identifying texts that share similar meaning which helped to reduce the data from the huge volume derived from the interviews.
- The third step was generating themes. The researcher undertook an interpretive analysis by establishing codes and relevant data extracts by arranging them according to primary themes. Another crucial aspect was to synchronise the data with the research questions.
- The fourth step was reviewing the themes. This involved a deeper review of the identified themes in relation to the aim and the objectives of the study.
- The fifth step was defining the themes. At this stage, the researcher dropped all the weaker themes and remained with the ones that tell the story about the data.

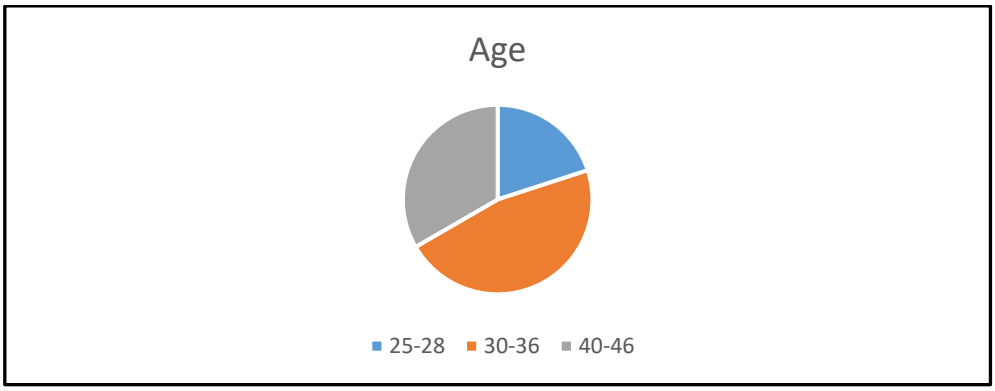
The themes that were identified included rainwater harvesting, household storage facilities, purchasing water from local vendors and household and community collaboration which are discussed under separate headings below after the demographic details of the participants are provided.

4.2 PARTICIPANTS' DEMOGRAPHICS

A set of 15 consent forms were distributed and signed by the participants before each interview. According to Warren, Melendez-Torres, Viner and Bonell (2020) individuals should understand what is being requested of them and parties involved must be fully informed about the study prior to providing their consent to participate. Therefore, the researcher interpreted the consent form into the local language (Sepedi) for those who were uncertain about the content of the document.

Some of the interview sessions were held at the local community hall and some at participants' home in order that the researcher was able to observe how they store the water and take pictures. The participants' demographics are provided below and

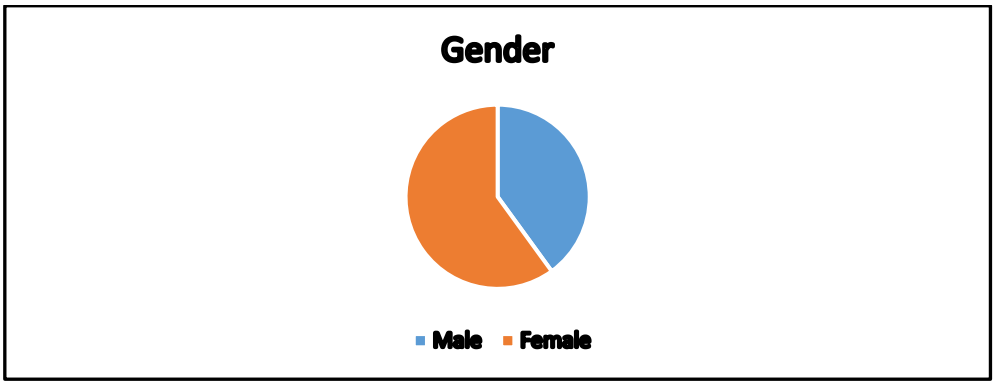
include the following categories: age, gender, designation and household income, Figures 4.1 – 4.4.



Author's contribution

Figure 4.1 Age distribution of the participants

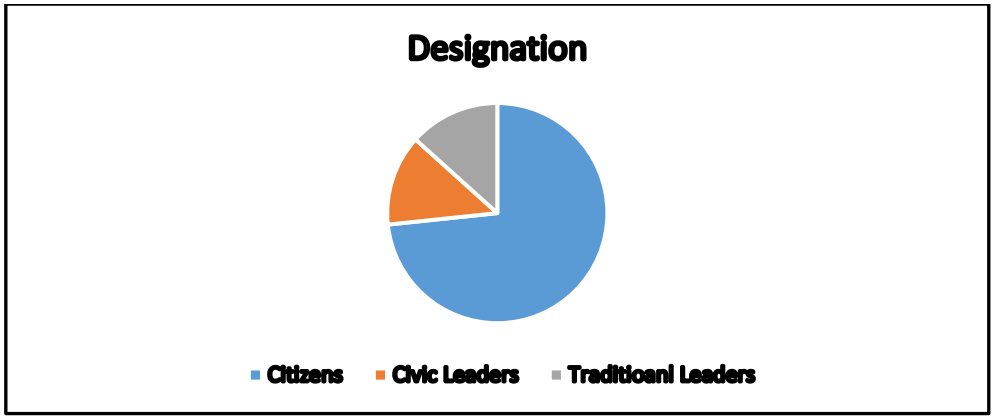
In terms of age, the figure shows that the majority (7) of the participants were of the age group 30-36, then 5 were of the age group 40-46 and 3 were age group 25-28. The pie chart below, Figure 4.2, provides a summary of the gender distribution of the participants.



