

# **Fostering sustainable domestic water debt management in Ngaka Modiri Molema District Municipality**

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degree Master of Commerce in Business Management, North-  
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## **DECLARATION**

I, Kearabilwe Motsosi, declare that this study titled “Fostering sustainable domestic water debt management in Ngaka Modiri Molema District Municipality” is my original work. This study has not been submitted to any other institution of higher education. I further declare that all sources cited are indicated and acknowledged in the references.

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Signed

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Date

## **DEDICATION**

This work is dedicated to God who helped me to complete my study.

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My gratitude goes to my supervisor Professor KFR Kadama for his guidance and contribution to making this study a success.

I thank the staff of Ramotshere Moiloa Local Municipality, Mahikeng Local Municipality, Ditsobotla Local Municipality, and Ngaka Modiri Molema District Municipality for their assistance and cooperation.

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## **Abstract**

Non-payment for water and services consumed is a persistent problem among South Africa's local municipalities. The primary research question addressed is – “what needs to be done to improve the payment of water bills by households and to minimise loss through the wastage of water”? The study was founded on the theory of constraints (TOC) which was propounded by Eliyahu Goldratt in 1979. It followed a mixed-method approach and it adopted descriptive and interpretive research designs. The population of the study comprised two categories namely residents that paid for water supplied (Category 1) and municipal officials in the departments of water and sanitation (Category 2). Convenience and snowball sampling were used to select 400 and three participants from population Categories 1 and 2 respectively. A self-administered questionnaire was used to collect data from the population Category 1 while a semi-structured interview guide was used to collect data from the population Category 2. The Statistical Package for Social Sciences (SPSS) statistical software was used to analyse the quantitative data while the qualitative data was thematically analysed. The results were described in the narrative and displayed in charts, figures, and tables.

Based on the research questions, several inferences were made, and recommendations were suggested. The recommendations suggested for each secondary research question address the primary research question of the study. Therefore, the aim of the study was achieved.

*Keywords: Attitudes, Behaviour, Bills, Conservation, Non-payment, Water, Wastage*

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## CHAPTER 1 INTRODUCTION

### 1.1 Introduction

Section 27 of the Constitution of the Republic of South Africa (1996) bestows upon its citizens the right to basic water and sanitation. These rights are operationalised in the Water Services Act 108 of 1997. This Act's objectives include the establishment of tariff standards for water services (Department of Water and Sanitation, 1997:10). According to the Municipal Structures Act 117 of 1998, district municipalities are responsible for the bulk supply of water to the sub-districts. The basic water supply per household is set at 6 000 litres (L) per month. Any amount of water consumed over and above 6 000L must be paid for based on a rising tariff, which means that the more one consumes, the more one pays (SAHRC, 2018:4).

In the 2030 Agenda for Sustainable Development implemented by the United Nations General Assembly in 2015, Goal 6 of the Sustainable Development Goals (SDG) emphasises the need to ensure the supply and sustainable management of water and sanitation for all (SAHRC, 2018:4). Sustainable water management (SWM) is defined as meeting the current water need for all consumers without disabling future supply (Russo *et al*, 2014:3935).

Municipalities incur costs in the procurement and distribution of bulk water and the upgrading and maintenance of water distribution systems. Hollingworth *et al*. (2011, 6) state that the purchase and distribution of bulk water account for about 37 percent of the operational expenditure of all South African municipalities. The various levels at which municipalities incur costs and where tariffs are imposed are illustrated in the infographic presented in Figure 1.1.

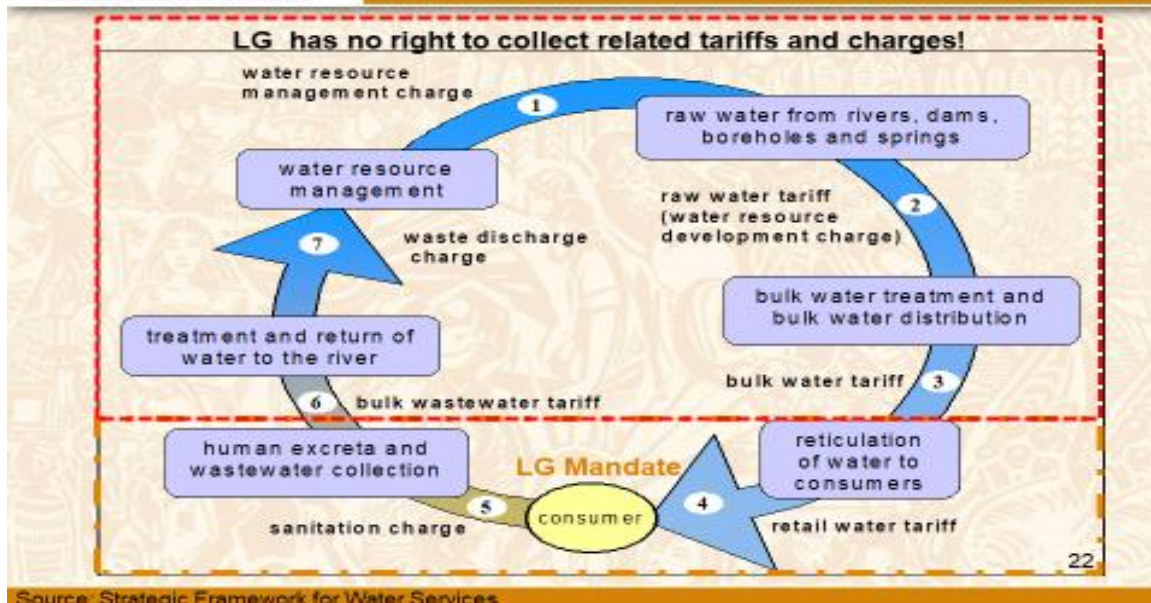


**Figure 0.1: Water cost and pricing chain**

Source: Mthobeli (2009:21) Adapted from the Department of Water Affairs and Forestry (2003:32)

Effective and efficient cost recovery must be implemented in all the linkages illustrated in Figure 1.1 for the value chain to operate efficiently. Municipalities rely on the retail water tariff to recover their costs (Linkage 4 in Figure 1.1). If municipalities fail to recover such costs from consumers, they are bound to encounter problems in paying for the bulk water supplied – resulting in disruptions in the value chain. Consumers who fail to pay their water bills accumulate debt with the municipality. Debt is the amount of money owed by an individual or an organisation to another party, which must be paid back (Chen, 2022:1). In this study, debts arising from unpaid water bills are referred to as water debt. A consumer may accumulate a water debt that exceeds their ability to pay.

In the value chain illustrated in Figure 1.1, municipalities incur losses through non-revenue water (unaccounted-for water) and from leakages in the aging water distribution infrastructure (Owen, 2018:50). Unaccounted-for water is the difference

between the amount of water entering the system and the total amount of water billed, including water that is metered but not paid for (Alegre et al, 2016:80 ).

The researcher observes that households located in reconstruction and development programme (RDP) units and rural settlements depend on water from communal taps, tankers, or other networks of water. According to Raj (2013:157), these networks are often the cause of lost water for municipalities, either through the negligence of the consumers leaving the taps running or maintenance issues. These factors lead to losses through high levels of unaccounted-for water in the municipalities.

Harawa *et al.* (2016:3620) report that one of the major challenges for Lilongwe City in Malawi in 2012 was the high levels of unaccounted-for water reported at 37% which is higher than the recommended 23% for developing countries. South African municipalities have surpassed the 36,8% non-revenue water percentage, exceeding the world average of 23% (McKenzie, 2012:3). From the above details, one can infer that there is a high level of wastage or water loss in South Africa and, as such, there must be considerable scope for improvement.

Improved water supply and efficient consumption are essential to achieve improved water conservation (Pereira et al, 2017:40). Operating costs arise from water extraction, treatment, and delivery. When the cost of water does not reflect the true value of the commodity and when service areas are not fully metered, maintained, or monitored, it becomes very difficult to encourage consumer participation in conservation programs. (Zetland, 2021:70).

