

RESEARCH ARTICLE

WILEY

Bulk water services delivery challenges in the Dr. Ruth Segomotsi Mompoti district municipality in South Africa's North West Province

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Abstract

This study thoroughly examines the difficulties in providing bulk water services in Dr. Ruth Segomotsi Mompoti district municipality in the North West Province, with the end goal of giving comprehensive suggestions for operational and strategic improvements. The study adopted a qualitative research approach, employing semistructured interviews for gathering data from officials of various municipalities responsible for overseeing infrastructure within the geographical confines of the municipalities they serve. The findings identified themes indicative of the focus areas contributing to the bulk water services delivery challenges. These emphasized the importance of fostering a collaborative work environment, thus promoting organizational learning, and implementing effective change management to elevate service delivery standards. It identifies the necessity for heightened operational efficiency and advocates for a cultural shift within municipal operations. Strategic planning, marked by the creation and regular refinement of master plans, is highlighted alongside the implementation of

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robust project management practices. The study emphasizes the critical need for synchronizing municipal planning processes with statutory requirements and the changing demands of the local community. The research advocates for a flexible and responsive approach to master planning, which is indispensable for adapting to shifts in administrative frameworks and community needs. The study recommends the development of a dynamic master plan for water services, one that is regularly reviewed and updated to reflect the evolving legislative landscape and community priorities. It also suggests that municipal authorities should ensure that the planning process remains inclusive and responsive to the residents' needs. Furthermore, training and capacity-building initiatives for municipal officials could be instrumental in enhancing their ability to adapt to these changing demands and legislative environments.

KEYWORDS

bulk water, challenges, municipality, service delivery, thematic analysis

1 | INTRODUCTION AND BACKGROUND INFORMATION

Governments are tasked with the provision of essential services to their population and striving for efficiency and responsiveness in their delivery. The South African government encounters similar service delivery challenges like many of its global counterparts. These issues in service delivery are not solely a South African issue but a global challenge, as detailed in a study by Chili et al. (2023), which examines the specific difficulties encountered by South African municipalities in providing services, thus offering a thorough analysis of the operational hurdles within local governance structures in South Africa.

The government's role in public service delivery encompasses providing critical services to its citizens, including healthcare, education, water and sanitation, transportation, and social welfare programs, as highlighted by Reddy (2016). The aim is to ensure these services are accessible to all in a fair and efficient way. However, the country has recently encountered significant challenges in effective service provision. A notable issue is the increasing frequency of service delivery protests over the last decade, stemming from the public's call for improved services and their displeasure with the present state of these services. Additionally, internal issues like

political conflict and discord between political and administrative bodies within local governments have exacerbated these service delivery challenges (Reddy, 2016).

Numerous local municipalities in South Africa are frequently confronted with accusations of poor administration, mismanagement, financial irregularities, and corruption. As Enaifoghe (2022) notes, these issues cast doubt on the local government's ability to provide adequate services to the communities they govern. The White Paper on Local Government (Republic of South Africa, 1998) outlines that the primary objective of local governments is to deliver essential services such as water, sewage, electricity, and roads, as part of their development mandate. Furthermore, according to the South African Local Government Association (SALGA), the Municipal Structures Act established the responsibilities of district municipalities, entrusting them with the oversight of services like electricity, sanitation, health care, and water, and delegating their provision to the local municipalities within their districts (South African Local Government Association, 2016).

As outlined by Weaver et al. (2017) water service delivery in South Africa is a prime example of the broader service delivery challenges in the country. This issue is complex, involving numerous actors and factors, and lacks a straightforward solution. The COVID-19 pandemic has intensified these difficulties, thus adversely impacting the local economy (Maxwell, 2022). To tackle these service delivery challenges, the adoption of knowledge management strategies has been proposed (Barbier & Tengeh, 2022). Effective knowledge management could enhance service delivery and prevent further degradation of public services. Furthermore, the implementation of the "Batho Pele principles" is aimed at improving the quality and reach of public services in South Africa (Tintswalo et al., 2022). Batho Pele, a Sesotho word, which means "People First," is an approach that seeks to foster the commitment of public servants to serve people and to develop mechanisms that promote service delivery. This approach, launched in 1997, seeks to encourage innovation and transform the Public Service at all levels. The approach is based on the eight principles that are consultation; service standards; access; courtesy; information; openness and transparency; redress; and value for money (Republic of South Africa, 1997).

Access to clean and reliable water is a fundamental determinant of communities' well-being and sustainable development. In the context of Dr. Ruth Segomotsi Mompati district municipality in the North West Province, South Africa, the provision of bulk water services faces significant challenges that have far-reaching implications for the socioeconomic environment of the area. The efficient delivery of bulk water services is essential for meeting the basic needs of the population, supporting economic activities, and ensuring environmental sustainability. However, the district municipality has been grappling with various obstacles that hinder effective supply of bulk water services, hence impacting the overall development and quality of life in the region.

Therefore, in response to these challenges, this study aimed to investigate the complexities surrounding the delivery of bulk water services in Dr. Ruth Segomotsi Mompati district municipality. By identifying the fundamental problems impeding efficient water supply, the research sought to give valuable insights into the underlying issues and potential solutions that can contribute to enhancing the provision of bulk water services in the municipality. This investigation is crucial for understanding the multifaceted dynamics of water service delivery and for informing evidence-based strategies to address the existing challenges and improve the overall well-being and sustainable development of the community.

Considering the CoGTA profiling of the Dr. Ruth Segomotsi Mompati (DRSM) district municipality and the slow pace of services reticulation in some parts of the district, the study aimed to explore challenges of service delivery across the DRSM jurisdiction with emphasis on bulk water services. It is a well-known fact that Covid-19 exposed the inadequate state of

providing basic services in many rural areas. North West Province and DRSM district municipality were no exception to that challenge. Many rural areas were at the receiving end of this challenge, and local municipalities resorted to the mobile distribution of water to alleviate the problem, however, that interim solution also brought challenges about the quality of water delivered by trucks to the needy and maleficence in some instances. In addition, there was also a challenge for a reliable supply of electricity in some of the municipalities, which also affected the bulk water service delivery.

1.1 | Problem statement

Service delivery infrastructure portfolios are managed across all three spheres of government, depending on the nature and magnitude of the development required. National and provincial governments put a significant emphasis on the front-end phase of infrastructure portfolios. However, once the infrastructure portfolios and projects are commissioned, there is a need for active operational and maintenance aspects of the infrastructure life cycle where the receiving district and local municipalities play a significant role. Infrastructure components such as water pipes and pumps and electrical components are manufactured to operate for a certain design life for which they are intended. However, to realize that intended design life, all components can only be expected to deliver for that specific period if they operate optimally and within the design parameters. DRSM district municipality is responsible for delivering bulk services to all Greater Taung, Mamusa, Kagisano-Molopo, Lekwa-Teemane, and Naledi local municipalities.

The government of the Republic of South Africa is “concerned about the quality and provision of drinking water services to the residents in the district area and is placing a regulatory focus on these systems to ensure safe drinking water supply to the Dr Ruth Mompati residents” (Republic of South Africa, 2023c, p. 47). Several reports highlight the bulk water services delivery challenges in the DRSM. For example, based on the Blue Drop audit that assesses the delivery, treatment, and distribution networks of water by considering key performance areas such as capacity management; drinking water quality risk management; financial management; technical management; and drinking water quality compliance, it was realized that the 2023 Blue Drop Score for DRSM was 31.47% (according to the audit, a performance of less 31% is regarded as dysfunctional system). In 2014, the score was 30.14%. More than 10 years ago, these scores stood at 64.16% and 52.94% for the years 2011 and 2012, respectively (Republic of South Africa, 2023b).

On the other hand, the No Drop assessments that base on water conservation and water demand management (WC/WDM) strategy, planning, and implementation; asset management; technical skills; and compliance and performance, revealed that in the year 2021/2022, DRSM had a No Drop score of 26%, a rank that is defined as “critical” (less than 31%). It is argued that “the score of 26% indicates that there is a critical need for urgent interventions to be implemented at Dr Ruth Segomotsi Mompati DM for all aspects of WC/WDM” (Republic of South Africa, 2023e, p. 233). Additionally, during the audit that based on the June 2021/2022 municipal financial year data, it was realized that the DRSM demonstrated a very limited understanding of its water use and the water conservation and water demand management strategy. Nevertheless, there was no proof of meter maintenance or replacements; there was also no proof of the competent water loss management team; and the number of repairs done was not sufficient (Republic of South Africa, 2023e).

The risk assessment that focuses on total design capacity; operational capacity (% inflow/design); effluent quality non-compliance; and technical skills compliance revealed that the

Cumulative Risk Rating in the year 2023 (CRR 2023) for DRSM stood at 98.4%. This is defined as “critical.” In 2022, it was 89.98% defined as “high.” A higher value of CRR requires urgent intervention (Republic of South Africa, 2023d). Also, according to Republic of South Africa (2023a, p. 8), the Technical Site Assessments (TSA) score (%) for DRSM which “reflects the condition of the raw water handling system (abstraction, pumps, pipe network), the water treatment plants (inlet works to disinfection and sludge treatment), delivery system (commend reservoirs, bulk pipe network and pumpstations) and distribution systems (pump and pipe networks)” was (Bogosing WSS) 18%. This is defined as a “critical state” indicating failure and dysfunctional process and infrastructure (Republic of South Africa, 2023a).

For this study, the scope of bulk services was limited to bulk water service delivery. Therefore, the problem that the study investigated was focusing on the challenges experienced in the provision of bulk water by the DRSM district municipality to the receiving municipalities.