Author's contribution

Figure 4.2 Gender distribution of the participants

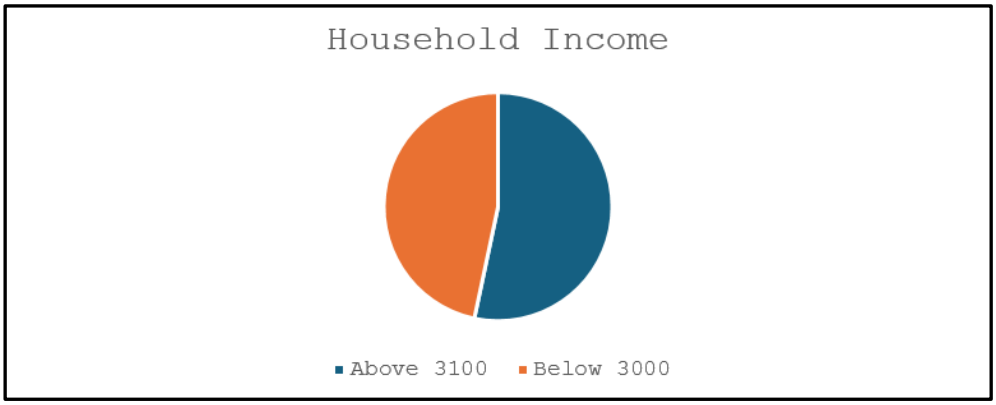
The table shows that 70% of the participants were females, whereas 30% were males. The pie chart below, Figure 4.3, provides a summary of the designation of the participants.



Author's contribution

Figure 4.3 Designation distribution of the participants

60% of the participants were ordinary citizens and 40% were civic and traditional leaders. The pie chart below, Figure 4.4, provides a summary of the household income of the participants.



Author's contribution

Figure 4.4 Household income distribution of the participants

Out of the total participants, 40%were having a household income of above R3100 and 60% below R3000. The study interviewed people from different social standing so that a homogenous perspective of the inconsistent potable water supply could be avoided. This approach helped to gather diverse viewpoints and perspectives about the way the provision of portable water supplies affected households within the study area.

4.3. THE THEMES IDENTIFIED DURING THE DATA ANALYSIS

In response to inconsistent water supply, households tended to be resilient by making efforts to absorb and adapt to the prevailing water deficit, and may also be able to transform the impact of this deficit into a sustainable lifestyle strategy (King et al, 2022:3326-7). This was done by developing coping strategies to sustain their living standard in order to achieve a level of access and availability of water and sanitation in their homes.

These strategies are referred to as alternative solutions to mitigate the impact of disasters which reduces their vulnerability to the shock (Logan & Guikema, 2020:1541). These responses to shocks are not always optimal strategies for the people involved, but at least they help in coping with the consequences of the shock. The resilience strategies that were described by the participants in Mashite village are provided below.

4.3.1. Context: inconsistent potable water supplies

The first question which was designed to break the ice with participants was based on examples about the water supply to the community in the last 18 months. This, question was aligned to the first objective and its research question and serves to provide a context to the themes that were identified. The first question was also an ice-breaker that encouraged participants to begin engaging with the interview process in a relaxed and conservational manner.

The study findings demonstrate that the majority of the respondents indicated that they receive water at least three times in a month, while a minority responded that they get water at least two times per week.

> “We only get water supply if there is a funeral in my section.”
>
> Participant C

> “Sometimes we get water once a week and sometimes once in two weeks.”
>
> Participant A

> “We get water 3 times a week, but most days is during the night.”
>
> Participant D

The above responses demonstrated that there is inconsistency in the supply of portable water in the village. The findings that there is an inconsistent potable water supply in the study area has synergies with other studies from rural areas in Limpopo Province (Malima, Kilonzo & Zuwarimwe, 2021:174; Mpongwana, Shumba & Bracking, 2022:224) and other provinces in South Africa (Apraku, Gyampoh, Morton & Karikari, 2023). In contrast to the views and experiences expressed by the participants, the Water Services Act, (1997) states that all South Africans should have access to fundamental water services because access to water is a basic human right.

Having established the regularity of the water supply in the area, the next questions focused on whether the participants knew when the water was planned to be delivered. The responses from the participants indicated that they rarely, if ever, knew when the water would be delivered.

> "My wife and I are working from 8am to 17pm and my son is doing matric at school so if the water comes on when we are both at work it means we have missed that opportunity to collect water."
>
> Participant K

> "I wish there was a timetable like load shedding schedule where we could see when there will be a supply of water for a better planning."
>
> Participant O

The study established that there was no formal schedule of portable water supply for residents to know when to expect the water supply. The majority of the participants reported that they are at home during the day and they expressed that they wished that the day the water was to be delivered it would be better if it was for the whole day and night. This finding corresponds with other studies that have demonstrated that potable water supplies in rural Limpopo Province are inconsistent and unpredictable (Loubser et al, 2021).

Having established the context, the remainder of the semi-structured questions focused on identifying examples of alternative ways to maintain a sustainable household water supply besides relying exclusively on the municipal supply which were used by the participants to develop mitigating resilience strategies to the water supply shock. The themes that emerged from these questions are described below.

4.3.2. Theme one: rainwater harvesting

The participants reported that households have acquired water tanks of varying sizes where the rainwater from the roofs of houses can be collected. The capacity of these water tanks typically ranged from 250 to 10000 litres.

> "We are grateful in rainy seasons because we do not have to rely on tap water for laundry". This method of using rainwater helps us a lot, rather than buying water therefore it saves us money."
>
> Participant B

> "I harvest rainwater by connecting the gutters from the roof to the JoJo tank. This method is effective because the water goes directly to the tank without manpower or electricity."
>
> Participant L

Rainwater harvesting has long been documented as a resilience strategy within rural communities in Limpopo Province and beyond (Matimolane, Strydom, Mathivha & Chikoore, 2023:281; García-Ávila et al, 2023). Figure 4.5 provides an example of a household roof – JoJo tank water storage facility.