On 20 October 2015, the South African Treasury sent a letter to (27) municipalities that have failed to pay their water authorities. It directed them to respond in writing as to why the Treasury should not invoke Section 216(2) of the Constitution because of their continued violations. The municipalities have responded positively and decided to commit to implementing long-term solutions to address the root causes of operational failures while meeting their financial obligations (National Treasury 2015). Such arrangements comprise the water debt management process.

The joint parliamentary committees on water and sanitation concluded that there was a need to address the alarming piling up of municipal debt to water authorities. The following measures were recommended by PMG (2019:2).

- Launch a campaign to promote a culture of payment for municipal services.
- Strictly manage defaults by taking decisive government action before court proceedings take effect.
- Local government commitment to ensure service and financial sustainability
- Debt restructuring.
- Using prepaid water and electricity meters
- Contracting out municipal revenue collectors.

This study focuses on the rising debt that the municipalities have accumulated over the years and endeavours to generate solutions to improve the unsustainable financial situation of municipalities regarding the water boards.

## 1.2 Background to the study

Ngaka Modiri Molema District Municipality (NMMDM) is one of the four districts in the North West province of South Africa. It is bordered by the Republic of Botswana to the north and several other district municipalities of the North West province as illustrated in Figure 1.2.



## Figure 0.2: Map of Ngaka Modiri Molema District

Source: Municipalities of South Africa (2020)

The NMMDM has five local municipalities, namely Ditsobotla, Mahikeng, Ramotshere-Moiloa, Ratlou, and Tswaing (Mahole *et al*, 2014:549). It covers a total surface area of 28,206 km<sup>2</sup> (Asong *et al*, 2019:13). The principal towns in the district include Mahikeng, Mmabatho, Zeerust, Groot Marico, and Lichtenburg. The district has an estimated population of 889,108 (StatsSA, 2018).

Sedibeng Water provides bulk water to the district municipality, while the local municipalities are responsible for the distribution and billing of water services to the residents. However, local municipalities have not optimally performed in the collection of payments for water consumed by households. This has resulted in the year-on-year escalation of the domestic water debt owed to Sedibeng Water. According to records obtained by the researcher, in July 2021, Municipality B owed R172 053 945.96 to Sedibeng Water; while Municipality A owed R 241 338 743.48 to Sedibeng Water (Municipality B, 2021 and Municipality A, 2021 Appendices 4-9). Overall, in addition to the debt that was inherited from Botshelo Water, NMMDM owes over R500 million to Sedibeng Water (DA North West, 2021).

In both Municipality A and Municipality B, the average domestic water-bills collection rates for the period 2019/2020 are low as shown in Tables 1.1 and 1.2.

**Table 0.1: Domestic water collection rates for Municipality B (2019/2020)**

| Month     | Water-bills collection rates for the year (%) |      |
|-----------|-----------------------------------------------|------|
|           | 2019                                          | 2020 |
| July      | 39                                            | 30   |
| August    | 42                                            | 35   |
| September | 171                                           | 233  |
| October   | 54                                            | 56   |
| November  | 46                                            | 63   |
| December  | 34                                            | 28   |
| January   | 36                                            | 38   |
| February  | 68                                            | 48   |
| March     | 60                                            | 54   |

|                      |             |              |
|----------------------|-------------|--------------|
| April                | 39          | 3            |
| May                  | 41          | 91           |
| June                 | 32          | 38           |
| <b>TOTAL AVERAGE</b> | <b>55.2</b> | <b>59.75</b> |

Source: Compiled from Municipality B monthly analyses for the period 2019, 2020, and 2021 (Appendices 4-6)

**Table 0.2: Domestic water collection rates for Municipality A (2019/2020)**

| Month          | Water-bills collection rates for the year (%) |              |
|----------------|-----------------------------------------------|--------------|
|                | 2019                                          | 2020         |
| July           | 74                                            | 74           |
| August         | 35                                            | 35           |
| September      | 22                                            | 22           |
| October        | 22                                            | 22           |
| November       | 74                                            | 74           |
| December       | 74                                            | 74           |
| January        | 35                                            | 35           |
| February       | 22                                            | 22           |
| March          | 22                                            | 22           |
| April          | 35                                            | 35           |
| May            | 22                                            | 22           |
| June           | 22                                            | 22           |
| <b>AVERAGE</b> | <b>38.25</b>                                  | <b>41.16</b> |

Source: Compiled from Municipality A monthly analyses for the period 2019, 2020, and 2021 (Appendices 7-9)

In both local municipalities, the average water-bill collection rates were below 60% in the two years under review. This implies that municipalities struggle to collect payments from residents. In a general notice of 25 May 2021 (Appendix 3), Sedibeng Water informed its employees that it had decided to suspend operations and maintenance services to NMMD due to its ever-growing debt.

### **1.3 Research problem**

From the background of the study, it emerges that NMMDM is heavily indebted to Sedibeng Water and has failed to service its spiralling debt with Sedibeng Water. This is a financial management disaster resulting in a cash flow crisis. The debt arises from low water payment collection rates and probably the high levels of loss through unaccounted-for water. NMMDM is in a situation where it cannot pay its suppliers, and if there is no effective intervention, the situation could escalate beyond manageable levels. This eventuality is not sustainable. As such, this study is justified in seeking ways to improve the water payment collection rates by the municipalities and to minimise wastage and loss through unaccounted-for water.

### **1.4 Research questions**

To address the water debt owed by NMMDM to Sedibeng Water, the primary research question is: What needs to be done to improve the payment of water bills by households and to minimise loss through the wastage of water?

The following are secondary research questions:

1. What are the factors that deter residents from paying their water bills?
2. What measures need to be implemented to improve the water payment rates by residents?
3. How effective are the measures applied to recover the outstanding water debt from residents?
4. What needs to be done to minimise the wastage of water?
5. How effective is the communication between local municipalities and residents?

### **1.5 Research objectives**

The primary objective of the study is to identify the factors that deter residents from paying their water bills.

The secondary objectives for the study are designed to :

- Assess the attitude and behaviour of residents towards payment for water.
- Evaluate the measures applied by the municipalities to enforce payments.

- Assess the measures undertaken to conserve water by both the residents and the municipalities.
- Evaluate the communication process between the municipality and the residents regarding water bills and usage.

## **1.6 Ethical considerations**

The researcher adhered to the North-West University code of conduct for researchers. The following ethical considerations were upheld:

- The researcher presented an introductory letter from the university to the relevant authorities seeking permission to conduct research
- Participation was voluntary, and respondents reserved the right to withdraw from the study as and when they wish
- A declaration of informed consent that details the ethical protocols was signed by respondents before the completion of the questionnaires
- The respondents were not exposed to any harm or legal liabilities
- The study took the principle of anonymity into cognisance
- The demographic information requested is required for the statistical profiling of respondents
- Data collected is solely utilised for the study and not for anything else that infringes on the respondents' rights to confidentiality
- Ethical clearance was obtained from the NWU (EMS-REC)

## **1.7 Outline of the study**

Chapter one: Introduction

This chapter provides a general overview of the research, including an introduction, background of the study, research question, and research objectives.

Chapter two: Theoretical foundations and literature review

The study reviews the theory of constraints and the factors that deter residents from paying for water, the attitude, and behaviour of the residents regarding the usage of water, and communication protocols between the municipality and residents.

### Chapter three: Research methods

This chapter addresses the research design and method, population, sampling methods, data collection techniques, data analysis, reliability, and validity.

### Chapter four: Presentation of findings

This chapter presents the findings obtained from the questionnaire administered to the residents.

### Chapter five: Discussion, recommendations, and conclusion

This chapter presents the recommendations and concluding remarks from the results obtained and presented in the preceding chapter.

## **1.8 Summary**

This chapter served as an introduction to the study. It commenced with an introduction outlining the background of the study. Thereafter the problem statement and the research questions were offered. Furthermore, this initial chapter formulated the research objectives and then concluded by highlighting the ethical considerations followed in the study.