Specifically, we seek to do the following:

1. Identify key challenges in the delivery of bulk water services within the Dr. Ruth Segomotsi Mompati district municipality
2. Assess the impact of these challenges on water quality, availability, and accessibility for residents and industries
3. Give recommendations for enhancing the efficiency and effectiveness of bulk water services in the district
4. Explore opportunities for infrastructure planning and improvement in bulk water service delivery to local municipalities within the district

1.2 | Study significance

This study gives valuable insights and practical solutions, potentially influencing academic discourse, policy-making, and industry practices. It focuses on addressing bulk water service delivery challenges within the DRSM district municipality. It successfully achieves its primary objective of exploring these challenges as mandated by the Municipal Structures Act of 1998. The study is extensive and covers several critical areas, including the development of a master plan for water services, the integration of financial and operational project aspects, and the utilization of grants like the Municipal Infrastructure Grant for infrastructure development. The study emphasizes the importance of collaboration, organizational learning, and change management in enhancing service delivery. It highlights the need for improved operational efficiency, culture change, and strategic planning, particularly in developing and updating master plans.

This study also underscores the robust project management practices and stakeholder involvement. The importance of efficient information management, ongoing infrastructure evaluation, and diversification of water sources are noted as vital for learning from the past performances to improve future strategies. The study explores the application of the legislative and policy framework regulating district municipalities, examines operations and project management practices, analyses the state of bulk water service delivery infrastructure, and identifies opportunities for infrastructure planning and improvement. It highlights the critical need for a formalized water service delivery master plan and the alignment of municipal plans with legislative frameworks and community needs. Generally, the study provides a comprehensive approach to addressing both current challenges and future needs in bulk water service delivery, thus ensuring a more resilient and efficient water service infrastructure in the DRSM district municipality.

2 | LITERATURE REVIEW

2.1 | Local government and its responsibilities

Local governments in South Africa are responsible for various functions, including infrastructure, roads, water, electricity, and waste management (Rogerson, 2020). However, challenges such as misappropriation, ineffective internal control tracking, and nepotism impede the successful implementation of oversight mechanisms meant to promote accountability (Moji et al., 2022). The politicization of the local bureaucracy and the lack of clearly enunciated definitions contribute to the challenges faced by failing local municipalities in service delivery and governance (Magagula et al., 2022; Reddy, 2016). Furthermore, the government's commitment to improving service delivery is hindered by serious challenges, including a communication breakdown between councils and citizens, corruption, and depleted municipal capacity (Thinyane et al., 2015).

In South Africa, like in any other part of the world, the government must make sure that services are delivered to the public in an effective, efficient, and economical manner. The importance of the local government's duty "to rebuild communities and environments based on promoting a non-sexist, non-racial society whilst improving the socio-economic status of people in different communities" was emphasized by Mabizela and Matsiliza (2020, p. 2).

The North West Province in South Africa has district municipalities that are actively involved in providing bulk and regional services directly, particularly in managing functions such as wastewater and sewerage. These district councils are pivotal in the entire value-chain process and may delegate certain responsibilities to service agents through service-level agreements. However, these activities must align with the policy and legislative frameworks established by the national government, such as the Water Services Act 108 of 1997 (Rakau, 2022). This involvement of district municipalities in service provision aligns with the concept of decentralization, which has been recognized as a means to enhance the efficiency and effectiveness of service delivery at the local level (Mkoma & Rwekaza, 2021). Furthermore, the importance of legislative frameworks in guiding water governance and management has been emphasized, hence highlighting the need for robust environmental laws and institutional structures to support effective water management (Eyüboğlu & Eyuboglu, 2022).

2.2 | Historical challenges of the district municipality

Previous studies illustrated several challenges experienced at the municipality level. Magagula et al. (2019) also highlighted challenges encountered by the district toward cooperation with local municipalities. These challenges remain unaddressed in many of the municipalities, and the communities feel the consequences of not addressing them through lack of service delivery.

2.2.1 | Capacity and skills shortage

In South African local governments, the most significant obstacle encountered is the scarcity of skills and limitations in capacity (Munzhedzi, 2021). This deficiency has led to ineffective spending, which plays a crucial role in the failure to provide services (Mahabir, 2014). Additionally, the absence of structured career paths, programs for skill enhancement, and insufficient investment in technical, administrative, and leadership abilities have exacerbated these capacity

issues (Poore et al., 2015). Sebola (2015) further emphasized how criticism of most district municipalities' failure to assist local municipalities stems from a lack of available skills, which undermines efforts to collaborate between the two municipalities. Sebola (2015) also asserts that district municipalities fail to spend their allocated funds and that this is due to a lack of project management expertise. In summary, capacity and skills shortages could be linked to a poor state of service delivery infrastructure and, ultimately, poor delivery of service to the communities.

2.2.2 | Legislation-related challenges

South African municipalities face significant legislative obstacles that impede efficient governance and service provision. These include sluggish policy execution, limited funds for environmental conservation, and overlooking the crucial role of local governments in such efforts (Holmes et al., 2012). Section 151 of the Republic of South Africa Constitution, 1996, states that district and local municipality councils have vested legislative and executive authority to administer without interference from other national and provincial spheres. The councils' autonomy is preserved as a result. This anatomy implies that if there is no effective collaboration between the district and the local municipality, service delivery will suffer the most due to misalignment between the two structures.

2.2.3 | Poor accountability

Manyaka and Sebola (2015) observed in their studies to support the claim that difficulties in municipal service delivery may be related to the fact that officials' performance is not monitored to the desired standard, and they are less likely to be held accountable for poor performance. Their view is that councils, as the executive authority, need to ensure that accountability tools and processes are implemented and followed where necessary to ensure accountability. van Niekerk and Dalton-Brits (2016) believe that councils at local and district governments frequently neglect to apply consequence management when municipal officials are facing substantiated charges of misconduct and subpar performance. Poor accountability implies that service delivery is not prioritized due to officials not being held responsible for their misconduct and poor performance.

2.3 | Global bulk water services delivery challenges

The delivery of bulk water services faces several global challenges that impact its effectiveness and sustainability. These challenges encompass various aspects, including governance, socio-ecological systems, geomorphology, refractory materials, urban health, collaboration, access to services, neoliberalism, water law, and eco-hydrology. The political dimension of water governance is highlighted in the retheorization of politics in water governance (Wilson et al., 2019). This emphasizes the importance of decision-making, usage, and management of water, and the need to consider diverse ontologies, epistemologies, and values related to water. According to Weaver et al. (2017), effective governance is essential for addressing the challenges faced in delivering water service. Water service delivery is a complex socio-ecological system

(C-SES) that requires a systemic approach. These systemic approaches are necessary to address bulk water delivery challenges and achieve just transitions in water service delivery. The management of transboundary rivers and the increasing pressure on ecosystem service delivery are recognized as key global challenges (Fryirs et al., 2018).

Geomorphological hazards and human activities significantly contribute to the degradation of water resources and ecosystem services (Grabowski et al., 2014). Geomorphology, the study of landforms and the processes that shape them, plays a crucial role in understanding river and water resources management. It provides valuable insights into river dynamics, sediment transport, and flood risk, which are essential for sustainable water management and infrastructure planning (Grabowski et al., 2014). However, poor governance can hinder effective water service provision, thus leading to inadequate access to clean water and sanitation, particularly in urban areas (Chng, 2012). Effective governance structures, including transparent decision-making processes and stakeholder engagement, are essential for improving water service delivery and promoting urban health (Wuijts et al., 2020). Geomorphological hazards, such as erosion and sedimentation, can have a significant impact on water resources and ecosystem services. These hazards can lead to the degradation of water quality and aquatic habitats, hence affecting the availability and quality of water resources (Grabowski et al., 2014). Human activities, including urbanization and land use changes, can exacerbate geomorphological hazards, further contributing to the degradation of water resources (Grabowski et al., 2014). Thus, understanding geomorphological processes is crucial for effective river and water resource management. Geomorphological assessments can inform the design of water infrastructure, such as dams and levees, to mitigate the impact of geomorphological hazards and ensure the sustainable use of water resources (Grabowski et al., 2014).

According to Marrengane and Croese (2020), collaboration and co-production of public services are important in addressing water and sanitation challenges. Collaborative approaches involve different stakeholders and can lead to more effective service delivery. The concept of collaboration has evolved from a focus on service delivery to encompass broader relationships, negotiation, and partnerships between various role players involved in service provision. In informal urban settlements, Victor et al. (2022) noted that access to a reliable supply of potable water is a major problem. Factors such as distribution network engineering, housing and network expansion planning, and public policy failures contribute to inequitable access to water and sanitation services. Addressing these challenges necessitates holistic solutions that guarantee equitable access to dependable and superior services for all individuals.

Neoliberalism has also influenced the marketization of public services, including water delivery (Birch & Siemiatycki, 2015). The interests of private businesses have become prominent, thus leading to the transfer of public services to private providers. This shift raises concerns about the equitable and sustainable delivery of water services, as private interests may prioritize profit over public welfare. Water law and administration play a significant role in water governance (Araral & Yu, 2013). However, there is a lack of consensus on the scope, definition, and measurement of water governance. This hinders the development of effective policies and practices for water service delivery. Further research and collaboration are needed to enhance the understanding and implementation of water governance frameworks. Eco-hydrology is crucial for balancing food production and the preservation of water-dependent ecosystems (Rockström, 2003). Water scarcity poses a significant constraint to sustainable development, particularly in semiarid rain-fed agriculture. Shifting toward productive green water flow and considering the eco-hydrological challenges are essential for achieving sustainable delivery of water services. Therefore, global challenges in bulk water services delivery

encompass various dimensions, including governance, socio-ecological systems, geomorphology, refractory materials, urban health, collaboration, access to services, neoliberalism, water law, and eco-hydrology. Addressing these challenges requires comprehensive approaches that involve effective governance, systemic thinking, collaboration, and sustainable practices.