Author's contribution

Figure 4.5 An illustration of a gutter connected from the roof to Jojo tanks

The above findings indicate that rainwater harvesting is an effective resilience method – but other research has indicated that this resilience strategy may lead to the stored

water becoming contaminated (Nguyen, Operario, Nyathi, Hill, Smith, Guerrant, Samie, Dillingham, Bessong & Rogawski McQuade, 2021).

4.3.3. Theme two: household water storage facilities

Another common resilience strategy to mitigate the inconsistent potable water supply is storing water. The participants indicated that they store through collecting water whenever the municipal supply becomes available with a hosepipe connected to an overhead storage tank or in smaller containers.

> "I sometimes sleep around midnight to fill two JoJo tanks using the hosepipe to the tank method. This method is faster than using a bucket to fill the tank."
>
> Participant A

Author's contribution

Figure 4.6 An illustration of a household water storage facility (hosepipe to tank)

This finding has synergies with other reports from Limpopo Province that rural households which experience inconsistent potable water supplies invest in storage facilities as a resilience strategy (Bazaanah & Mothapo, 2023; Adeyeye et al, 2020).

4.3.4. Purchasing water from local vendors

Another commonly reported resilience strategy deployed by the participants was buying their drinking water from commercial water vendors throughout the year. These vendors sell potable water in tankers and small containers. The class of population that buys water from the vendors cannot be classified as either wealthy or poor. Hence, it appears that the vast majority of the community members buy potable water from water tanker vendors when confronted with shortages.

> “We are relying on SASSA money, but we are forced to buy a drum of water for R50 from those who have boreholes in their households and still have to pay the donkey cart for delivery. This strategy is ineffective because we end up borrowing money from others in order to have drinking water.”
>
> Participant M

Author’s contribution

Figure 4.7 An illustration of a donkey cart collecting water from a vendor

These findings correspond with Bazaanah and Mothapo (2023:18) who state that “4% [of participants] rely on water vendors” in a similar study undertaken in Lepelle Nkumpi Local Municipality.

4.3.5 Household and community collaboration

Participants were asked what households and the community do to respond to the inconsistent potable water supply from the municipality. From the perspective of households, it was reported to be normal to borrow or share water with neighbours.

> “My neighbour is an elderly person so we connect a hosepipe through the fence to share with her when she runs out of water.”
>
> Participant G

The quote above touches on the topic of both resilience and vulnerability. In this instance, the participant was willing to assist a vulnerable neighbour. However, other studies have indicated that this is not always the case – which could contribute further to unequal access to potable water supplies within communities in Limpopo Province and beyond (Mbana & Sinthumule, 2024).

Households also resorted to requesting extended family members to assist with the costs of drilling boreholes in order to access water.

> "I had to request my children who work in Gauteng to save money for us to drill borehole. This method is both effective and sustainable because we make extra cash by selling the water."
>
> Participant D

Whilst this resilience strategy may also generate additional household income, it has also been reported that bore hole water in parts of Limpopo Province is contaminated (Nguyen et al, 2021) – which may contribute to an increased burden of disease in a particular locality.

From the community perspective, the majority explained that they have public gathering meetings to discuss the issues that affect the community at large, including the inconsistency of potable water supply.

> "We always raise the issue of water shortage with the traditional council during community meetings".
>
> Participant C

Community based agency in the face of inconsistent potable water supplies has been documented in other parts of Limpopo Province (Hofstetter, Van Koppen & Bolding, 2021:259).

However, it was also reported that more drastic action in the form of civil disobedience was also resorted to.

> "We sometimes close roads to protest in order to send the message to the councillor about our grievances".
>
> Participant H

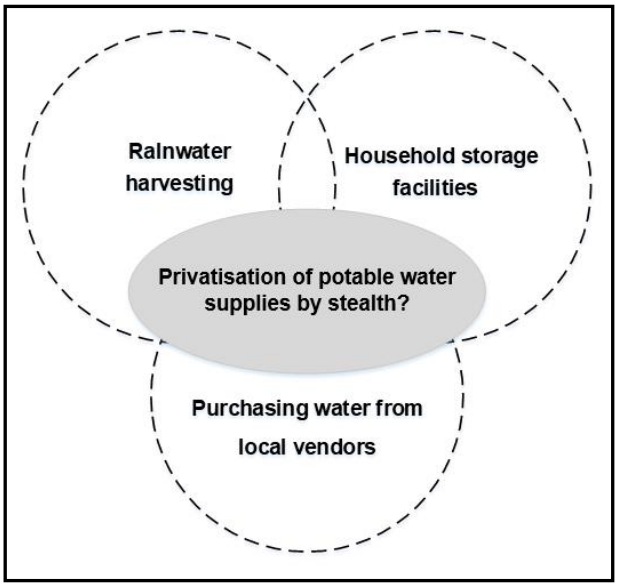
Participant's contribution, 2023

Figure 4.8 An illustration of a community protest

This finding corresponds with the definition by Vos et al (2020) of collective action as activism that takes the shape of political protests and directly confronts the status quo through petition signing or taking part in public rallies and demonstrations. The finding also corresponds with multiple reports of community protests in the face of poor service delivery in Limpopo Province (Mamokhere, 2020) and other parts South Africa (Vhumbunu, 2021:3-5; Zerihun & Mashigo, 2022; Mamokhere, 2023:61-64).

4.4. SUMMARY OF THEMES

The themes that were identified form the data include: rainwater harvesting, household storage facilities, purchasing water from local vendors and household and community collaboration. What becomes evident is that although the themes represent diverse resilience strategies that have been designed by community members to reduce their vulnerability to the inconsistent potable water supplies experienced in the area – it is plausible that there is an over-riding 'take home message' that has surfaced from this exploratory study. That message is: privatisation of potable water supplies by stealth, Figure 4.9.



Author's contribution

Figure 4.9 Privatisation of potable water by stealth?