## **CHAPTER 2 THEORETICAL FOUNDATIONS AND LITERATURE REVIEW**

### **2. Introduction**

This chapter introduces the theoretical foundations and the literature review of the study. In the theoretical foundation, the theory of constraints is explored to evaluate the elements that apply within the three local municipalities. Subsequently, the five steps of the theory of constraints are explored to identify the linkages with the municipal system.

The literature review discusses sustainable water debt management in municipalities, public debt management, and specific factors that deter residents from paying for water consumed. It delves into the attitudes of the community towards payment for water, and the behaviour of the community regarding payment for water and the conservation of water. Further, communication as an important factor in management is reviewed in terms of its utility in corporate governance such as the municipalities.

### **2.1 Theoretical foundation**

This section reflects on the theory of constraints (TOC), the management theory upon which this study is founded. The TOC is a management theory that falls under the systems and contingency management viewpoints (Byrnes, 2014:430).

### **2.2 Theory of constraints**

The TOC was propounded by Eliyahu Goldratt in 1979 and it has, over the years, evolved to strengthen its scope during implementation in matters of governance (Dias *et al*, 2019:78). The TOC comprises a set of decision-making and critical-thinking standards that evolved from the optimised production timetables (Goldratt, 1986). Goldratt and Cox (1984) illustrated Goldratt's decision-making and critical-thinking concepts in the novel "The Goal". After recognising the shortcomings of TOC in adjusting it to routine production conditions, it was decided that improvements were needed (Goldratt & Fox, 1986). "The Race" shifted TOC's focus away from the manufacturing floor and into all aspects of a corporate or non-corporate business. This led TOC to be viewed as a holistic theory that informs and shapes organisational

leadership (Goldratt, 1988:444). TOC has become an important factor in the field of management best practices (Vishnu & Kumar, 2014:2).

The TOC is based on the premise that systems have at least one constraint, otherwise, they would produce unlimited amounts of whatever they strive to attain (Goldratt, 2006:1). A constraint, often called a bottleneck, is any factor that prevents a system from achieving its intended goals (Goldratt, 1990:5).

According to Amin *et al* (2018:303), the TOC is a scientific approach to improvement that recognises that complex systems comprise multiple interlinked activities, one of which acts as a constraint on the entire system. This constraining activity is the "weakest link in the chain." According to Librelato *et al.*, (2014:2), a constraint refers to any aspect that can limit, inhibit, or hinder an organisation's output. In other words, constraints limit the potential of entities to make to profit. Therefore, an entity's output can be increased by minimising the constraints (Goldratt, 1990:6). Constraints vary in nature and magnitude. Goldratt (2006:1) cites the following as examples of the diverse constraints:

- Resources
- Capacity
- Suppliers
- The market
- Finance
- Knowledge or competence
- Policy

Goldratt (1990:8) describes a systematic approach to success based on linear programming and systems thinking. One of the qualities of the TOC is that it organically prioritises the improvement and refinement of tasks (Tull, 2020:45). The TOC offers a valuable set of tools for achieving that goal. This implies that systems are never entirely efficient due to inherent inexhaustible constraints. Nevertheless, constraints may be alleviated but never eliminated.

Goldratt (1990:4) asserts that businesses comprise different areas of expertise that are joined together, like a chain. In addition, Goldratt (1990:4) says that when it comes to fixing problems, someone inside the organisation might not always recognise the

interrelations, and someone outside might not always see the needs of each organisation. The theory of constraints, therefore, associates the departments of a business with a chain that comprises the business itself. Some sections of a business are capable of productivity but are inhibited by faulty or weak rings within the business chain.

From the above discussion, the productivity of entities can be improved by identifying the constraints within their systems. Goldratt proposed five focusing steps that should be followed to identify and alleviate the constraints within systems. The steps are illustrated in Figure 2.1

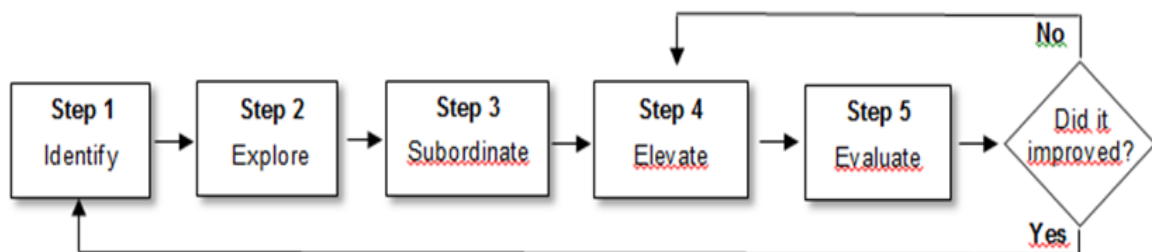


**Figure 0.1:** Goldratt`s Five focusing steps

Source: Dias *et al* (2019:79)

**Table 0.1: The five focusing steps**

| Step                                             | What to do                                                                                                                                                                                                                                |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Identify the constraint                       | Identify the current constraint (the single part of the process that limits the rate at which the goal is achieved).                                                                                                                      |
| 2. Exploit the constraint                        | Improve the throughput of the constraint using existing resources                                                                                                                                                                         |
| 3. Subordinate everything else to the constraint | Review all other activities in the process to ensure that they are aligned with and truly support the needs of the constraint                                                                                                             |
| 4. Elevate the constraint                        | If the constraint persists, consider what further actions can be taken to eliminate it from being the constraint. Normally, actions are continued at this step until the constraint has been “broken” (until it has moved somewhere else) |
| 5. Repeat                                        | Evaluate.                                                                                                                                                                                                                                 |

Source: Adapted from Goldratt (1990: 5)

The five focusing steps are a continuous improvement cycle. Once a constraint is resolved, the next constraint should immediately be addressed. This step is a reminder to never become complacent, aggressively improve the current constraint, and then immediately move on to the next constraint. The theory of constraints is all about constant process improvement. That means that once one constraint is fixed, then the process is bound to uncover a new one. The process starts all over again to identify the next constraint and avoid inertia.

### **2.2.1 The thinking processes**

Cattaneo and Bassani (2016:305) state that Goldratt's thinking process was proposed as a follow-up to the TOC. The thinking process is an approach that is based on the principle of continuous improvement, and a general approach for investigating, analysing, and creating solutions to problems (Kuruvilla, 2017:10). The TOC Thinking Processes (TP Tools) are integrated problem-solving tools based on rigorous cause-and-effect logic (Ghorbani, 2014:272). Mabin (2015:2) states that Goldratt TP tools enable the business to create breakthrough solutions by identifying, challenging, and correcting unexamined assumptions. Furthermore, they help to answer the following fundamental questions that managers need to know:

1. "What to Change?"
2. "What to Change to?"
3. "How to Cause the Change?"

These generic questions and TP tools are described in Table 2.2.