2.4 | Water service delivery challenges in other African countries

The delivery of water supply services in Africa faces numerous challenges that impact its effectiveness and sustainability. These challenges encompass a range of dimensions, including issues related to infrastructure failures, access to improved water and sanitation, water quality, sustainability, governance, and the implementation of technological solutions. Failures including persistent malfunctions and complete failures of water withdrawal taps, according to Offiong et al. (2022), present a difficult situation for both water users and service providers. Important obstacles preventing the delivery of household water services in rural Africa include early identification and forecasting of smart water tap failures. Water service providers in Africa have made significant investments to ensure the long-term viability of water supply and withdrawal systems (Offiong et al., 2022).

Access to improved water and sanitation is a persistent challenge in Sub-Saharan Africa (Armah et al., 2018). The provision of water and sanitation services is influenced by a combination of biosocial, sociocultural, and contextual factors, thus underscoring the importance of conducting multidisciplinary research and implementing policy interventions. Armah et al. (2018) noted that international organizations and national governments are stepping up their efforts to address the challenge due to the size and complexity of the water and sanitation problem.

Drinking water contamination is more prevalent in rural areas compared with urban areas, with Africa and Southeast Asia experiencing higher levels of contamination. Microbial contamination affects all types of water sources, including piped supplies, hence highlighting the need for improved water quality management (Bain et al., 2014). According to Foster (2013), sustainability is a long-standing policy challenge in rural water supply in Sub-Saharan Africa. Factors such as system age, distance from district/county capitals, and absence of user fee collection are associated with the nonfunctionality of community-managed handpumps. These risk concerns must be addressed for rural water supply systems to be sustainable (Foster, 2013). Townships, which are urban areas of towns historically reserved for Black people, confront unique difficulties in providing water services. Local municipalities, categorized as Category B2 municipalities, are responsible for household water supply and face significant challenges in delivering water services in townships (Weaver et al., 2017).

Technological solutions can contribute to improving water service delivery in Africa. Deep learning tools have been used to model failures in smart water taps, hence enabling early detection and prediction of failures (Offiong et al., 2022). Cellular instrumentation on rural handpumps has also been evaluated to improve service delivery and ensure reliable and sustained water supply (Nagel et al., 2015). Therefore, the delivery of water supply services in Africa has been facing several issues that compromise its effectiveness and sustainability. These encompass issues such as deficiencies in infrastructure, the availability of improved water and sanitation facilities, water quality concerns, the sustainability of water services, governance challenges, and the implementation of technological solutions. Addressing these challenges requires interdisciplinary approaches, improved governance frameworks, investment in

infrastructure, and the adoption of appropriate technological solutions to ensure reliable and sustainable water service delivery in Africa.

2.5 | Challenges in bulk water services delivery in South Africa

In South Africa, the provision of bulk water services faces complex issues that substantially affect the efficiency of water service delivery across the nation. The factors influencing the delivery of these services encompass governance, infrastructure management, institutional challenges, and societal change. These issues notably affect the availability, quality, and long-term viability of water services, particularly in local municipalities. The governance structure in South Africa is a key determinant in shaping the delivery of these services. Significant obstacles like political interference and institutional inefficiencies have been identified as impediments to effective water service delivery (Mngomezulu, 2020). Effective political administration is crucial for improving service delivery at the municipal level and for fostering effective local governance (Reddy, 2016). Additionally, the models of governance and funding strategies for water infrastructure play a pivotal role in investment decisions and access to fundamental water and sanitation services (Ruiters & Matji, 2015).

The delivery of bulk water services in South Africa has been facing numerous challenges that impact its effectiveness and sustainability. These challenges encompass a variety of elements, including concerns related to infrastructure, the accessibility of enhanced water and sanitation services, water quality issues, governance obstacles, financial limitations, and the impact of external factors such as climate change and the COVID-19 pandemic. The delivery of bulk water services in South Africa has been facing a significant challenge in the form of infrastructure failures (Dithebe et al., 2019). These challenges arise due to the aging of infrastructure, insufficient maintenance, and inadequate investment in water infrastructure assets. These challenges can result in setbacks in the timely delivery of water infrastructure assets and thus impede the provision of dependable water services (Dithebe et al., 2019). The challenge of ensuring access to improved water and sanitation continues to persist in South Africa (Aiyetan & Das, 2021). Despite endeavors to enhance access to basic water services, certain regions, particularly small centers and rural nodes, still face ongoing issues with infrastructure quality (Mutamba, 2019). To address these challenges, it is imperative to implement focused interventions that guarantee equal access to water services for all individuals in South Africa. Water quality is a pressing issue that demands significant attention in the delivery of bulk water services in South Africa (Mutamba, 2019). Contamination of water sources, particularly in rural areas, poses health risks to communities. Thus ensuring water quality standards and implementing effective monitoring and treatment measures are essential for delivering safe and clean water to the population. The significance of governance cannot be overstated in the provision of water services in South Africa (Ruiters & Matji, 2015). The current water institutions and governance models have encountered difficulties in terms of insufficient investments, restricted availability of essential water and sanitation services, and ineffective management of water infrastructure (Ruiters & Matji, 2015). Addressing these governance challenges is essential to enhance the provision of bulk water services.

Funding and financing are significant challenges in the water infrastructure value chain in South Africa (Ruiters & Amadi-Echendu, 2022). Limited financial resources and competing priorities pose constraints on investment in water infrastructure. In that regard, developing sustainable investment models and prioritizing funding for water infrastructure projects are

essential for ensuring the long-term delivery of bulk water services. The provision of bulk water services in South Africa is additionally confronted by external factors, such as the impacts of climate change (Maphela & Cloete, 2019). Changing rainfall patterns, increased frequency of droughts, and rising temperatures impact water availability and quality. Thus, adapting water infrastructure and management strategies to the changing climate is crucial for ensuring resilient and sustainable water service delivery.

The challenges in water service delivery in South Africa have been further underscored by the COVID-19 pandemic (Blignaut et al., 2020). The lack of personal protective equipment, interruptions to electricity and water supplies, and the need for infection control measures have posed additional challenges for dental professionals delivering water-dependent services. It is crucial to implement and embrace suitable measures to alleviate these challenges, ensuring the secure provision of water services during the pandemic. Therefore, the delivery of bulk water services in South Africa has been facing various challenges that impact its effectiveness and sustainability. The challenges encompassed in this context consist of issues related to infrastructure deficiencies, access to enhanced water and sanitation facilities, water quality concerns, governance matters, funding and financing limitations, and the influence of external factors like climate change and the COVID-19 pandemic. Hence, addressing these challenges requires comprehensive approaches that involve investment in infrastructure, improved governance frameworks, sustainable funding models, and adaptation to changing circumstances to secure the provision of dependable and sustainable delivery of bulk water services.

2.6 | Challenges of bulk water services delivery in the North West Province

The delivery of bulk water services in the North West Province has been facing numerous challenges that impact its effectiveness and sustainability. These challenges encompass a range of factors, including issues with infrastructure, the availability of enhanced water and sanitation services, concerns about water quality, governance matters, funding and financing limitations, and the influence of external factors like climate change and the COVID-19 pandemic. According to Dithebe et al. (2019), provision of bulk water services in the North West Province is significantly hampered by infrastructure failures. These failures can result from aging infrastructure, lack of maintenance, and inadequate investment in water infrastructure assets. Dithebe et al. (2019) also observed that the perceived presence of these challenges leads to delays in the provision of water infrastructure assets and impedes the delivery of dependable water services. According to Coetzee et al. (2016), access to improved water and sanitation remains a persistent challenge in the North West Province. Despite endeavors to enhance the availability of essential water services, there are still regions, particularly in rural communities, where challenges related to infrastructure quality persist (Coetzee et al., 2016). The provision of water services in these areas requires targeted interventions to ensure equitable access for all residents of the North West Province. Coetzee et al. (2016) also highlighted water quality as another critical concern in the North West Province's bulk water services delivery. Contamination of water sources, particularly in rural areas, poses health risks to communities. Thus, ensuring water quality standards and implementing effective monitoring and treatment measures are essential for delivering safe and clean water to the population of the North West Province.

According to Ruiters and Matji (2015), the water institutions and governance models currently in place have encountered difficulties in terms of insufficient investments, restricted availability of basic water and sanitation services, and ineffective management of water infrastructure. Addressing these governance challenges is essential to enhance the provision of bulk water services in the North West Province. The water infrastructure value chain in the North West Province has been facing significant challenges in terms of funding and financing (Ruiters & Matji, 2015). Limited financial resources and competing priorities pose constraints on investment in water infrastructure. To ensure the sustainable provision of bulk water services in the province, it is crucial to establish viable investment models and prioritize funding for water infrastructure projects in the long run.

External factors, including climate change, present additional obstacles to the delivery of bulk water services in the North West Province. Changing rainfall patterns, increased frequency of droughts, and rising temperatures impact water availability and quality. Adapting water infrastructure and management strategies to the changing climate is crucial for ensuring resilient and sustainable water service delivery in the province. As per Weaver et al. (2017), the COVID-19 pandemic has highlighted the pre-existing challenges in water service delivery in the province. The lack of personal protective equipment, interruptions to electricity and water supplies, and the need for infection control measures, have posed additional challenges for delivering water services during the pandemic. Adapting and adopting appropriate measures to mitigate these challenges is essential for ensuring safe and reliable provision of water services in the North West Province.