The question mark after 'stealth' in Figure 4.9 represents a deliberate uncertainty. Historically, water has been a source of contested conflict in southern Africa (Webster, 2024). More recently in South Africa the Constitution and the governing party have committed to water as a basic need – yet the poor municipal service delivery track record confounds efforts to meet the Constitutional commitment (Mlambo & Maserumule, 2023). Loosely speaking there are two opposing perspectives relating to the sustainable delivery of water in South Africa. On the one hand some argue for the wholesale privatisation of water (Veriava, 2020:325) whilst, on the other hand, some argue for a more egalitarian approach (Moore, 2022:801). There is a third perspective – that of public-private partnerships being a viable option for delivering potable water (Lima, Brochado & Marques, 2021).

In the instance of this case study, what becomes evident is that out of necessity the households which participated in the research are contributing to producing a reasonably sustainable potable water supply. Likewise, the municipality is contributing – albeit inconsistently. Nevertheless, this observation opens a possible window into a possibility for consideration by the municipality. Given the current reality that the municipality cannot supply water consistently, is it possible to support the local community by providing water storage facilities, or other type of support, for community members? Likewise – would it be possible for the municipality to communicate the

time that the water supply will be active so that community members can ensure their storage facilities are full?

In summary, although the findings from this research have parallels with other studies in rural areas. The study may also have provided sufficient insights into the local household management strategies and dynamics relating to potable water supplies in the context of an inconsistent potable water supply by the municipality. Given these insights, it many now be possible for the community and municipality to open a conversation about how best to further boost the localised home-grown resilience strategies that have been developed.

4.5 CONCLUSION

The chapter outlined the data analysis and interpretation relating to the three research objectives outlined in Chapter One. The context of the research was established by the participants who explained that they do experience inconsistent potable water supplies. The themes that emerged represent a suite of resilience strategies that the participants reported on. The themes that were identified included rainwater harvesting, household storage facilities, purchasing water from local vendors as well as household and community collaboration.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION AND OVERVIEW OF THE STUDY

This chapter provides a summary of the research, which focused on the lesson learnt from community-based resilience strategies applied to mitigate inconsistent potable water supplies at a selected village in Lepelle-Nkumpi Local Municipality. The chapter concludes by reflecting on both the findings and limitations of the study before providing recommendations that surfaced during the research process. The justification for focusing on community-based resilience strategies applied to mitigate inconsistent potable water supplies was to explore techniques that households have developed to mitigate the inconsistent water supply at a village in Lepelle Nkumpi Local Municipality.

The research paradigm for this study was interpretivist whereby the researcher went to the participants' homes to understand their reality through their experience of storing water and collect supporting evidence – such as photographs. The study's methodology entailed qualitative research, building upon the body of current literature and a theoretical framework to evaluate community resilience to inconsistent potable water supplies in a rural community. Although the concept of collective actions informed the theoretical framework, the focus was to highlight the necessity of working collectively with one common goal for improved results.

Sustainable Development Goal number 6 also influenced the study because SDG6 was considered to be relevant to the study because it covers the human right to fair access and affordable drinking water. A qualitative exploratory research design was adopted. For data collection purposes, face to face interviews were conducted using a semi structured interview guide comprised of open- ended questions. An inductive approach to the thematic content analysis was adopted to systematically interrogate the data collected using both the collected narrative data analysis and supporting evidence (photographs).

5.2 SUMMARY OF KEY FINDINGS

The biographical information which included the age, gender, designation and household income of the participants were presented and analysed. The information indicated that the majority of the participants were middle-aged and more females than males. The findings further indicated that the majority of the households were earning below the South African minimum wage of R3500 and also relied on the social grants as their primary survival mechanism. The summary of the findings is outlined below.

5.2.1 Summary of research Objective One

To identify resilience strategies being applied in selected communities in the Lepelle-Nkumpi local municipality to mitigate potable water challenges.

The findings illustrated that there is inequality in potable water distribution among the participants. Some were receiving water two times a week, with others receiving water three times a week. The study further showed that there were unpredictable times to receive water supply from the municipal taps. The first common strategy used to overcome the shock of water scarcity was rainwater harvesting which proved to be an effective resilience strategy because it was cost effective. The second strategy was household water storage facilities whereby participants using varying sizes of tanks and containers to store potable water. The participants emphasised that this method was costly because they were paying donkey carts to transport water from the water sources to their households. The third strategy was buying water from local water vendors. The findings also suggest inequalities because the low-income earners cannot afford to operationalise all of these resilience strategies.

The last strategy was the household and community activism. The findings showed that citizens work together to raise funds for boreholes. They also take care of the vulnerable as the findings showed that some citizens are elderly persons who cannot carry containers when there is no delivery of potable water supply from the municipal taps. The findings further showed that there was a clear sense of collective action to mitigate the inconsistent potable water supplies through social protests in order to send a message to the local ward committees. The findings of the study thus revealed several resilience strategies being used within the study area to overcome the

experienced difficulties caused by the inconsistent potable water supply in the area. Therefore, the study successfully addressed this objective.

5.2.2 Summary of research Objective Two

To determine the efficacy of the resilience strategies at both the community and household levels.

The goal of objective two was to determine the efficacy of the resilience strategies identified from objective one to adapt to the inconsistent potable water supplies in the area. The above objective was not addressed because every time the researcher asked about the effectiveness of this strategies, the participants kept talking about the inconsistent potable water supply.

5.2.3 Summary of research Objective Three

To suggest mechanisms that facilitate potable water mitigation resilience strategies that could be applied within the selected communities and plausibly beyond.

The participants emphasised the inconsistence of municipal water supply, as well as the absence of formal schedules for water delivery and therefore suggested that if there was a formal schedule in place, the resilience strategies could be more efficient. According to the findings, communities and community leaders should work together to strengthen resilience strategies by fostering better communication. Furthermore, fostering the spirit of sharing with neighbours and those who cannot afford to buy from water vendors could close the gap between the ‘haves and ‘have nots’.