**Table 0.2: The thinking process tools**

| Generic Questions        | Purpose                                | TP Tools                   | Explanation                                                                                                                                                                                                                                                                                                   |
|--------------------------|----------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| What to change?          | Identify the core problem              | Current Reality Tree (CRT) | The current Reality Tree shows the current state, which is unsatisfactory and needs improvement. When creating the diagram, undesirable effects (UDEs) are identified and traced back to their root cause (the underlying problem).                                                                           |
| What to change to?       | Develop simple and practical solutions | Evaporating clouds (EC)    | Evaporating Clouds help to identify specific changes (called injections) that eliminate UDEs. It is particularly useful for resolving conflicts between different approaches to solving a problem. It is used as part of the process of progressing from the Current Reality Tree to the Future Reality Tree. |
|                          |                                        | Future Reality Tree (FRT)  | The future Reality Tree shows the future state, which reflects the results of injecting changes into the the system that is designed to eliminate UDEs.                                                                                                                                                       |
| How to cause the change? | Implement Solutions                    | Pre-requisite tree (PRT)   | Pre-requisite Tree that shows an implementation plan for achieving the future state. Creates a logical structure that organises knowledge and derives tactics from strategy                                                                                                                                   |
|                          |                                        | Transition tree (TT)       | The diagram describes in great detail the action that will lead to the fulfilment of a plan to implement changes                                                                                                                                                                                              |

Source: Akman & Senol (2016:103)

### **2.2.2 Deductions made from the Theory of Constraints**

The TOC offers several lessons for scholars of the management sciences and for practicing managers and has been variously interpreted and applied (Melendez, 2018:48). Dias *et al.* (2019:78) and Simit *et al.* (2014:933) analyse Goldratt's work and list the following observations as key lessons:

- The TOC is a continuous improvement process to improve and manage system constraints
- The TOC focuses first on the system's leverage points and then on how all parts of the system impact the operation of the leverage points.
- Any intervention that does not improve the performance of the weakest link will not improve the system and can be considered a waste.
- The TOC is ideally about change and the five focusing steps are directly concerned with the three fundamental questions about change that every manager needs to know.
- the theory can be implemented in every sector and every entity.
- System constraints can be either physical or in the form of policies.

## **2.3 Literature review**

This section commences with a discussion of the objectives of the Municipal Finance Act 56 of 2003 and public debt management. It proceeds to elaborate on the factors that deter residents from paying for water consumed and the attitude and behaviour of residents regarding the usage and payment for water. It also explores business recovery procedures for debt, the Municipal Finance Act 56 of 2003, the strategies to alleviate water debt, and reviews communication between the municipality and the residents.

### **2.3.1 Section 32 of Municipal Finance Act 56 of 2003**

The objective of this Act is to ensure sound and long-term administration of local fiscal and financial issues by establishing norms, standards, and other requirements for:

- maintaining transparency and accountability in municipal fiscal matters

- the management of their revenues, expenditures, assets, and liabilities, and the handling of their financial dealings
- budgetary and financial planning processes and the coordination of those processes with those of organs of state in other spheres of government
- borrowing by the municipality
- the handling of financial problems in municipalities
- supply chain management and
- other financial matters.

Enwereji (2019:97) notes that the primary goal of this Act is to improve financial management in local governments and to promote economic growth at the grassroots level. Section 6(4) of the Municipal Financial Management Act (56 of 2003) stipulates that the accounting officer of a municipality is responsible for managing the financial administration of the municipality, and must for this purpose take all reasonable steps to ensure:

- that the resources of the municipality are used effectively, efficiently, and economically.
- that full and proper records of the financial affairs of the municipality are kept following prescribed norms and standards.
- that the municipality has and maintains effective, efficient, and transparent systems -
  - of financial and risk management and internal control; and
  - internal audit operating following prescribed norms and standards.
- that unauthorised, irregular, or fruitless and wasteful expenditure and other losses are prevented.
- that disciplinary or, when appropriate, criminal proceedings are instituted against any official of the municipality who has allegedly committed an act of financial misconduct or an offence in terms of Chapter 15.
- that the municipality has and implements:
  - a tariff policy referred to in section 74 of the Municipal Systems Act.
  - a rates policy as may be required in terms of any applicable national legislation.

- a credit control and debt collection policy referred to in section 96(b) of the Municipal Systems Act; and
- a supply chain management policy in accordance with Chapter 11.

Section 96(b) and section 74 of the Local Government Municipal Systems Act (32 of 2000) provide that concerning the levying of rates and other taxes by a municipality and the charging of fees for municipal services, a municipality must, within its financial and administrative capacity, establish a sound customer management system that aims to create a positive and reciprocal relationship between persons liable for these payments and the municipality and where applicable a service provider.

In any public organisation, good financial management is the foundation of good governance. The National Treasury implemented the budgeting modifications since the fundamental goal of the Municipal Finance Management Act (MFMA) is to encourage prudent financial management. Furthermore, the MFMA requires responsible financial control to provide improved services to communities.

### **2.3.2 Public debt management**

Public debt is the total of the nation's debts, debts of local and national governments, and an indicator of how much public spending is financed by borrowing (Woo & Kumar, 2015:705). Lewis & Vinals (2014:11) state that public debt management is the process of establishing and executing a strategy for managing the government's debt to raise the required amount of funding, pursue its cost objectives, and meet any other government's goals. Lewis & Vinals (2014:13) furthermore state that the main objective of public debt management is to ensure that the government's financing needs and its payment obligations are met at the lowest possible cost over the medium to long run.

Fourie & Blom (2022:28) concur that Public Debt Management is one of the crucial elements in the public sector and requires that government must be proactive about it in terms of management, administration, monitoring, and evaluation. However, Fourie & Blom (2022:32) also state that South Africa uses loans to fund the budget deficit as the revenue collected is not balanced with government expenditure. This, as a result, affects the municipalities' access to funding. Consequently, the municipalities cannot afford to pay their service providers. NMMDM has experienced the withholding of

services by Sedibeng Water due to non-payment of services by the municipality (Appendix 3).

The Helen Suzman Foundation (2018:1) avers that municipal consumer debt is caused by non-payment of municipal services such as water, sanitation, electricity, trash and refuse removal, and property rates. Enwereji (2020:333) defines municipal consumer debt as the inability of municipal service consumers to pay for municipal services rendered. This inability to pay increases the public debt incurred by the government. The inability to mobilise payments from owing and defaulting residents has contributed to the poor quality of services provided by municipalities. The researcher is convinced that, to ensure continuity of services to residents, municipal consumer debt must be at the barest minimum. This can be attained when public debt managers enforce debt collections, debt control, and debt recovery (Enwereji, 2016:15).

Onar *et al.* (2018:1846) maintain that in the current global recessionary environment, late payments and outstanding debts are becoming increasingly common, and debt collection solutions are important for organisational survival. To be effective and recover maximum debts, municipalities must correctly utilise their human resources and communicate with their delinquent clients via the most convenient route that culminates in the lowest costs (Onar *et al.*, 2018:1845).

Delinquent accounts are accounts with outstanding balances that are over 30 days past the due date and are entered into the collections process (Chehrazi and Weber 2015:3077. A debt collection process is a set of procedures used to recover overdue claims from the debtor (Lada & Kudelko, 2018:148). Lada and Kudelko (2018:153) mention success factors and barriers involved in debt collection:

#### Success factors

- Reliable cost-benefit analysis
- Outsourcing a debt collection improves business relationships
- Court case management by judges

#### Barriers

- The long time for a court and execution debt collection
- High debt collection costs

- The need to engage a lawyer at every stage of debt collection

Enwereji (2016:17) cites some procedures for recovering outstanding accounts, which include debt selling, communicating with clients through telephone calls, emails, and social media platforms, and engaging in the legal route. These methods are elaborated on below.

According to Stifler and Parrish (2014:4), debt selling refers to a creditor's agreement to sell outstanding debts to a third party or a collection agent. In distressed situations where the organisation urgently needs financial assistance, debts can be sold to a third party to enable the organisation to meet its financial obligations (Tuite, 2010:59). The advantages of debt selling as noted by Tuite (2010:59) include immediate re-strengthening of the organisational account and enabling the organisation to carry out its financial obligations as budgeted. The reasons for the accrued debts may be attributed to inability or refusal to pay, unemployment, improper billing, inadequate service delivery, and poor credit control (George, 2014:1). Enwereji (2016:19) concurs that debt selling remains an option available for organisations to recover the debts accruing to their accounts. The municipalities could utilise this type of collection method to help alleviate the high debt that has accumulated over the years.

A call centre is a centralised office for receiving and transmitting a large volume of information by telephone (Kurniali, 2015:299). Automated call centre services include telephone calls, emails, texting, and software services that are performed electronically (Reynolds, 2010:22). Kurniali (2015:300) asserts that staffed call centres or front offices act as an interface between the customer and a company where they can call and report problems or ask for information regarding products or services offered. Telephone calls are one of the most effective ways of collecting overdue bills; however, phone calls are expensive, and they should only be used for problematic debts (Marx *et al.*, 2017:34). Oodith and Parumasur (2014:75) outline the following benefits of a call centre:

- Easy to use - call centre is relatively easy to administer, the staff makes calls to customers to inform them about their account in arrears for them to pay.