2.7 | Status of DRSM district municipality bulk water services

The outlook on the status of the bulk water service delivery within the DRSM district municipality was the output of the profile and analysis performed in preparation for the rollout of the DDM across South Africa.

Almost 60% of the households within the district depend on groundwater as a source of their water supply. Only 52% have piped water within their dwellings (Republic of South Africa, 2020). In terms of the Municipal Structures Act, DRSM is the designated WSA. It is responsible for ensuring access to water and sanitation in its local municipalities.

The geographical demarcation for this study is limited to DRSM DM in the North West province. DRSM district municipality is a Category C municipality in North West Province. It is one of the four district municipalities within the North West Province, and it is on the border of the Northern Cape Province. In terms of geographical area, the DRSM district municipality is the largest district in the province, with a population of 522,406 (Republic of South Africa, 2020).

DRSM is home to five local municipalities: Naledi, Greater Taung, Kagisano-Molopo, Mamusa, and Lekwa-Teemane. The population of the DRSM district municipality is located in about 470 small villages and towns scattered in a radius of 250 km (Republic of South Africa, 2020). The DRSM district municipality is among the areas affected by those outcomes as high poverty levels characterize them due to socio-economic inequalities. Of particular concern, Republic of South Africa, (2020, p. 7) raised the inability of communities to access basic services as a constraint in “improving the quality of life of the rural communities and also achieving economic development,” and this is compounded by the backlog in service delivery.

2.8 | DRSM district municipality bulk water services delivery

The efficiency and long-term viability of bulk water service delivery in the DRSM district municipality are impacted by a range of challenges. These challenges encompass diverse elements such as issues with infrastructure, the availability of enhanced water and sanitation facilities, water quality concerns, governance matters, funding and financing constraints, and the necessity for ecosystem-based approaches. The DRSM district municipality encounters a substantial obstacle in the provision of bulk water services as a result of infrastructure failures (Hellberg, 2020). These failures can result from aging infrastructure, lack of maintenance, and inadequate investment in water infrastructure assets. According to Hellberg (2020), the perceived prevalence of these difficulties delays the delivery of water infrastructure assets and impedes the supply of reliable water services.

Access to improved water and sanitation remains a persistent challenge in the DRSM district municipality (Harris, 2020). Despite the efforts made to enhance the availability of essential water services, there are still areas, particularly in rural communities, where infrastructure quality challenges persist (Harris, 2020). To ensure fair access for all residents in the district, targeted interventions are required in the provision of water services in these areas. Moreover, the DRSM district municipality has been putting great emphasis on water quality in the delivery of its bulk water services (Makaya et al., 2020). Contamination of water sources, particularly in rural areas, poses health risks to communities. Thus, ensuring water quality standards and implementing effective monitoring and treatment measures are essential for delivering safe and clean water to the population of the district. Governance plays a crucial role in water service delivery in the DRSM district municipality (Makaya et al., 2020).

The existing water institutions and governance models have faced challenges in terms of inadequate investments, limited access to basic water and sanitation services, and ineffective management of water infrastructure (Makaya et al., 2020). Addressing these governance challenges is crucial for improving the delivery of bulk water services in the district. Funding and financing are significant challenges in the water infrastructure value chain in the DRSM district municipality (Knüppe, 2011). Limited financial resources and competing priorities pose constraints on investment in water infrastructure. Developing sustainable investment models and prioritizing funding for water infrastructure projects are essential for ensuring long-term bulk water services delivery in the district. Ecosystem-based approaches have the potential to play a pivotal role in tackling water challenges in the DRSM district municipality (Stosch et al., 2017). These approaches recognize the importance of healthy ecosystems in providing water-related services and benefits. Restoring wetlands and implementing catchment-based solutions can improve water quality, flood buffering, carbon storage, and habitat provision (Stosch et al., 2017). The analysis of public policies and programs is essential for addressing water security in the DRSM district municipality (Adom & Simatele, 2021).

Understanding the interactions between water management institutions and the roles they play is crucial for effective water resources management. Involving community leaders in water resources management can enhance local participation and ensure sustainable delivery of water services (Adom & Simatele, 2021). Therefore, bulk water delivery services in the DRSM district municipality face various challenges that impact their effectiveness and sustainability. These challenges include infrastructure failures, the availability of enhanced water and sanitation facilities, water quality concerns, governance matters, funding and financing constraints, and the necessity for ecosystem-based approaches. Addressing these challenges requires

comprehensive approaches that involve investment in infrastructure, improved governance frameworks, and sustainable funding models.

2.9 | Conceptual framework

In the DRSM district municipality, ensuring the sustainability of bulk water delivery services necessitates the presence of effective financial management and capacity, strong municipal capabilities, the fulfillment of political and administrative responsibilities at the local level, good governance practices, and active public involvement. In that scenario the municipality must prioritize investments in water infrastructure, equipment, and personnel and develop appropriate financial management practices. In addition, the municipality must prioritize the development of essential technical and managerial capabilities to effectively manage water supply systems. It is crucial to establish appropriate institutional structures and procedures that facilitate the efficient and effective delivery of water supply services. This study examines the challenges in providing bulk water services in Dr. Ruth Segomotsi Mompati district municipality, with the end goal of producing comprehensive suggestions for operational and strategic improvements based on the following themes:

2.9.1 | Theme 1: capacity building

In this study, we seek to reveal that focusing on the growth and advancement of employees is a crucial component of building organizational capacity. We also argue that collaboration both within and among different departments is crucial for the exchange of knowledge and shared learning. Additionally, work ethic, shaped by efficient communication and teamwork, plays a vital role in the development of organizational capacity. Furthermore, we argue that organizational culture profoundly influences operational effectiveness. Therefore, a cultural transformation toward a more proactive and responsive workplace is of paramount importance.

2.9.2 | Theme 2: communication

In this study, we seek to reveal that communication is deeply intertwined with work ethic and employee engagement. There is a clear need for enhanced communication strategies to cultivate a workforce that is more engaged and efficient. We also argue that the success of collaboration both within various municipal departments and with external parties significantly depends on communication. It is therefore essential to tackle communication difficulties to enhance collaboration and boost operational efficiency based on a holistic strategy. We hold the view that communication is crucial in the strategic planning and execution of municipal projects.

2.9.3 | Theme 3: funding

The study underscores the municipality's substantial financial limitations, especially in executing large-scale infrastructure initiatives. We also argue that grants and other external funding sources are key elements in funding infrastructure development. Additionally, striking a

balance between the financial backing from national authorities and the distinct requirements of the local municipality presents a significant challenge. Therefore, confronting funding challenges requires the municipality to seek out various sources of funding and implement sustainable financial tactics.

2.9.4 | Theme 4: governance

Governance is intimately linked to organizational culture. It is crucial to address the cultural factors to improve the governance process. We argue that effective governance plays a pivotal role in attaining operational efficiency and enhancing it requires a comprehensive strategy. We also argue that governance is fundamental in strategic planning, especially in the realms of infrastructure development and service delivery.

2.9.5 | Theme 5: operations and maintenance

We argue that the successful integration of different operational and managerial aspects is crucial for alignment and efficiency. We also argue that maintaining infrastructure, especially bulk water facilities, encompasses complex procedures and responsibilities. For improved operations and maintenance, municipalities must concentrate on both immediate and long-term planning. Additionally, this study seeks to emphasize the influence of organizational culture on operations and maintenance. Project execution, a crucial component of operations and management, is intricate and carries substantial responsibilities.

2.9.6 | Theme 6: organizational culture

Organizational culture plays a pivotal role in enhancing employee engagement and facilitating growth. The operational efficiency within a municipal framework is deeply impacted by the prevailing organizational culture. We also argue that the work ethic, an integral part of the organizational culture, significantly affects teamwork and communication within a municipal context. Additionally, the role of organizational culture in a municipality's ability to adapt to change and drive innovation is significant. Furthermore, to improve organizational culture, strategic actions are necessary to cultivate a positive, proactive, and collaborative environment. Organizational culture extends its influence beyond just internal functions, affecting how the municipality engages with external stakeholders and the community.

2.9.7 | Theme 7: planning

Collaboration emerges as a key element in municipal planning, emphasizing inclusivity and thoroughness. It is clearly understood that political dynamics significantly impact municipal planning. We also argue that effective planning requires active stakeholder involvement. Nevertheless, implementation readiness is pivotal for the triumph of municipal planning initiatives. This study delves into the complexities of executing projects, particularly in municipal

infrastructure. Infrastructure development is a cornerstone of municipal planning. Nevertheless, the adherence to legislative frameworks stands as a critical principle in municipal planning.

3 | METHODOLOGY

The primary objective of the research was to extract lessons from previous experiences to pinpoint areas for enhancement, thereby facilitating the development of novel approaches to ameliorate conditions within the DRSM district municipality. This necessitated an acknowledgment of the existing shortcomings and strategies for their rectification to enhance the delivery of bulk water services within the DRSM district municipality. Accordingly, the research adopted an interpretivist paradigm.

Reflecting the nature and goals of this study, a qualitative methodology was identified as the most fitting. As such, data collection methods (like interviews) and data analysis approaches (such as data categorization) that generate or employ nonnumerical data, are commonly classified as “qualitative.”

Exploring bulk water services delivery challenges in the DRSM district municipality in the North West Province required a qualitative data collection method. The qualitative approach was chosen to understand the experiences and perspectives of the stakeholders involved in delivering bulk water services in the district.

Qualitative research methodology in service delivery research contributes to the development of evidence-based practices and policies. This offers a more profound comprehension of the intricacies and difficulties associated with delivering services, thus enabling the implementation of focused interventions and enhancements. By employing rigorous qualitative research methods, researchers can generate valuable insights that inform service delivery practices and contribute to the overall enhancement of service quality and outcomes.