5.3 RECOMMENDATIONS

Improving access to potable water: the absence of potable water supply, the cost of water and long distances from a water source to households are some of the main focus points to consider. To improve access to potable water there are several possible options such as negotiating temporary reduction of water fees with local water vendors and distributing larger containers to families in order to increase the quantity of potable

water stored at households, as well as to decrease the number of trips per day to the water sources.

Additionally, the findings emphasised the lack of communication and information exchange. Therefore, by putting in place systems for promptly informing the citizens about future potable water supply schedules, community members will be better equipped to manage water resources and make sound decisions.

5.4 AREAS FOR FUTURE RESEARCH

Based on the findings, the municipality is failing to deliver a consistent potable water supply to citizens. Therefore, areas for future research could be to investigate the ways in which municipalities are currently distributing the potable water to the communities and how they communicate with citizens about potable water-related matters. A further area of research could be how best to facilitate the privatisation of potable water given that most of the resilience strategies that were reported on by participants indicated that potable water was being privatised by stealth in the study area. Lima et al. (2021) also emphasised that of public-private partnerships being a viable option for delivering potable water. Therefore, further research on privatisation of potable water could contribute to the betterment of inconsistent potable water supply.

5.5 LIMITATIONS OF THE STUDY

There are three major limitations. The first – at the level of logistics – is that certain participants, such as tribal leaders, required consultation by appointment and in some instances, participants stated that they had essential responsibilities to undertake so they did not make the appointments as agreed. Consequently, the researcher had to be flexible and expected to have to rearrange and suggest a suitable date and time for participants which prolonged the duration of the study. In addition, despite the guarantee of anonymity, some community members felt uncomfortable answering some questions. Therefore, the researcher reaffirmed to the participants that the required information would be used exclusively for study reasons.

The second limitation is that from an academic perspective, as with all qualitative research of a localised nature, the findings are only representative of the study area

and therefore cannot be generalised to a broader population (Mezmir, 2020:17). Despite this limitation, the findings have relevance within the locality and may be informative for other water governance issues.

The third limitation relates to Objective Two. When the researcher requested information relating to the efficacy of the community resilience strategies the focus invariably became that the participants rarely knew when the water supply would come on so they missed the opportunity to fill their water storage facilities. As such, the objective itself was not completely responded to – but the findings do represent evidence of a community-wide frustration with regard to inconsistent potable water supplies in the area.

5.6 CONCLUSION

This chapter outlined an overview of the study, summarised the key findings and suggested recommendations and areas for future research then the limitations of the research. The study aimed to undertake an exploratory investigation into the community-based resilience strategies that the community developed to mitigate inconsistent potable water supplies that they experience. The objectives of the study were aligned to the data collected and only objective 1 and 3 were fully addressed. Lepelle-Nkumpi Local municipality is encouraged to re-look at the mandate of the municipalities in the delivery of potable water to their local communities so they are aligned with fulfilling both the governing party's commitment to water as a basic right and SDG Goal 6.

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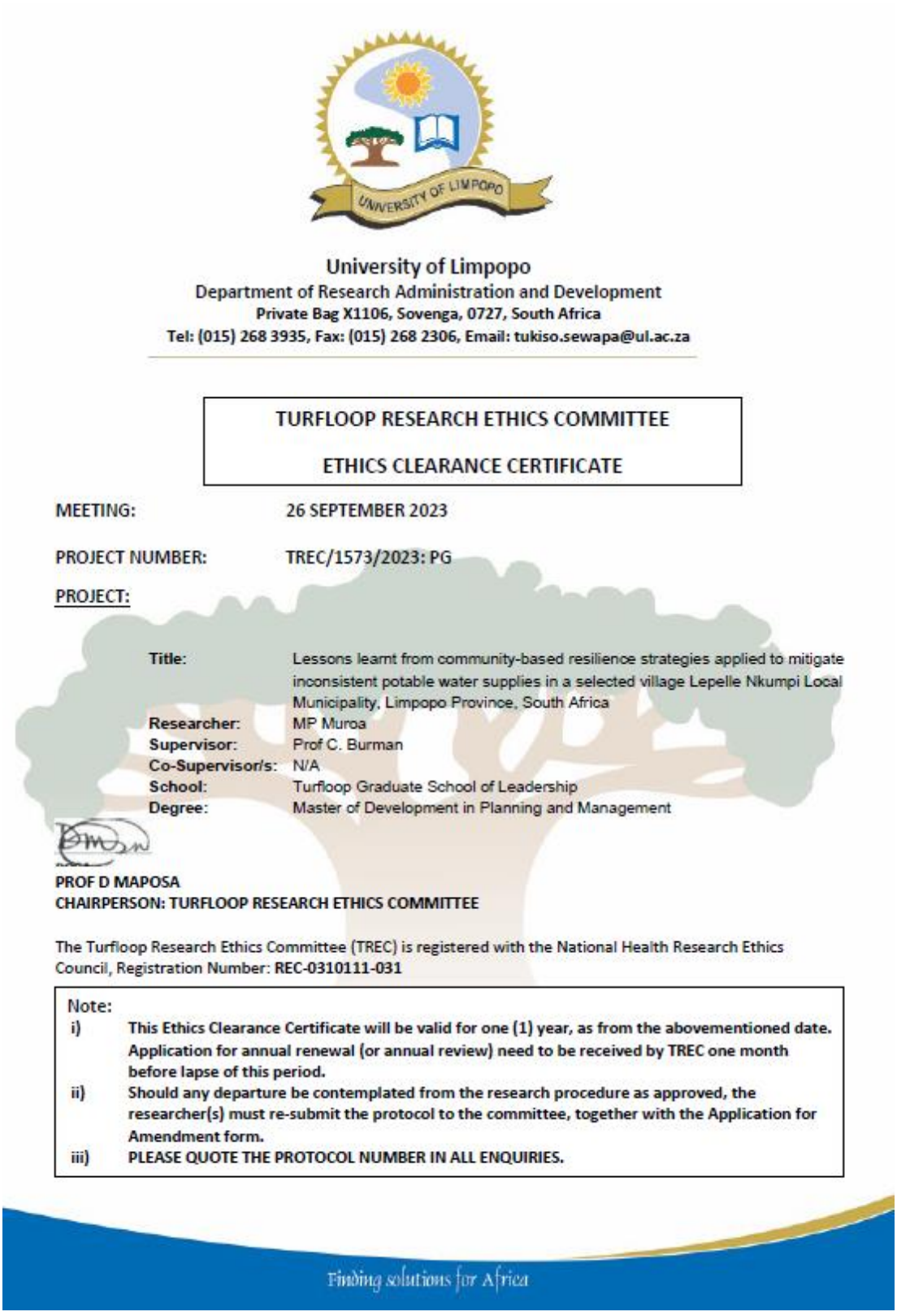
APPENDICES