- Fast response - compared to other mediums, the call centre's response rate is relatively high.
- Increased sales - the staff calls many customers, and ultimately more customers pay their accounts
- Can reach a large volume of customers - the staff can make many telephone calls per day reaching a large number of customers compared to other mediums of communication.
- Customers can interact with the callers - this method enables the customers to engage with the callers, by inquiring if they do not understand something.

The researcher is of the view that it is a good idea for municipalities to designate call centres to call the account holders, only if there are large accounts that need to be resolved. The researcher is convinced that this method would be most suitable to target large communities such as the Ngaka Modiri Molema District Municipality (NMMDM).

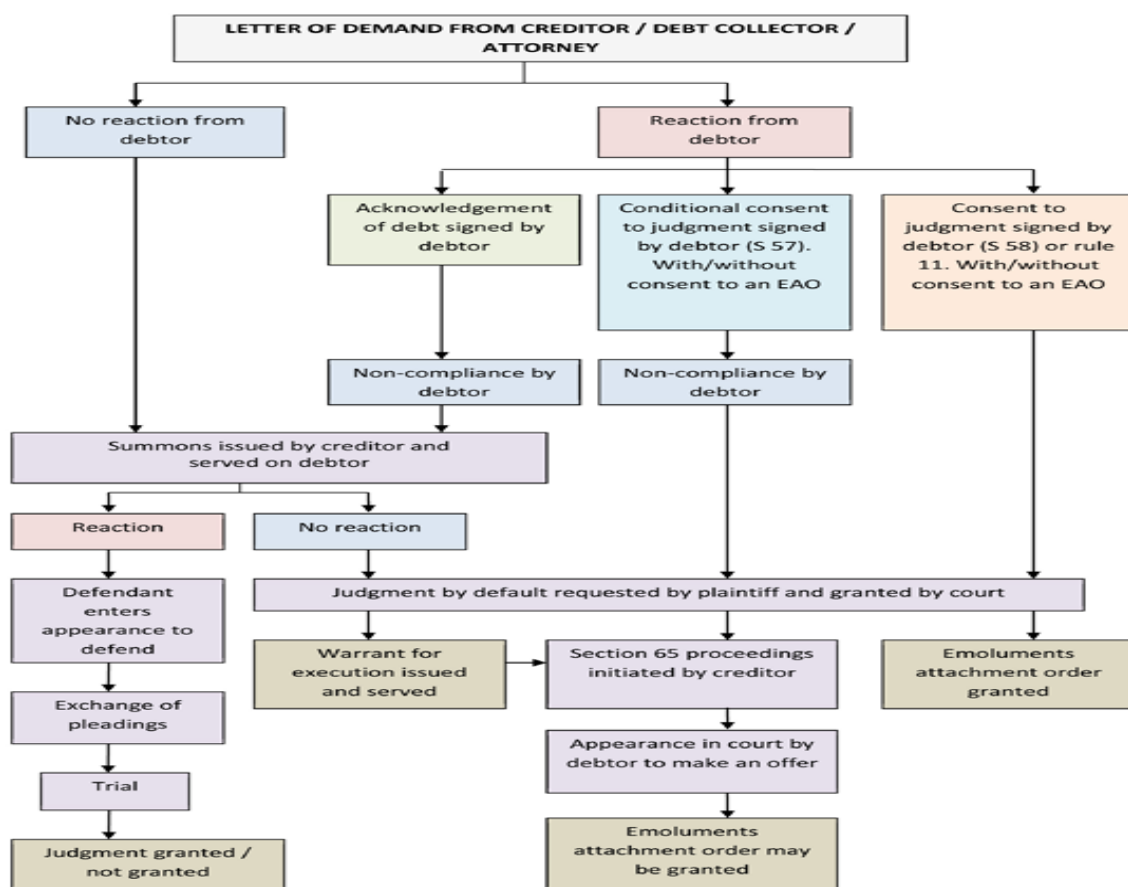
Email, short for electronic mail, consists of messages which are sent and received using the internet (Wang, 2016:285). Many people and organisations use emails, and they can be used as a means of communication, informing a failure or an update of the municipal services. Murray (2017:119) asserts that it is quick and convenient, making it extremely easy to send messages out daily or hourly, instead of the very long time it might take to send a letter. The researcher sees this method as an effective option if adopted by the municipality to send bills to customers and reminders to defaulters.

Social media is the term often used to refer to new forms of media that involve interactive participation. Commonly used social media platforms include Facebook, Twitter, and WhatsApp (Manning, 2014:1158). According to Kumar and Raja (2018:724), social media are computer-mediated technologies that allow the creation and sharing of information ideas, career interests, and other forms of expression via virtual communities and networks. Moreover, social media technologies take many different forms including blogs, business networks enterprise social networks, forums, microblogs, photo sharing, product/service reviews, social bookmarking, social gaming, social networks, video sharing, and virtual worlds. The researcher recommends that municipalities can use social media platforms as a communication tool to deliver messages cheaply to large sections of residents.

Municipalities are permitted to pursue or bring legal action against defaulters to recover municipal debt from residents. Section 109 and 112 of the Municipal Systems Act (Act 32 of 2000) stipulates that people who break municipal rules should be prosecuted by the municipality. Furthermore, municipalities should carry out effective enforcement by imposing fines on defaulters to recover debts, as required by Section 113 of Act 32 of 2000. However, Marx *et al.* (2017:35) warn that legal action costs money, often even more than the amount collected from the debtor if the lawsuit is successful. As such, they advise that organisations should only take legal action under the following circumstances:

- All other reasonable procedures have been tried without any success.
- There are no reasons for the defence or dispute of the claim.
- The debtor can afford to pay the principal debt and the legal costs.

Figure 2.2 illustrates the legal route of the debt collection process which municipalities could follow to recover outstanding debts from the residents.



## **Figure 0.2:Debt collection process**

Source: SAHRC (2017:16)

The implementation of the above requires a significant amount of time and resources. As such, before embarking on the legal route to collect on delinquent accounts, organisations must exhaust the alternative options, while considering the available resources, expenses, and benefits (Wittlinger *et al.*, 2008:7).

### **2.3.3 Revenue management strategy**

Municipalities in South Africa continue to face serious financial issues, which have a negative influence on their financial viability and ability to perform basic services. These financial issues include a lack of proper financial management, such as under-collection of revenues or uncontrolled expenditure. These are further exacerbated by political dysfunctionality (Glasser and Wright, 2020:413). However, the Revenue Enhancement Strategy was developed following Section 142 of the Municipal Finance Management Act (No 56 of 2003) and is aimed at ensuring the municipality's ability to meet its obligations, sustainably provide basic services, and strengthen its financial situation. Section 142 of the Municipal Finance Management Act (No 56 of 2003) stipulates that a financial recovery plan must be aimed at securing the municipality's ability to meet its obligations to provide basic services or its financial commitments and identify specific revenue-raising measures that are necessary for financial recovery, including the rate at which any municipal tax and tariffs must be set to achieve financial recovery.

Revenue management involves all the procedures necessary to ensure that the income of government departments is properly planned and fully accounted for, and that revenue collected is safeguarded and banked promptly (National Treasury, 2018:12). Mofokeng (2018:27) maintains that the revenue management strategy was created to address issues that affect the revenue value chain to increase debt collection and reduce the number of queries. Limpopo Municipal Revenue Management Strategy (2018:8) identified challenges that affect municipal revenue performance:

- Poor cash flow management which ultimately leads to non-payment of creditors
- Inaccurate and incomplete billing
- Low revenue collection which results in high reliance on grants
- Lack of implementation of credit control policies and by-laws

- Inability to account for and address distribution losses on water and electricity monthly
- Lack of capacity to roll out revenue and debt management policies and strategies
- Excessive indigent consumption
- Illegal connections
- The credibility of municipalities' reported data
- Unwillingness to pay by customers

Mofokeng (2018:27) argues that non-payment by the residents for the services rendered by the municipality is the leading factor affecting the revenue value chain. The NMMDM revenue collection rate is below the industry benchmark; therefore, they should deploy strict debt collection methods (NMMDM Annual Report, 2021:210).