3.1 | Sampling and data collection

For this study, the population consisted of employees from the DRSM district municipality, Lekwa-Teemane, Mamusa, Kagisano-Molopo, Greater Taung, and Naledi local municipalities. The municipality manager and infrastructure director represented each municipality. The sample size consisted of eight participants. The reason for that was based on the fact that they were responsible for the operations and maintenance of the municipalities' water service delivery infrastructure.

In this study, two nonprobability sampling methods were employed to choose the participants. The sampling approach utilized a judgment technique. We purposefully selected participants within a pool of senior management of municipalities based on their wide scope of work and the contributions they would offer to the study.

Although the number of participants initially planned for this study was predetermined, it was determined that further interviews were unnecessary based on the information gathered during the conducted interviews. The interviews were continued until the data reached a point of saturation, where we felt that the research question had been adequately addressed. A total of eight interviews were conducted, and it was observed that after the seventh interview, there was minimal new information being obtained.

Malterud et al. (2016, p. 1759) argue that “saturation is not as objective and indisputable as it might appear, at least from a peer reviewer’s perspective.” It is argued that “the consideration of the characteristics of the study at hand, such as the epistemological and theoretical approach, the nature of the phenomenon under investigation, the aims and scope of the study, the quality and richness of data, or the researcher’s experience and skills of conducting qualitative research, should be the primary guide in determining sample size and assessing its sufficiency” (Vasileiou et al., 2018, p. 15). In decisions regarding the final sample size, among other things, it should be recognized that “sample size alone is not the only factor at play” (Braun & Clarke, 2021, p. 211). Therefore, “small sample size should not be seen as a limitation, in and of itself, when evaluating the rigor and findings of qualitative research” (Young & Casey, 2019, p. 5).

Saturation is likely to be achieved at any point (Mason, 2010). This is why, in their study, Hennink and Kaiser (2022, p. 9) had confidence of describing “an array of approaches to assess saturation that demonstrate saturation can be achieved in a narrow range of interviews (9–17) or focus group discussions (4–8), particularly in studies with relatively homogenous study populations and narrowly defined objectives.” Guest et al. (2020) argue that saturation can be assessed after six interviews. In their study, Constantinou et al. (2017) initially achieved saturation with the fifth interview. After re-ordering the sequence of interviews, saturation was achieved after the sixth, seventh, and eighth interviews. Additionally, Hennink et al. (2017) argue that code saturation can be reached after nine interviews.

Therefore, in this study, semistructured interviews were conducted with eight officials from five local municipalities and the district municipality. These interviews employed open-ended questions, thus allowing for extensive probing. These interviews lasted between 30 to 60 min, averaging 45 min. Each interview session was recorded to ensure accurate and comprehensive data collection for subsequent analysis.

3.2 | Data analysis

This study incorporated thematic analysis, a method noted for its flexibility and absence of a predefined philosophical framework (Bryman & Bell, 2014). This approach allowed for a more adaptable examination of the data, hence facilitating nuanced interpretation without the constraints of a specific theoretical stance. According to Braun and Clarke (2006), thematic analysis involves a six-step process. These steps were adhered to in transcribing the data gathered from the interviews in the study. This structured approach ensured a systematic and comprehensive analysis of the interview data.

3.3 | Validity

In the qualitative research conducted, we adhered to the established practices to ensure validity by focusing on accurately representing the studied phenomenon. A key practice was member checking, involving participants’ verification of their responses or the study’s findings. This step confirmed that interpretations aligned with participants’ intended meanings. Furthermore, we employed triangulation of data sources and methods, thus enhancing the credibility and depth of the findings. By utilizing multiple data sources and methods, cross-verification of data points and interpretations was possible, thus bolstering the validity of the research outcomes. These

strategies collectively reinforced the reliability and contextual relevance of the study's conclusions.

3.4 | Reliability

In the qualitative research undertaken, the concept of reliability was approached with a focus on ensuring that the research procedures could be replicated and the consistency of outcomes in similar studies. The study also recognized the vital link between reliability and trustworthiness in qualitative research. Key elements such as dependability, credibility, confirmability, and transferability were emphasized to uphold the integrity and relevance of the research findings, thus ensuring that they are both reliable and applicable in similar contexts.

4 | RESULTS AND DISCUSSION

In the conducted interviews, the participants articulated a range of challenges confronting bulk water service delivery. These challenges have been methodically categorized into seven distinct themes, which are capacity building, communication, funding, governance, operations and maintenance, organizational culture, and planning.

4.1 | Capacity building

Strengthening institutional structures and processes is key to enhancing service delivery, as this ensures more effective governance and management within municipalities. Therefore, capacity building in municipalities is more than just about improving individual skills; it is about enhancing the overall institutional capability to deliver quality services. Through effective capacity building initiatives, municipalities can better respond to service delivery challenges, thereby contributing to the well-being and development of their communities.

4.1.1 | Talent management

Talent management is a key aspect of capacity building in municipal governance. Participant NLM1 discusses the challenges related to the aging infrastructure and the need for skilled talent within the municipality:

It is five (5) because 50% of the infrastructure is old. New lines have to be revamped
... the problem is people come with their knowledge and they mess up the design.
(Participant NLM1)

This statement highlights the necessity for skilled talent in managing and revamping the existing infrastructure, thus emphasizing the challenges posed by external contractors and the need for in-house expertise. Municipalities exhibiting robust talent management, characterized by continuous training and career advancement opportunities, show marked improvements in service delivery. This effective management of talent ensures a skilled, dedicated, and

efficient workforce, which in turn leads to enhanced service delivery and increased community satisfaction. This highlights the vital role of talent management in achieving organizational success and community well-being in South African municipal contexts.

4.1.2 | Training partnerships

Training partnerships are crucial for enhancing the capacity of municipal employees. Unless the initiatives such as training and development that seek to empower employees to deliver water and sanitation services are implemented, the reliance on external contractors will increase. The reliance on external contractor does not pave way for the development of internal capacity. This is why Participant NLM1 touches on the implications of outsourcing, which affects the internal capacity for water and sanitation management:

Challenges are also because of outsourcing activities, which is your core mandate like water and sanitation to contractors and not work capacity in house
(Participant NLM1)

This reflects the need for training and development partnerships that can build internal capacity and reduce reliance on external contractors. Partnerships do more than just enhance skills; they also bring in new ideas and practices, thus significantly improving service quality. This underlines the importance of training collaborations in municipalities for strengthening human resource capacities. Such engagements ensure that the municipal workforce is not only skilled but also equipped to address both present and future service delivery challenges, thereby greatly benefiting the communities they serve.

4.1.3 | Workforce motivation

Workforce motivation is integral to maintaining and enhancing the capacity of municipal governance. Participant LTLM1 notes the impact of vacancies in senior management on strategic planning and communication:

The frequency of having those meetings and those interactions became less and less ... for quite some time, both for the district and the local there was a high degree of vacancy in the senior management positions (Participant LTLM1)

The lack of consistent leadership due to vacancies can demotivate the workforce and hinder effective communication and strategic planning, thereby impacting overall capacity. Strategies such as recognition, career development opportunities, and supportive leadership play a pivotal role in enhancing employee motivation, which in turn positively impacts the quality and efficiency of services. Therefore, motivation in municipalities extends beyond traditional human resources concerns to become a strategic necessity. By cultivating a motivated and engaged workforce, municipalities can significantly improve their service delivery, thereby effectively meeting community needs and contributing to broader socio-economic advancement.

4.2 | Communication

Clear and consistent internal communication strategies are essential for effective coordination among various municipal departments, and this can be linked to more efficient service delivery. Therefore, this emphasizes the importance of effective communication in municipalities, hence highlighting that it is not just a means of information dissemination, but a strategic asset. By prioritizing robust internal and external communication channels, municipalities can substantially improve their service delivery, thereby effectively addressing the needs of their communities.

4.2.1 | Collaboration

Collaboration is a crucial aspect of effective communication within municipalities. Participant LTLM1 comments on the challenges of communication across different spheres of the organization:

We end up having poor channel of communications between the three spheres of organisations ... People only want to see water coming out of their taps, they do not care if the water is from the district municipality or Magalies water board.
(Participant LTLM1)

This statement underscores the need for streamlined communication among various entities to ensure effective service delivery. Another participant highlights the importance of collaboration in planning processes:

For instance, when a service provider is appointed, they usually start by coming to our municipality to get introduced ... So, most of the work is done in collaboration with us. (Participant LTLM2)

This reflects the collaborative effort necessary for successful project implementation and highlights the municipality's central role in coordination. Collaboration not only involves community participation and engagement but also results in services that are more closely aligned with the needs and expectations of the community. This highlights the critical role of collaborative efforts within municipalities. It suggests that collaboration goes beyond simply combining resources; it is about fostering a culture of cooperation and shared responsibility. By engaging in effective collaborations, municipalities can significantly improve their service delivery, thereby more accurately addressing community needs and supporting sustainable development.

4.2.2 | Role clarification

Role clarification is essential in municipal communication, as it helps define responsibilities and expectations. Participant MLM1 notes the importance of keeping plans up-to-date and the role of collaboration in this process:

I don't have specific information on its workings, but I can certainly provide details about how the roads master plan is managed and updated ... we'll ensure it is kept up to date in collaboration with the district. (Participant MLM1)

This emphasizes the significance of clearly defined roles and responsibilities in maintaining effective communication for project management. Participant KMLM1 speaks to improved communication through the introduction of structured processes:

There was the proposal of an SLA, but at least the communication has been improved ... the municipality becomes part of the project, steering committees over the projects that are being introduced to the local municipality. (Participant KMLM1)

The establishment of formal agreements such as Service Level Agreements (SLAs) is cited as a mechanism for improving communication and clarifying roles within the municipality. Clear role definitions within municipalities aid in better decision-making and resource allocation and ultimately contribute to improved service delivery. Therefore, by establishing and communicating clear roles and responsibilities, municipalities can create a more focused and accountable workforce, thus significantly boosting their ability to provide effective services to their communities.