The sections below provide supporting evidence for the study.

Appendix A: Ethical clearance certificate



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TURFLOOP RESEARCH ETHICS COMMITTEE

ETHICS CLEARANCE CERTIFICATE

MEETING: 26 SEPTEMBER 2023

PROJECT NUMBER: TREC/1573/2023: PG

PROJECT:

Title:	Lessons learnt from community-based resilience strategies applied to mitigate inconsistent potable water supplies in a selected village Lepelle Nkumpi Local Municipality, Limpopo Province, South Africa
Researcher:	MP Muroa
Supervisor:	Prof C. Burman
Co-Supervisor/s:	N/A
School:	Turfloop Graduate School of Leadership
Degree:	Master of Development in Planning and Management

PROF D MAPOSA
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:
i) **This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.**
ii) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.**
iii) **PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.**

Finding solutions for Africa

Appendix B: Informed consent

Appendices B1 and B2 contain the English and Sepedi versions of the informed consent form that was signed prior to interviewing participants.

Appendix B1: English version (informed consent)

APPENDIX B1: LETTER REQUESTING CONSENT OF PARTICIPATION.

Dear Participant

I am a student enrolled in Master of Development in Planning and Management at the Turfloop Graduate School of Leadership (TGSL), University of Limpopo. You are invited to participate in my study titled: **Lessons Learnt From Community-Based Resilience Strategies Applied To Mitigate Inconsistent Potable Water Supplies in Lepelle Nkumpi Local Municipality, Limpopo Province, South Africa.** The purpose of this study is to investigate the mitigation strategies that have been designed and implemented within your community, to build resilience to the potable water supply challenge that the residents experience. You are invited to participate in the face-to-face interview. Please note:

- In this study, your participation is voluntary, and you can withdraw at any time without stating any reason;
- The study does not cause any harm and if you feel uncomfortable with answering any questions, feel free to notify the researcher.
- In this study, your personal information will be kept confidential and anonymous.
- The time allocated for the interview will take 30 minutes.
- Feel free to ask questions and clarifications related to the study.

I _____, hereby agree to voluntarily participate in the research titled **"Lessons Learnt From Community-Based Resilience Strategies Applied To Mitigate Inconsistent Potable Water Supplies in Lepelle Nkumpi Local Municipality, Limpopo Province, South Africa".** I have read and understood the contents of this invitation to participate in this study and hereby confirm my voluntary consent to participate in the study and that my responses will be kept confidential and anonymous. I also understand that I am not bound to participate in the study and that it is my right to stop my participation at any time whenever I feel uncomfortable without stating any explanations.

Participant signature _____ Date _____ Researcher's signature _____ Date _____

After the study, a copy of the report will be made available to the University of Limpopo Library database. If you need any further information, please contact the following:

Supervisor: Prof. Burman (Christopher.burman@ul.ac.za)

Turfloop Graduate School of Leadership

Appendix B2: Sepedi version (informed consent)

APPENDIX B2: LETTER REQUESTING CONSENT OF PARTICIPATION.

Motšeakarolo yo a rategago

Ke nna moithuti ka fase ga Master of Development in Planning and Management go la Turfloop Graduate School of Leadership (TGSL), Yunibesithi ya Limpopo. O laletšwa go tšea karolo go nyakišišo yaka: **Lessons Learnt From Community-Based Resilience Strategies Applied To Mitigate Inconsistent Potable Water Supplies In Lepelle Nkumpi Local Municipality, Limpopo Province, South Africa**. Maikemišetšo a nyakišišo ye ke go nyakišiša maano a phokotšo ao a hlamilwego le go phethagatšwa ka gare ga setšhaba sa geno, go aga go kgotlelela tlhohlo ya kabo ya meetse a go nwa yeo badudi ba itemogelago yona. O laletšwa go tšea karolo poledišanong ya go lebana le sefahlego. Hlee la hloko:

- Thutong ye, go tšea ga gago karolo ke ga boithaopo, gomme o ka ikgogela morago nako efe goba efe ntle le go bolela lebaka le ge e le lefe;
- Thuto ga e bake kotsi le ge e le efe gomme ge o ikwa o sa phuthologa go araba dipotšišo le ge e le dife, ikwe o lokologile go tsebiša monyakišiši.
- Thutong ye, tshedimošo ya gago ya motho ka noši e tla bolokwa e le sephiri le go se tsebje.
- Nako yeo e abetšwego poledišano e tla tšea metsotso ye 30.
- Ikwe o lokologile go botšiša dipotšišo le ditlhathollo tšeo di amanago le thuto.