Figure 2.3 presents a revenue enhancement model showing how the components of the system interrelate and work together to achieve a unified objective.

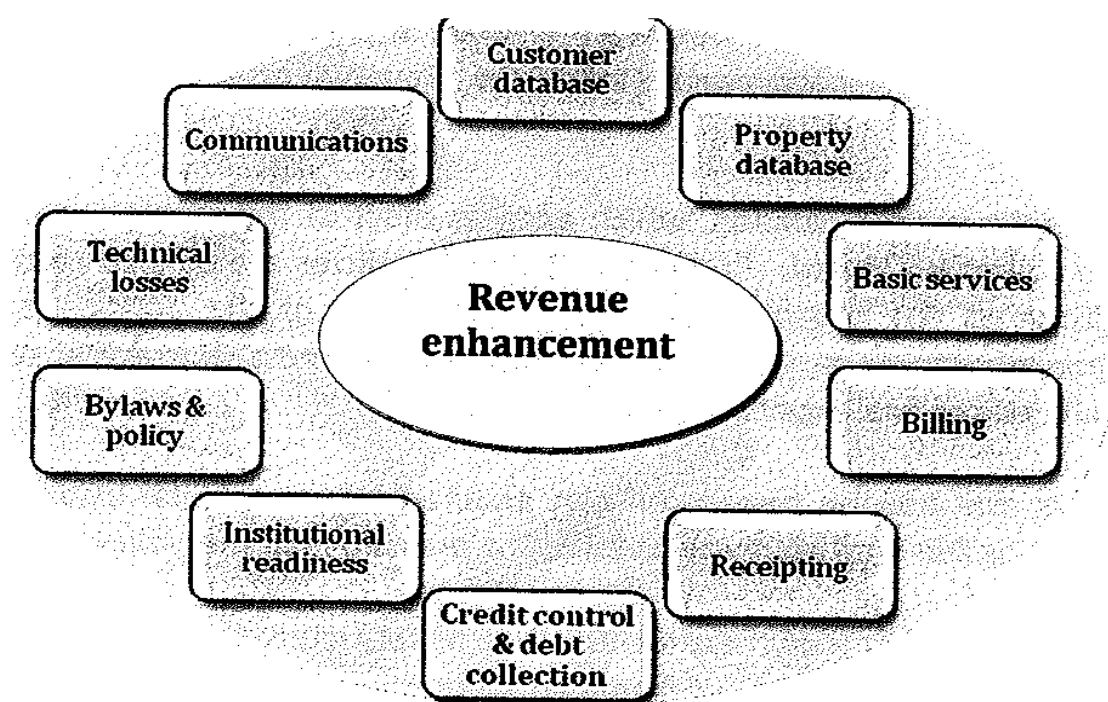


**Figure 0.3:Revenue enhancement model**

Source: SALGA (2014:4)

Figure 2.3 portrays billing and credit collection elements that should be adhered to in revenue collection in municipalities. Palmer (2014:27) defines credit control as a process by which businesses examine and manage their accounts with other businesses or people. Further, credit control aims to preserve strong business connections and deliver accurate information about an account's status. Marx *et al.* (2017:226) claim that after all the credit checks have been done on the customer, only then can the organisation extend the credit to the customer. However, it is critical to set a credit limit on the account to keep the company's risks to a minimum.

The municipality is legally obligated to give notice to the person responsible for the account a minimum of 14 days of written notice of termination for water and electricity accounts in arrears; otherwise, the disconnection of services is deemed illegal (SAHRC (2012:2). The City of Tshwane municipality launched a campaign in 2022, where they disconnected defaulting accounts. This yielded positive results, whereby companies that owed the municipality paid their debt (Masilela, 2022:1).

Customers should be informed about the different payment methods available to them by the municipality. Enwereji (2016:31) notes that the methods of payment used by municipalities include: cash payments at municipality offices, electronic financial transfers (EFT), debit orders, mobile payments, shopping payments, direct bank deposits, and post office payments. Araki (2013:8) confirms that these payment methods have been widely adopted by many countries in Asia and have been successfully implemented. These methods are discussed below.

EFT transactions transfer money from one account (payer) to another (payee) and require both parties to have bank accounts (Ndlovu, 2020:5). Furthermore, any financial transaction utilising an electronic terminal, such as the automated teller machine (ATM), falls under this category. This method of money transfer saves time, decreases administrative costs, eliminates the time and effort required to make cash payments, and reduces municipal corruption (Araki, 2013:3).

A debit order is an agreement between a payer and a third party to transfer a billed amount of money from the payer's account to pay for a service or repay a loan monthly (Standard Bank, 2022:1). Enwereji (2016:32) maintains that a debit order is a payment option that acts as an instruction from a resident authorising the bank to pay bills from a

specific account to the municipality's accounts to settle each month's bill. The benefits of adopting debit orders, according to Van Wyk (2020:1), include flexibility, cost-effectiveness, time savings, increased cash flow, elimination of cash risk, and better budget planning for the municipality.

Mobile payment refers to payment services operated under financial regulation and performed from or via a mobile device (Hasan, 2020:99). A user can pay for a variety of services using a mobile phone instead of cash, check, or credit card. Mobile phones and other mobile devices are now used to send cash to electronic funds transfer platforms, and their popularity is growing due to their convenience and security (Hoofnagle *et al.*, 2012:2). Harper (2018:1), mentions that the benefit of mobile payments is that they are quick, secure, and always available when you need them.

When residents go grocery shopping, they can pay their municipal services accounts to the cashier. Municipal accounts can be paid at major stores in South Africa, including Pick'n'Pay, Checkers, Shoprite, SPAR, Pep, Ackerman's, Boxer, Makro, and Builders Warehouse, for the convenience of customers (Enwereji, 2016:34). Araki (2013:7) notes that consumers have transitioned from using manual payment methods to electronic payment methods, and the customers and residents in South Africa should expect organisations and municipalities to develop payment choices that make it easy for them to pay.

Direct deposit is the mechanism through which residents pay their water bills to the bank via direct deposit. The recipient receives a teller or payment receipt as proof of payment in this transaction. Lang (2013:1) avers that a direct deposit makes cash payments easier and lowers transaction expenses. Customers and residents queue to pay their debts and utility bills at the bank, making this method of payment time-consuming. Payments through bank transactions attract bank fees.

Enwereji (2016:32) avers that post offices in South Africa are unreliable due to incessant strike actions by workers. However, according to the Annual Report of the post office (2018:29), to enhance a performance-based culture, the post office will embark on reskilling and rebuilding lost capacity as well as redesigning the performance management system and workplace environments for its employees. Although this is the oldest form of payment, it is trusted by pensioners and it is convenient for grant

beneficiaries that are paid through the post office, to pay for municipal services at the counter (Researcher's inference).

#### **2.3.4 Business recovery procedures**

Fischer *et al.* (2019:249) define business recovery as a short-term restoration action that returns a business to a minimally acceptable level of operation or production. The Companies Act (No 71 of 2008) states that business rescue is "*the temporary supervision and management of a company's affairs, business, and property by a business rescue practitioner, a temporary stay on claimants' rights against the company or in respect of property in its possession, and the development and implementation (if approved) of a business plan for a company that is "financially distressed."*

Section 139 of the Municipal Finance Management Act (Act No 56 of 2003) states that if a municipality, because of a crisis in its financial affairs, is in serious or persistent material breach of its obligations to provide basic services or to meet its financial commitments, or admits that it is unable to meet its obligations or financial commitments, the provincial executive must promptly request the Municipal Financial Recovery Service:

- to determine the reasons for the crisis in its financial affairs
- to assess the municipality's financial state
- to prepare an appropriate recovery plan for the municipality
- to recommend appropriate changes to the municipality's budget and revenue-raising measures that will give effect to the recovery plan and submit it to the MEC for finance in the province.