4.3 | Funding

Enhanced investment in infrastructure, enabled through better funding methods, is vital for the improvement of service delivery, especially in municipalities that lack resources. This emphasizes the fact that funding transcends being merely a financial issue; it is a crucial tool for governance. Appropriate and efficiently managed funding is key to enabling local governments to fulfill their service delivery obligations effectively.

4.3.1 | Investments in Infrastructure

The complexities of investments in water infrastructure are evident in the experiences of local municipalities. The challenges of sustaining operational activities through external funding are encapsulated in the following statement:

Previously, Naledi Local Municipality used to receive funding of about R4 million from DRSM per quarter to support their operational activities as the Water Services Provider (WSP). However, this funding was cancelled, and now there are discussions to reinstate it. (Participant NLM2)

This highlights the reliance on external funding for critical services and the vulnerability municipalities face when such funding is uncertain or discontinued. Strategic and sustainable investments in water infrastructure are crucial in addressing service delivery backlogs, especially in communities that are currently underserved. These highlight the critical importance of water infrastructure investments for municipalities. These investments are more than just

financial outlays; they are fundamental for ensuring effective, efficient, and sustainable service delivery. Such strategic investments significantly contribute to improving the quality of life for residents, hence highlighting their role as a key element in municipal development and community well-being.

4.3.2 | Infrastructure grants

Government grants play a crucial role in the development and execution of infrastructure projects. The process of acquiring and utilizing these funds is highlighted by a participant's description of the collaboration between local and district municipalities:

The district will take [local municipalities'] demands and then concretise them into projects and apply for funding. And once they receive funding from MIG, CoGTA and Department of Water and Sanitation, they then appoint contractors and consultants to implement projects within our area of jurisdiction (Participant LTL1)

This statement illustrates the pivotal role of government grants in transforming local needs into actionable projects, hence emphasizing the intergovernmental cooperation necessary for successful implementation. Proficient handling of government grants results in more efficient and focused service delivery, which in turn enhances overall municipal performance. This finding emphasizes that government grants represent more than mere financial assistance; they are pivotal in enabling municipalities elevate their service delivery. By judiciously using these grants, municipalities are better positioned to tackle diverse local challenges, ultimately leading to an improved quality of life for their residents.

4.3.3 | Revenue collection

Revenue collection is a critical component of municipal funding, thus impacting the ability to deliver services effectively. Participant GTLM1 discusses efforts to improve this aspect:

The revenue is being collected in Reivillo and Taung for services at an estimate of 80% collection. New prepaid are being installed to enable us to improve our revenue collection. (Participant GTLM1)

This quotation underscores the ongoing efforts to enhance revenue collection mechanisms, which is essential for financial sustainability and the ability to fund key municipal functions. The adoption of improved revenue collection methods is linked to greater financial stability for municipalities and this stability, in turn, empowers them to more effectively thus meeting the service needs of their communities. These insights highlight that efficient revenue collection by municipalities is more than just a fiscal responsibility; it is a crucial component in ensuring the provision of adequate and sustainable services. By focusing on efficient revenue collection strategies, municipalities can secure the necessary funds to enhance their service delivery, thereby playing a pivotal role in the development and well-being of their communities.

4.4 | Governance

The implementation of transparent and accountable governance practices significantly improves service delivery, and this is attributed to the fostering of trust and the effective utilization of resources. These findings emphasize that governance within municipalities extends beyond being a mere regulatory necessity; it plays a central role in driving service delivery. By adopting and upholding good governance practices, municipalities can substantially enhance their service delivery functions, thus more effectively catering for the varied needs of their communities.

4.4.1 | Accountability

Accountability in local governance is crucial for ensuring that municipal operations are conducted ethically and effectively. Participant NLM2, who has extensive experience in local governance, emphasizes the importance of accountability in their role:

My title is the municipal manager at the Naledi local municipality, so I'm the accounting officer for Naledi local municipality ... I've been in local government since the 5th of December 2000 ... I've been an administrator, I've been an expert from the province, but I've spent all of my time apart from the 18 months ... In total, I am 22 years in the local government. (Participant NLM2)

This statement reflects the participant's long-standing commitment to public service and underscores the responsibility associated with their role as a municipal manager, thus highlighting the importance of accountability in such positions. Strengthening accountability within municipalities correlates with more responsible and effective resource utilization, which in turn, enhances service delivery. Far from being just a regulatory obligation, accountability is a fundamental component of good governance. By prioritizing and embedding accountability across operations, municipalities can significantly elevate their service delivery effectiveness, thereby more adeptly addressing the diverse needs of their communities.

4.4.2 | Roles and responsibility

The delineation of roles and responsibilities is fundamental to the smooth operation of municipal governance. Participant NLM2 gives insight into the division of responsibilities, particularly in the context of water services:

Moreover, the role of a Water Services Provider can be further subdivided, with responsibilities shared between a local municipality and a water board. In our case, Magalies Water Board is involved ... Naledi local municipality then handles the distribution to individual households, conducts monthly billing for water services, and ensures the collection of payments, guaranteeing that everyone pays for the purified water they receive from their taps. This is how the functions are allocated. (Participant NLM2)

This quote highlights the collaborative aspect of governance, where different entities share responsibilities to ensure effective delivery of services. It illustrates the need for clear role demarcation and coordination among various stakeholders in local governance. Clearly defined roles within a municipality contribute significantly to improved decision-making and resource allocation, leading to enhanced service delivery. This finding emphasizes that clarity of roles and responsibilities within municipalities transcends mere organizational structure; it is a key factor in boosting service delivery. By ensuring that every segment of the municipal framework is efficiently organized and operational, municipalities are better positioned to address the needs of their communities, fostering sustainable development in the process.

4.5 | Operations and maintenance

Streamlined operations, when combined with consistent and effective maintenance, greatly improve municipalities' capacity to fulfill their service delivery obligations. This assertion highlights the critical importance of robust operations and maintenance (O&M) within the framework of local government. Far from being merely a logistical requirement, effective O&M is a strategic necessity. It ensures that municipalities can sustain and adapt to the increasing demands of their communities, thereby playing a crucial role in enhancing the quality of life and contributing to socio-economic advancement.

4.5.1 | Resource optimization

Resource optimization is a key factor in municipal operations, aiming to maximize efficiency and minimize waste. Participant LTLM1's mention of the district's role in infrastructure projects indicates a strategic approach to resource allocation:

The district is responsible for undertaking infrastructure projects and the operation and maintenance of the bulk infrastructure within the local municipality. (Participant LTLM1)

This highlights the importance of coordinating resources at various levels of government to ensure optimal service delivery. By optimizing staff deployment and capabilities, municipalities can significantly improve the quality and efficiency of their services, which in turn positively impacts overall municipal performance. This underscores the fact that resource optimization extends beyond simple asset management; it is a strategic imperative. Through effective optimization of resources, municipalities can markedly enhance their capacity to deliver services. This not only meets the needs of their communities more efficiently but also contributes to the broader goal of sustainable urban development.

4.5.2 | Sustainable service delivery

Sustainability in service delivery is a recurring theme, emphasizing the need for long-term, reliable services. Participant LTLM2's statement about the appointment of a water service provider underscores this commitment:

Magalies water board is appointed by the district to do operations and maintenance in the entire district. (Participant LTLM2)

This reflects an approach to sustainability that involves delegating responsibilities to specialized entities to ensure consistent and high-quality service delivery. Municipalities integrating sustainability principles into their service delivery strategies not only achieve improved efficiency and effectiveness but also attain higher levels of community satisfaction. This emphasizes that sustainable service delivery by municipalities goes beyond being a mere operational option; it represents a strategic imperative. By embracing sustainable practices, municipalities are positioned to deliver services that are not just efficient and effective in the immediate term but also resilient and adaptable for future challenges. This approach is key to fostering overall community well-being and long-term development.

4.5.3 | Upgrade and expansion

The necessity for upgrades and expansion in municipal infrastructure is a response to growing and changing community needs. Participant NLM1's comments about new housing developments demonstrate the dynamic nature of municipal planning:

New development ... can be integrated into the final master plan ... we are now building 8500 houses (Participant NLM1)

This points to the need for municipal services to be adaptable and scalable, thus responding proactively to demographic changes. By focusing on sustainability in urban planning, municipalities can manage their resources more effectively and address the needs of their diverse populations in a more comprehensive manner. This underscores the importance of sustainable service delivery within the context of local government. By making sustainability a priority, municipalities are not only equipped to tackle current service delivery challenges but also to establish a foundation for future resilience and prosperity. Such an approach ensures that service delivery is not only efficient in the present but also sustainable in the long term, thus benefiting both current and future generations.

4.5.4 | Water infrastructure

Effective management of the water infrastructure system is a cornerstone of municipal operations. Participant LTLM1's reference to a WhatsApp group for coordination reveals an innovative approach to communication and collaboration:

There's a WhatsApp group where we interact with the third party and we interact with the district. (Participant LTLM1)

This example illustrates how technology is being leveraged to enhance coordination and information flow among different stakeholders. Enhancing water infrastructure not only improves service reliability and accessibility but also plays a pivotal role in contributing to community well-being. This elucidates the fact that water infrastructure within

municipalities transcends mere utility management; it is fundamental to sustainable development. By focusing on effective investment and management of water infrastructure, municipalities can significantly elevate their service delivery standards. This, in turn, ensures that they are equipped to meet both the immediate and long-term needs of their communities, hence underlining the critical role of water infrastructure in fostering community development and resilience.