Nna_____, ke dumela go tšea karolo ka boithaopo nyakišišong yeo e nago le sehlogo se se rego **"Lessons Learnt From Community-Based Resilience Strategies Applied To Mitigate Inconsistent Potable Water Supplies In Lepelle Nkumpi Local Municipality, Limpopo Province, South Africa"**. Ke badile le go kwešiša diteng tša taletšo ye ya go tšea karolo nyakišišong ye gomme ka mo ke tiišetša tumelelo ya ka ya boithaopo ya go tšea karolo nyakišišong le gore dikarabo tša ka di tla bolokwa e le sephiri le go se tsebje. Gape ke kwešiša gore ga ke tlamege go tšea karolo thutong le gore ke tshwanelo ya ka go emiša go tšea karolo ga ka nako efe goba efe ge ke ikwa ke sa phuthologa ntle le go bolela ditlhaloso le ge e le dife.

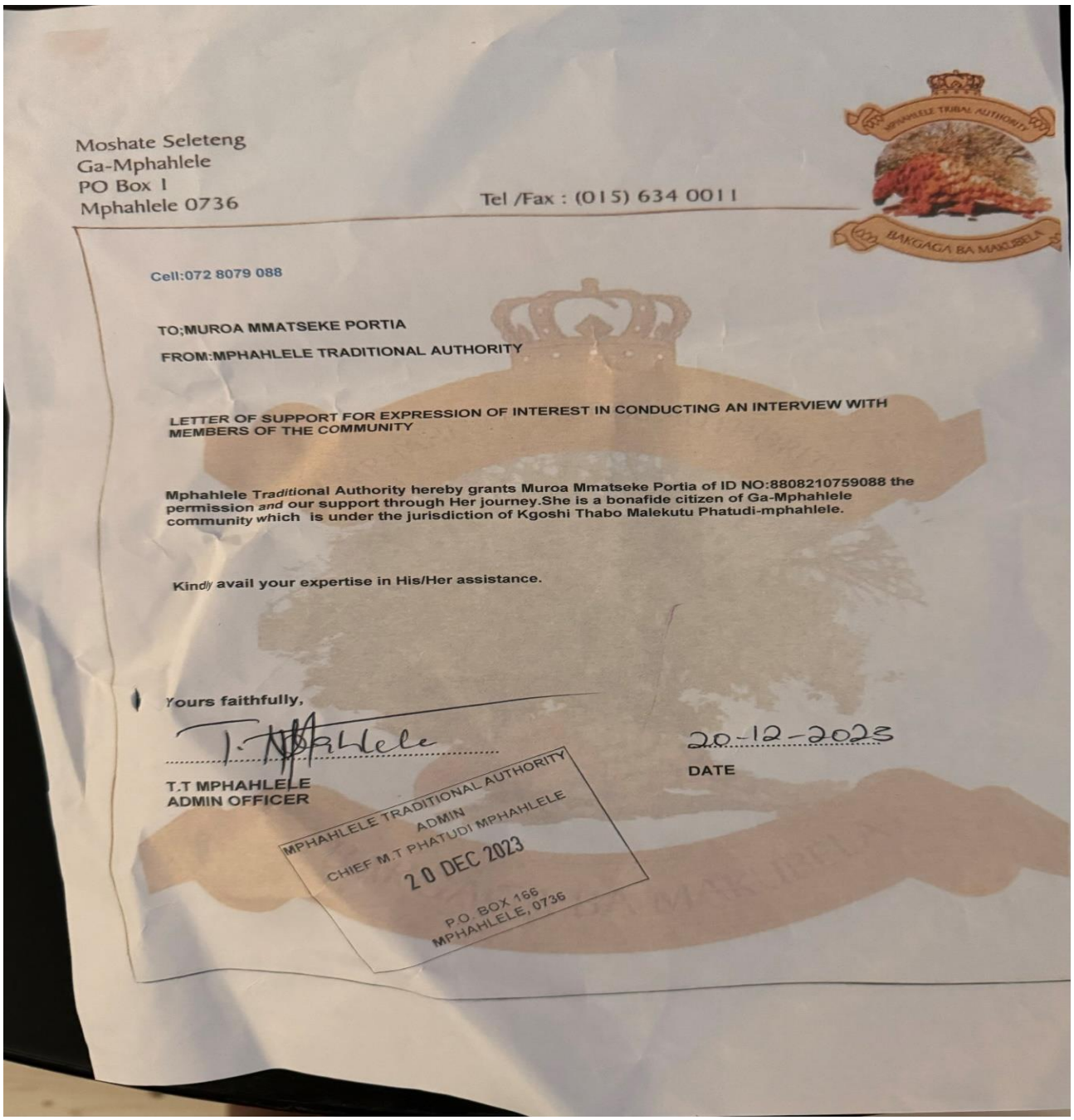
Mosaeno wa motšeakarolo _____ letšatšikgwedi _____
Mosaeno wa monyakišiši _____ letšatšikgwedi _____

Ka morago ga nyakišišo ye, khophi ya pego e tla hwetšagala go polokelo ya tshedimošo ya Bokgobapuku bja Yunibesithi ya Limpopo. Ge o nyaka tshedimošo ye nngwe, hle ikopanye le ba ba latelago:

Mookamedi: Prof. Burman (Christopher.burman@ul.ac.za)

Turfloop Graduate School of Leadership

Appendix C: Letter of permission – Mphahlele Traditional Authority



Moshate Seleteng
Ga-Mphahlele
PO Box 1
Mphahlele 0736

Tel /Fax : (015) 634 0011

Cell:072 8079 088

TO:MUROA MMATSEKE PORTIA

FROM:MPHAHLELE TRADITIONAL AUTHORITY

LETTER OF SUPPORT FOR EXPRESSION OF INTEREST IN CONDUCTING AN INTERVIEW WITH MEMBERS OF THE COMMUNITY

Mphahlele Traditional Authority hereby grants Muroa Mmatseke Portia of ID NO:8808210759088 the permission and our support through Her journey.She is a bonafide citizen of Ga-Mphahlele community which is under the jurisdiction of Kgoshi Thabo Malekutu Phatudi-mphahlele.