The municipalities in this study are regarded as entities, therefore, all the activities that are included in the business recovery process may apply to them. Business recovery processes can be used to address the enormous level of debt that has built over time. The business rescue plan, according to Marx *et al.* (2017:422), is a decision-making document that fosters the company's rehabilitation for a higher return for its creditors or stakeholders than in insolvency.

Rosslyn-Smith & Pretorius (2015:17) proffer five principles organisations should consider when creating a corporate rescue plan:

**Table 0.3: Five principles of a rescue plan**

|                                              |                                                                                                                                                                                                                                              |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tool for declaring feasibility               | The plan's outcome is contingent on what is possible; that is, the plan entails a strategy to rehabilitate the organisation and, as a result, provide creditors with a higher return, based on facts, conditions, and practical assumptions. |
| Medium of communication                      | The business rescue plan is an important communication tool in the turnaround process; it must be clear, intelligible, and comprehensive in terms of the company's future reorganisation.                                                    |
| Enabler of transparency                      | A complete and explicit rescue strategy is the greatest way to ensure transparency throughout the process.                                                                                                                                   |
| Statement of contractual obligations         | An approved rescue plan is a legally binding contract between all parties involved. It is also regarded as a court decision with potential legal implications.                                                                               |
| Attract and secure post-commencement funding | It is vital to find a new source of money as soon as possible following the start of the rescue proceedings to ensure that the distressed organisation can continue to operate.                                                              |

Source: Rosslyn-Smith & Pretorius (2015:17)

Table 2.3 outlines the financial recovery plan, a stepwise approach to recovery that distinguishes between difficulties that must be addressed in the short, medium, and long term to reach this goal. The strategic goal of the financial recovery plan is to address the municipality's current financial distress by focusing on increasing the municipality's short-term financial liquidity and long-term financial sustainability. Umar *et al.* (2017:1361) affirm that the financial recovery plan could be used as a tool to guide the municipality and the Provincial Intervention Team in addressing the municipality's financial crisis and ensuring that the municipality regains its financial health in the shortest time possible while addressing all issues that negatively impact the municipality's financial health.

### **2.3.5 Factors that deter residents from paying for water consumed**

In parts of South Africa where consumers have enjoyed a free supply of water, the costs have been borne by the state usually through the local municipalities (van Koppen &

Schreiner, 2014:544). Kanyane (2014:310), Manyaka (2014:128) and Hanjahanja and Omuto (2018:1), as well as Liu *et al.* (2020:2), indicate that the reasons for the non-payment for water in South African municipalities include:

- Unemployment
- Poverty
- Entitlement issues
- Political issues
- Socio-demographic factors
- Inaccurate billing system

The study by Gidey and Ewnetu (2015:13) on households in urban areas of Ethiopia identified several socio-economic factors that underpinned their willingness to pay for improved water services. These include family size, the age of the account holders, household income, daily expenses, and the level of satisfaction with service delivery. Considering the above, managers must know the factors that deter payment for water consumed and adopt the necessary mitigation strategies to ensure a sustainable water supply. The factors for non-payment identified are elaborated below.

Unemployment is a condition in which a person is actively looking for a job but is unable to find it (Bonakele, 2016:12). In 2018, the unemployment rate for the North West province stood at 28.3% (SOPA, 2022:4). The unemployment rate in the North West province in 2022 stands at 35.7% with youth unemployment at an all-time high of 63% (SOPA, 2022:5). This indicates a significant increase of 7.4% of unemployment rate from 2018 to 2022. Kanyane (2014:311) affirms that unemployment is a major problem causing non-payment for municipal services in some of the municipalities, especially the North West province. Ncube & Monnakgotla (2016:89) state that when a considerable fraction of the population is employed, the likelihood of a municipality earning a constant stream of funds is high. In some circumstances, many consumers are pensioners and provincial grant-holders who do not have adequate income to cover their monthly expenses, not to mention paying for municipal services (Enwereji, 2019:91).

In 2001 South Africa adopted a policy intended to provide free basic services to poorer households. Under this policy, municipalities were tasked to identify indigent households that would receive services such as water and electricity for free or at

substantially subsidised rates (STATSSA, 2018:2). The general rule is that indigent households are entitled to 6 000L of free water per household per month and 50kwh of free electricity (SAHRC, 2017:13). The Indigent Policy is aimed at including those currently excluded from access to basic services, through the provision of a social safety net (Department of Local Governance, 2015:3). StatsSA (2019:1) reports that about 76% of the indigent households in South Africa benefit from free basic water services. Enwereji (2019:91) proposes that the municipalities should support deserving residents through the implementation of indigent policies or by giving subsidies to disadvantaged households to pay a flat rate for services consumed. However, Leburu (2017:8) warns that flat rates are susceptible to abuse, and municipalities should approach this recommendation with caution.

Raywat (2019:18) defines poverty as the inability to achieve the minimum standard and or afford a basic standard of living. StatsSA (2015:13) reports that more than a quarter of the South African population was living below the food poverty line in 2015. The poverty line refers to the amount of money that an individual needs to afford the minimum required to survive (StatsSA, 2019:3). Approximately 13.8 million South Africans were living below the food poverty line in 2015, down from a peak of 16.7 million in 2009 (Ngqakamba, 2021:2). The North West province is at a staggering 59.6% below the poverty line (STATS SA, 2015:15). Enwereji (2019:90) affirms that poverty in South Africa is on the rise and this fact undoubtedly contributes to the failure to pay for municipal services. This creates a stark picture of the financial challenges of the South African population at large.

The entitlement mentality is defined as a sense of deservingness or being owed a favour when little or nothing has been done to deserve special treatment (Sinha, 2018:2). Worku (2018:100) avers that residents' entitlement mentality is to blame for the high rate of non-payment of municipal services. Lund (2011:10) affirms that some consumers in South Africa boycott payment for municipal services due to land rights and citizenship, which give them the conviction that land and all municipal services are free and should not be paid for. Sikor and Lund (2010:12) mention that consumers are convinced that they are entitled to service provision as a dividend of democracy. This was the case in Soweto where the residents owe the municipality a substantial sum of monies, including water and electricity debt, which compromises the

municipality's financial stability (Joel, 2020:2). From the above, emerges the issue of entitlement in South African municipalities is a major concern that needs to be addressed by the relevant authorities.

Apartheid, which refers to institutionalised racism against black South Africans, began with the election of the National Party (NP) in 1948. Apartheid existed from 1948 to 1994, and it passed through several periods because of internal conflicts and international forces (Gouzoulis *et al.*, 2021:6). Enwereji and Uwizeyimana (2020:335), state that some political organisations, such as the African National Congress (ANC), advocated non-payment for services as a means of weakening apartheid's control in black-dominated areas by making them ungovernable. Furthermore, the ANC incited boycotts and encouraged black communities to refuse to pay for municipal services. Simpson (2010:27) claims that the regular local government service delivery protests in South Africa are nearly identical to what occurred in most townships during the 1980s when most Africans came onto the streets to protest the NP government's inequalities. Mngomezulu (2020:39) concurs that the service delivery protests in South Africa under the ANC's control are like the apartheid-era riots. From the above narrative, it is discernible that the culture of non-payment for municipal services in South Africa is politically entrenched and is exacerbated by poor service delivery in black-dominated townships.