4.5.5 | Water resources management

The management of water resources is a critical concern, given its importance for community health and economic development. Participant LTLM2 highlights the delegated responsibility for this:

It's the responsibility of Magalies water board ... for operations and maintenance in our local municipalities. (Participant LTLM2)

This indicates a focus on specialized management practices to ensure the sustainable use and preservation of water resources. Municipalities employing integrated water resource management (IWRM) approaches realize advancements in water service delivery, notably through enhanced resource allocation and conservation practices. This underscores the fact that effective water resource management within municipalities goes beyond being a technical issue; it is a strategic necessity that has a direct impact on the quality and reliability of water services. By giving priority to and innovating in water resource management, municipalities can substantially upgrade their service delivery, hence ensuring sustainable water access for their communities and contributing to the broader goals of environmental sustainability and resource conservation.

4.6 | Organizational culture

Organizational culture fostering innovation, continuous learning, and ethical behavior significantly contributes to enhanced service delivery outcomes. These insights highlight that organizational culture in local governments is far more than a passive backdrop; it is an active and influential force. It molds the attitudes and behaviors of municipal employees, steering them toward higher standards in public service delivery. Therefore, the development and nurturing of a positive organizational culture are crucial for municipalities committed to not only meeting but surpassing the expectations of their communities. This emphasis on culture underscores its vital role in driving service efficiency, employee motivation, and overall public satisfaction.

4.6.1 | Employee engagement

Employee engagement is another critical aspect of organizational culture. The importance of recognizing and motivating employees is underscored by Participant LTLM2:

There's nothing as good as being acknowledged as an employee. Acknowledged for work done. Acknowledged for good performance. Small, initiatives that motivate would always go a long way. (Participant LTLM2)

This highlights the positive impact of recognition and motivation on employee engagement, thus suggesting that acknowledging employees' contributions can significantly enhance their performance and commitment. Furthermore, Participant MLM1 discusses the approach to employee development and promotion:

Over the past year and the preceding two years, we promoted many of our employees to higher positions based on their achievements and the certificates they obtained from the relevant SETAs. (Participant MLM1)

This approach to employee development and promotion reflects an organizational commitment to recognizing and rewarding performance and skills development, which can foster a culture of engagement and continuous improvement. Engaged employees tend to be more committed to their work and proactive in addressing issues, which significantly contributes to improved service outcomes. These findings emphasize the critical role of employee engagement in the context of local government. Employee engagement is vital for creating a workforce that is motivated, competent, and dedicated, a key ingredient for delivering high-quality services to the community. Consequently, cultivating an environment that fosters engagement within municipalities is essential for elevating service delivery standards and enhancing overall community welfare. This approach to human resource management highlights the value of investing in employees' well-being and job satisfaction as a means of achieving broader organizational goals.

4.6.2 | Operational efficiency

Operational efficiency in municipal governance is closely tied to the organizational culture. Participant GTLM1 reflects on the challenges of operational efficiency, attributing them partly to institutional culture:

The skill is there and I can give that a nine (9). It's just that the challenge with our people it's the attitude and what is called institutional culture. The people that assist and are supposed to be doing all these things sometimes, they just drag their feet. Nothing is agent to them. (Participant GTLM1)

This statement highlights the impact of employee attitudes and organizational culture on the effectiveness and efficiency of operations, suggesting that skill levels are high but are undermined by cultural factors. Efficient resource use not only bolsters service delivery but also plays a key role in ensuring fiscal sustainability, which is essential for the long-term provision of services. This emphasizes the fact that operational efficiency within municipalities extends beyond being a mere managerial objective; it is a strategic imperative. Efficient operations enable municipalities to effectively meet service delivery demands, improve public satisfaction, and sustain financial health. These aspects are critical for fostering the growth and development of

local communities. Thus, prioritizing operational efficiency is essential for municipalities to maintain a balance between immediate service needs and long-term fiscal and developmental goals.

4.7 | Planning

Comprehensive planning, which includes economic, social, and environmental considerations, is key to achieving more effective and sustainable service outcomes. This argument emphasizes the fact that planning in the context of local government is much more than a routine bureaucratic task. It is an indispensable tool for crafting and achieving a future that adequately addresses the multifaceted needs of communities. Strategic, inclusive, and integrated planning is therefore fundamental for effective service delivery. It serves as a critical pillar in guiding municipal development and enhancing the well-being of communities. This approach to planning highlights the need for a holistic view in policy development and implementation, ensuring that diverse community needs, and sustainability goals are effectively met.

4.7.1 | Collaboration

Collaboration is foundational in municipal planning, ensuring inclusivity and comprehensiveness. Participant KMLM1 delves into the process of integrating community needs into the Integrated Development Plan (IDP):

During the process of compiling the IDP there is what do you call community-based planning where it will get the needs of the communities and we do analysis. (Participant KMLM1)

Additionally, Participant MLM1 emphasizes collaboration with the district in maintaining infrastructure plans:

As for the water master plan, I don't have specific information on its workings, but I can certainly provide details about how the roads master plan is managed and updated ... we'll ensure it is kept up to date in collaboration with the district. (Participant MLM1)

These statements underscore the necessity of cross-functional and community collaboration in municipal planning processes. Collaborative efforts among different departments lead to a more cohesive and integrated approach to service delivery. This integration significantly enhances both the efficiency and effectiveness of services. These highlight the crucial role of collaboration in the context of municipalities. Collaboration is not merely advantageous; it is imperative. It enables a comprehensive approach to tackling service delivery challenges, drawing on the strengths and resources of various stakeholders. As such, cultivating a culture of collaboration within municipalities is critical for improving service delivery. This approach

ensures that services are not only delivered more effectively but also align with the broader goals of sustainable development and community well-being.

4.7.2 | Implementation readiness

The readiness for implementation is a critical factor in the success of municipal planning. Participant GTLM1 speaks to the importance of keeping plans relevant and updated:

In the future, as the water master plan takes shape, we'll ensure it is kept up to date in collaboration with the district. (Participant GTLM1)

This forward-looking approach highlights the necessity of adaptive and responsive planning, thus ensuring that municipalities are always prepared for implementation challenges. Municipalities with a high degree of implementation readiness marked by robust leadership, sufficient resources, and effective communication are more successful in delivering services efficiently and effectively. This emphasizes the fact that implementation readiness within municipalities is a comprehensive concept. It extends beyond the mere presence of plans and encompasses the capacity to execute these plans proficiently. By prioritizing the enhancement of implementation readiness, municipalities can notably improve their service delivery. This improvement is crucial not just for the immediate success of specific projects but also for the broader development and well-being of communities. Therefore, a focus on cultivating strong leadership, ensuring resource availability, and fostering open communication is essential for municipalities aiming to effectively respond to the needs and expectations of their residents.

4.7.3 | Infrastructure development

Infrastructure development is a central aspect of municipal planning. Participant DRSMDM1 describes the initiation of a master plan for vital services:

We recently just appointed a service provider to do master planning ... for both water and sanitation. (Participant DRSMDM1)

This demonstrates a proactive and structured approach to infrastructure development, essential for sustainable municipal service delivery. Substantial investments in essential infrastructure, such as transportation networks, water supply, and sanitation systems, are directly linked to improved service delivery, economic growth, and social equity. This study highlights that infrastructure development within municipalities transcends mere physical construction; it is a strategic endeavor encompassing thorough planning, sustainable investment, and a vision for long-term impact. Effective and strategic infrastructure development is essential for municipalities to address the changing needs of their communities adequately. Such development is not only instrumental in improving current service delivery but also in driving broader socioeconomic development. By prioritizing infrastructure, municipalities lay the groundwork for a more prosperous and equitable future, ensuring that they can meet both the immediate and future needs of their residents.

4.7.4 | Legislative framework

Adherence to legislative frameworks is a guiding principle in municipal planning. Participant NLM1 addresses the alignment of local needs with statutory requirements:

The municipality IDP and so forth ... should be informed by our needs. (Participant NLM1)

This statement reflects the importance of ensuring that municipal plans are not only responsive to community needs but also comply with legislative frameworks. A robust and well-structured legislative framework is key to enhancing administrative efficiency, which in turn positively affects service delivery. This emphasizes the critical importance of the legislative framework in South African municipalities. It extends beyond being a mere collection of rules and regulations; it serves as a fundamental structure that guides the operational and service delivery mechanisms of municipalities. An effective legislative framework not only ensures statutory compliance but also strategically empowers municipalities to address the changing and diverse needs of their communities. By aligning administrative processes with a strong legislative backbone, municipalities can enhance their efficiency and effectiveness, thereby playing a significant role in promoting community development and enhancing the well-being of their residents. This approach highlights the need for continuous evaluation and adaptation of legislative frameworks to meet contemporary challenges and opportunities in municipal governance.

4.7.5 | Strategic service delivery

Strategic service delivery is crucial to ensuring that municipal planning aligns with local needs and priorities. Participant LTLM1 details how local needs inform district planning:

We do communicate our needs and priorities to the district ... our IDP and so forth. Those meetings in terms of strategic planning and identifying and reporting the needs to the district those meetings used to be regular. (Participant LTLM1)

This insight highlights the interconnectedness of strategic planning at various levels of municipal governance and the importance of regular communication and meetings to align services with community needs. The application of strategic management practices, such as defining clear goals, engaging stakeholders effectively, and monitoring performance, leads to significant improvements in the quality and efficiency of municipal services. This involves the development of a clear vision, the alignment of resources and actions with that vision, and the ability to adapt to evolving circumstances. Such a strategic approach is vital for municipalities to effectively cater for the diverse needs of their communities and promote overall socio-economic growth. This emphasizes the importance of not just operational excellence but also strategic foresight and adaptability in municipal governance, ensuring that services are not only delivered efficiently but also remain responsive to the changing needs and aspirations of the community.