Kindly avail your expertise in His/Her assistance.

Yours faithfully,

T.T MPHAHLELE
ADMIN OFFICER

20-12-2023
DATE

MPHAHLELE TRADITIONAL AUTHORITY
ADMIN
CHIEF M.T PHATUDI MPHAHLELE
20 DEC 2023
P.O. BOX 166
MPHAHLELE, 0736

Appendix E: Semi-structured interview guide (English and Sepedi version)

A. Biographical information – *Tshedimošo ka ga bophelo*

Age - *Mengwaga*

18-24		25-34		35-54		55 & above	

How many people live in your household? – *Ke batho ba ba kae bao ba dulago ka lapeng goba ka gae?*

1-4		5-7		8-10		11-15		16 & above	

What is your household income per month? - *Letseno la ka lapeng goba ka gae kgwedi ka kgwedi ke lefe?*

R200-R800		R900-R1500		R1600-2000		R2100-R3000		R3100 & above	

Designation - *Maemo*

Citizen		Civic leader		Traditional leader		Other	

B. What are the resilience strategies being applied in selected communities in the Lepelle-Nkumpi local municipality to mitigate potable water challenges?- *Ke mekgwa efe eo e tšewago go metse goba ditšhaba tšeo di hlokotšwego ka mmasepaleng wa selegae wa Lepelle-Nkumpi go sesefatša tlhotlo ya meetse*

1. Can you give me some examples about the water supply to the community in the last 18 months? – *O ka fana ka e mengwe ya mehlala malebana le kabo ya meetse mo dikgweding tše lesomeseswai (18) tša go feta?*
2. Please give examples of what happens when the water supply from the municipality comes on when you are at your house? – *Ka kgopelo fana ka mehlala ya seo sa go direga ge kabo ya meetse go tšwa mmasepaleng e fihla ge o le ka ntlong goba ka gae?*

3. Please give examples of what happens when the water supply from the municipality comes on and you are not at your house? - *Ka kgopelo fana ka mehlala gore go direga eng ge kabo ya meetse go tšwa mmasepaleng e fihla o se gona ka ka ntlong goba ka gae?*

4. Can you give examples of alternative ways to get water besides through municipal supply? – *O ka fana ka ditsela tše dingwe tša go hwetša meetse ntle le go abelwa ke mmasepala?*

5. Describe how households store water throughout the week? - *Hlatholla ka fao legae goba ka gae le bolokago meetse mo bekeng?*

C. How effective are the resilience strategies being applied to mitigate the potable water challenges at both the community and household levels? – *Botshephegi ke bjo bo bjang go magato ao a tšewago go sesefatša dithlotlo tša meetse go bobedi maemong a setšhaba le malapeng?*

1. Can you give me some examples of how people in your household feel about the inconsistency of potable water supply have on your household? – *O ka fana ka e mengwe ya mehlala malebana le ka mokgwa woo batho bao ba lego ka lapeng leno ba ikwago ka gona ka go hloka boitseparelo bja kabo ya meetse eo ba nego nayo ka lapeng?*

2. Can you give me some examples of how people in the community feel about the inconsistency of potable water supply have on the community at large? – *O ka fana ka e mengwe ya mehlala malebana le ka mokgwa woo batho motseng ba ikwago ka gona malebana le tlhokego ya boitseparelo bja kabo ya meetse setšhabeng ka kakaretšo?*

3. What does your household do to respond to the inconsistent of potable water supply from the municipality? – *Lapa leno le dira eng go ikarabela go tlhokego ya boitseparelo bja kabo ya meetse go tšwa mmasepaleng?*

4. How does the community respond to the inconsistent potable water supply challenge? – *Setšhaba se dira eng go ikarabela go tlhokego ya boitseparelo bja kabo le tlhotlo ya meetse?*

D. **What strategies could be applied in the future to use the insights from the research to develop potable water mitigation resilience strategies within the selected communities and plausibly beyond? – *Ke mekgwa efe eo e ka šomišwago nakong tšeo di tlago le go ya pele go tšwa bokagareng bja dinyakišišo go hlabolla mekgwa ya go sesefatša tlhtlo ya kabo ya meetse ka gare ga ditšhaba tšeo di hlokotšwego magareng ga tše dingwe?***

1. What do you think the municipality could do in the future with regard to the inconsistent potable water supply to improve the situation in your community? – *Ke eng seo o gopolago gore mmasepala o ka se dira nakong eo e tlago malebana le tlhokego ya boitseparelo bja kabo ya meetse go matlafatša seemo setšhabeng goba motseng?*

2. Looking to the future, what strategies do you suggest could improve the water challenge for the community to overcome the challenge of inconsistent potable water supply? – *Go lebeletšwe bokamoso, ke e fe mekgwa eo o akanyago gore e ka matlafatša tlhotlo ya meetse setšhabeng goba motseng go fenya tlhotlo ya tlhokego ya boitseparelo bja kabo ya meetse?*

3. What do you think could be community-based strategies that could improve the water challenge for your household to overcome the challenge of inconsistent potable water supply? – *Ke eng seo o gopolago gore e ka ba mekgwa ya setšhaba goba motse go ka matlafatša tlhotlo ya meetse ka lepeng la geno go fenya tlhotlo ya tlhokego ya boitseparelo bja kabo ya meetse?*

FINISHING COMMENT – *Maikutlo a go ruma*

1. What else is important about water supply from your perspective? – *Ke eng se sengwe se bohlokwa malebana le kabo ya meetse go ya ka mmono wa gago?*