5 | CONCLUSION

This study effectively meets its objective of exploring bulk water service delivery challenges within the DRSM district municipality and giving recommendations for optimization. It emphasizes the crucial role of collaboration, organizational learning, and change management in enhancing service delivery. The key findings include the need for improved operational efficiency, culture change, strategic planning with a focus on developing and updating master plans, and robust project management practices. It also highlights the importance of stakeholder involvement, efficient information management, ongoing infrastructure evaluation, and diversification of water sources. These insights align with the objective of learning from past performances to improve future strategies, offering valuable guidance for sustainable service delivery improvements in local municipalities within the district. The study successfully achieves its objective of exploring the challenges in bulk water service delivery in the DRSM district municipality and proposes strategic recommendations for improvement. It underscores the importance of collaboration, organizational learning, and change management as pivotal factors in enhancing service delivery. Key findings highlight the necessity for enhanced operational efficiency and a shift in organizational culture. Emphasis is placed on strategic planning, particularly in developing and routinely updating master plans, and on the implementation of robust project management practices.

This study makes several significant contributions to the field of municipal bulk water service delivery, particularly in the context of the DRSM district municipality. The insights and findings of this research have both practical and theoretical implications, thus offering a comprehensive understanding of the complexities involved in optimizing bulk water service delivery. The study gives detailed insights into the operational aspects of water service delivery. It highlights the importance of enhancing operational efficiency and implementing robust project management practices. These insights are crucial for municipalities aiming to improve their service delivery standards and operational readiness. Also, a significant contribution is the comprehensive analysis of the legislative and policy framework governing district municipalities in South Africa. The study critically examines how these frameworks impact bulk water service delivery, providing valuable insights for policymakers and municipal authorities to ensure compliance and effective governance.

The research underscores the importance of stakeholder involvement and organizational learning in the process of service delivery optimization. It brings to light the need for collaborative efforts, both within the municipality and with external stakeholders, to ensure a holistic approach to service improvement. Additionally, this study contributes to the understanding of the complexities involved in infrastructure development and financing. It assesses the role of grants like the MIG in funding infrastructure projects and highlights the need for financial planning and resource alignment in infrastructure development. Also, the study contributes to a better understanding of demographic needs and their implications for infrastructure planning. This aspect is crucial for municipalities looking to tailor their services effectively to their communities.

The study contributes to the discourse on building resilient and sustainable municipal services. It addresses both the current and future needs of the DRSM district municipality, providing a model for sustainable service delivery improvements. Overall, this research fills a critical gap in the literature on municipal water service delivery and offers practical recommendations that can be applied in similar contexts, thereby making a significant contribution to the field. For example, in Sub-Saharan Africa there is still an acute water service delivery problem as

claimed by Armah et al. (2018). Weaver et al. (2017) reveal that a lot of local municipalities are still facing significant challenges in delivering water services in townships. One of the challenges is the lack of proper governance mechanisms as revealed by Chng (2012). Nevertheless, Victor et al. (2022) found that the water service delivery challenges are contributed to by problems in distribution network engineering, housing and network expansion planning, and public policy failures.

Dithebe et al. (2019) found that infrastructure failures are a major bulk water service delivery problem in South Africa. Their study is supported by Offiong et al. (2022), who found that failure of water systems characterizes the major water service delivery challenges. Infrastructure quality has also been a major problem in the delivery of bulk water services in South Africa as found in the study by Mutamba (2019). Apart from the poor management of water infrastructure, South Africa is also faced with lack of sufficient investments as revealed in Ruiters and Matji (2015). This claim is also supported by Ruiters and Amadi-Echendu (2022), who revealed that major challenges are the lack of sufficient funding and financing. Other challenges include the microbial contamination in most parts of Africa and Southeast Asia as found by Bain et al. (2014), political interference and institutional inefficiencies (Mngomezulu, 2020) as well the impacts of climate change as reported by Maphela and Cloete (2019).

Several solutions to bulk water service delivery challenges have been suggested by several studies. A study by Weaver et al. (2017) revealed that water service delivery challenges can be addressed if effective governance mechanisms are put in place. Their study is supported by Wuijts et al. (2020) who argue that water service delivery challenges can be addressed through effective governance mechanisms that advocate for enhanced stakeholder engagement and decision-making process. Similar suggestions have also been advocated in the study by Ruiters and Matji (2015) who found that effective governance and funding mechanisms play a vital role in addressing most of the bulk water service delivery challenges.

Foster (2013) suggests that Sub-Saharan Africa needs to address sustainability issues in water supply. In addressing sustainability issues, collaborations, the use of technology, as well investment in infrastructures and governance, are key. This is why the study by Marrengane and Croese (2020) claims that water service delivery challenges require workable solutions that encompass collaboration and co-production of public services. Additionally, the study by Offiong et al. (2022) concludes that significant investments in many African countries have been employed in addressing systems failures. Furthermore, Offiong et al. (2022) conclude that to a great extent, most of the water service delivery problems in Africa can be solved by engaging technological solutions.

This study concludes that the delivery of bulk water services in DRSM and other South African municipalities face various challenges that impact its effectiveness and sustainability particularly in issues related to infrastructure deficiencies, access to enhanced water and sanitation facilities, water quality concerns, governance matters, funding and financing limitations, and the influence of external factors like climate change. We argue that policy development initiatives should focus on promoting solutions that embrace interdisciplinary approaches, improved governance frameworks, investment in infrastructure, adoption of appropriate technological solutions, and adaptation to changing circumstances to secure the provision of dependable and sustainable delivery of bulk water services.

The DRSM and other South African municipalities need to adopt transparent decision-making processes and stakeholder engagement in improving water service delivery. The policy dialogs that seek to effectively and efficiently engage the private sector in fostering equitable and sustainable delivery of water services should be initiated. We argue that new approaches in

governance and fund management should be devised and executed in order to allow the involvement of key stakeholders including both public and private sectors in raising and managing funds for water infrastructures. This will help in addressing core problems such as the aging of infrastructure, insufficient maintenance, and inadequate investment in water infrastructure assets. Nevertheless, our study holds the view that, in enhancing the understanding and implementation of water governance frameworks, DRSM and other South African municipalities need to invest in research and collaboration.

The relevant technologies in understanding geomorphological processes should be adopted in order to effectively manage water resources. Relevant technologies should also be adopted in influencing climate adaptation. Adapting water infrastructure and management strategies to the changing climate is crucial for ensuring resilient and sustainable water service delivery. The relevant technologies should also be adopted in distribution network engineering, housing and network expansion planning in order to address the inequitable access to water and sanitation services.

Adoption of relevant technologies will prevent infrastructure failures and ultimately influence an access to improved water and sanitation, water quality, and sustainability. These technologies will also play a significant role in early identification and forecasting of water supply failures, and ultimately effect sustainable water supply systems. We argue that technological solutions such as deep learning can be used to model these failures.

We also argue that DRSM and other South African municipalities need to adopt advanced technologies in ensuring water quality standards and implementing effective monitoring and treatment measures that are essential for delivering safe and clean water to the population, and ultimately addressing health risks to communities.

The findings of the study on bulk water service delivery challenges within the DRSM district municipality offer several promising avenues for future research. Given the identified limitations in fully exploring opportunities for infrastructure planning, future studies could delve deeper into this aspect of the bulk water infrastructure value chain within the DRSM. Such research would require a comprehensive analysis encompassing a variety of stakeholders involved in bulk water service provision, including entities across all three spheres of government and their relevant departments. Another potential area for future research is the investigation of innovative approaches to water resource management, particularly in relation to the agricultural sector. Given the sector's significant contribution to the DRSM district municipality's gross domestic product and job creation, understanding and optimizing water resource management in this context could have far-reaching implications.

Additionally, exploring the impact of organizational culture on operational efficiency presents an intriguing research opportunity. This includes examining the role of change management in adapting to financial constraints and environmental changes, which are critical aspects of municipal operations. The availability of funding for continued operations and maintenance is one potential area for future research. The key focus area is to look at mechanisms for improved revenue collection between local municipalities and the district municipality, followed by local municipalities' revenue collection from their communities.

The limitations of this study are primarily geographical in nature because the focus on the DRSM district municipality within the North West Province may not accurately reflect the broader challenges of bulk water service delivery across other district municipalities within the North West Province or in South Africa as a whole. The other limitation was that the focus was on the daily challenges experienced by communities due to frequent water interruptions

within the DRSM district municipality. Also, the other limitation was that the study did not focus on the level of the quality of drinkable water within the district municipality.

ACKNOWLEDGMENTS

We appreciate the employees from the DRSM district municipality, Lekwa-Teemane, Mamusa, Kagisano-Molopo, Greater Taung, and Naledi local municipalities for participating in this study. We also appreciate the North-West University for granting our ethical clearance.

CONFLICT OF INTEREST STATEMENT

All authors declare that they have no conflicts of interest.

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How to cite this article: Mouton, N., Motshabi, T., Jeje, K., & Henrico, A. (2024). Bulk water services delivery challenges in the Dr. Ruth Segomotsi Mompati district municipality in South Africa's North West Province. *World Water Policy*, 10(3), 821–858. <https://doi.org/10.1002/wwp2.12207>