Socio-demographic variables such as income, age, gender, and the size of the family have a considerable impact on residential water consumption (Liu *et al.*, 2020:2). The association between household income and water use has been investigated by several researchers, and the findings illustrate that as one's income rises, so does one's water usage (Jiang *et al.*, 2019:104). Otaki *et al.* (2017:10) aver that high-income families have more water equipment than low-income families, such as dishwashers, washing machines, swimming pools, and outside garden watering facilities. High-income groups, according to Fan (2014:1), have a stronger ability to pay, and water bills make up a small portion of their total income. Zhao (2019:33) claims that elderly persons are more likely than younger adults to take more active actions to conserve water because they have a higher inclination toward saving.

Hanjahanja and Omuto (2018:1) claim that traditional water metering is notorious for being unreliable, incorrect, and a cause of customer dissatisfaction. As a result, it is

widely regarded as one of the key reasons why water service providers operate badly and have low revenue collection rates. They note that Nakuru city in Kenya has a huge problem concerning incorrect billing systems. Billing is the step-by-step process of requesting payment from clients through issuing invoices (Tripathi, 2022:1). It is a vital element in the revenue enhancement model illustrated in Figure 2.3. The municipal billing system is affected by factors prevalent in the municipal billing environment, such as the absence of information from the formal cadastral registration, data from the meter readings, electronic fund transfer, lack of standardisation, integration, and support, lack of capacity regarding the billing information communication technology (ICT) and human capital (Mazibuko, 2013:166). Furthermore, the City of Johannesburg Metropolitan Municipality, Nelson Mandela Bay Metropolitan Municipality, and Ekurhuleni Metropolitan Municipality were faced with high cases of inaccurate billing, where the incorrect meter readings affected revenue collection because the bills were often higher than expected, leading to disputes. Mazibuko (2013:168) goes on to propose that municipalities should combat inaccurate billing by installing reliable ICT in the billing departments.

### **2.3.6 Unaccounted-for water**

Unaccounted-for water is the difference between the quantity of water entering a system and the sum of water billed, including the water which is measured but for some reason not paid for (Alegre *et al.*, 2016:80). The researcher deduces that unaccounted-for water includes water that is consumed at communal water points, and water lost through leakages. Farok (2016:28) describes non-revenue water as the difference between system input volume and authorised billed consumption. From the above narrative, it emerges that unaccounted-for water does not generate revenue for municipalities; as such, municipalities should endeavour to keep it at the bare minimum.

The main issue facing water services provision is high levels of unaccounted-for water through the ageing water reticulation infrastructure (Owen, 2018:50). McKenzie *et al.* (2012:6) assert that water losses in South Africa are currently in line with world norms but have significant scope for savings which is an important consideration in such a water scarce country. Reducing water losses, therefore, represents an important issue when balancing future water requirements with the available resources.

Jagals (2012:2) mentions that the coverage of water and sanitation services to households in rural settlements is very scanty, and they generally rely on water from communal taps, tankers, or other suppliers. Raj (2013:157) maintains that these distribution methods contribute to lost water for municipalities, through either negligence of the consumers leaving the taps running or maintenance issues. These factors contribute to the high levels of unaccounted-for water in the municipalities.

Farok (2016:32) suggests measures that the municipalities could use to combat the high level of unaccounted-for water, these include:

- Every household should have a prescribed tested meter
- Municipalities must ensure billings for service connections are based on actual meter readings. Estimated billing should be discontinued
- Faulty meters should be replaced
- A task force should physically check at least 10% of readings (collected by inspectors)
- Identify the consumers using water through illegal or by-pass connections and take legal action
- Physical leaks must be fixed as soon as possible

### **2.3.7 Strategies to alleviate water debt**

Van Zyl *et al.* (2018:2), Kelly (2013:21), and Enwereji (2019:92) suggest the following strategies to alleviate water debt:

- Install a reliable metering and billing system
- Improve the water quality
- Promote water conservation through
  - Positive attitude and behaviour towards water usage among residents
  - Water-saving tips
- Promote communication between the municipality and the residents

Darby (2010:445), defines prepaid meters as advanced gadgets that identify consumption in more detail than conventional meters and communicate via a network back to the utility for monitoring and billing purposes. Marais *et al.* (2016:12) note that

prepaid meters allow automatic reading and telemetric submissions to a central location; consequently, prepaid meters minimise the problem of inaccurate billing. Van Zyl *et al.* (2018:2) state that in South Africa and other developing countries, advanced water metering (specifically in the form of prepaid meters or water management devices) is driven by the need to provide services to previously unserved communities and deal with the problems caused by rapid urbanisation. Loteni (2018:2) avers that prepaid water meters were introduced as a proactive mechanism to mitigate the problem of non-payment due to inaccurate billing and to provide households with the opportunity to manage their usage without incurring debts for the service. Loteni (2018:15) further asserts that in countries such as Italy, Canada, and Northern Ireland, the objectives of introducing prepaid meters were to increase expected savings, improve demand management, improve customer relationships by reducing complaints and minimise operational costs. Chowns (2015:266) argues that prepaid water meters have been introduced as a mechanism for cost recovery and a solution to the problem of non-payment. The installation of prepaid meters in some parts of South Africa has not been smooth sailing. Veriava (2019:598) mentions that residents of Soweto were against the installation of prepaid meters in their households. Moreover, they halted the “Operation Gcin’amanz” (operation save water) project by the Johannesburg Water service provider which they perceived as intrusive monitoring.

Water quality is a term used to qualify the physical, chemical, and biological characteristics of water regarding set standards (Obilonu, 2013:46). Odiyo and Makungo (2012:135) aver that for domestic use, typical pollutants of South Africa’s water resources include waste released by the growing industrial sectors, domestic and commercial sewage, acid mine drainage, faecal contamination due to insufficient infrastructure and leaking sewers, domesticated animals grazing too close to water sources, agricultural runoff, and litter. Odiyo and Makungo (2012:140) note that these pollutants have affected water quality in vulnerable communities in Limpopo province and impact negatively on public health, particularly in remote rural communities that are rarely supplied with treated municipal water. Edokpayi *et al* (2018:2) claim that residents in parts of Limpopo withheld payment of water services to the municipality due to the poor quality of water provided. Furthermore, the residents used their money to look for alternative water supply such as boreholes, while other residents resorted to the collection of water from wells, ponds, springs, lakes, rivers, and rainwater harvesting to

meet their domestic water needs. Obilonu (2013:49) suggests the following strategies to mitigate water quality problems: prevention of pollution, treatment of polluted water, safe use of wastewater, and restoration and protection of the ecosystem. Edokpayi *et al* (2018:15) recommended that the municipality in Limpopo should intervene in their water treatment plants and consider microbiological contamination as a priority. It is recommended that water bodies and the environment, in general, should be protected through appropriate legislation guidelines and public awareness campaigns. Taking these steps would result in better water quality for our present society and future generation.

Kumari and Singh (2017:76) define water conservation as an action, behavioural change, technology, improved design, or process implemented to reduce water loss. Njoku *et al.*, (2022:2) aver that increased worldwide water usage exacerbates water scarcity, particularly in arid countries like South Africa, where precipitation is low, limiting available surface water and influencing individual attitudes about the use of limited water resources. Matos *et al.* (2013:444) concur that it is necessary to improve the efficiency of water use by promoting the implementation of new water reuse projects and better control of water losses to ensure the future availability of water resources.

Mutsaa (2019:49) states that many African cities are losing huge amounts of treated water due to pipe leakages, wastage, and illegal connections, which in turn results in a significant loss in revenue. As a result, the provision and delivery of potable water becomes more difficult. Mutsaa (2019:49) concurs that this challenge has been mitigated by the government by managing water demand through pricing, enforced water conservation measures, and widespread public campaigns. Matos *et al.* (2013:445) maintain that to support sustainable water management we must have detailed knowledge of domestic water demand patterns. Therefore, domestic water management and methods for decreasing water waste should be emphasized at the household level. According to a study conducted in the United States, Australia, and the United Kingdom, families with water-saving appliances such as water-saving toilets, water-saving faucets, or low-flow showerheads consume 9–12% less water (Liu *et al.*, 2020:6). Polonsky *et al.* (2014:615) maintain that water usage can be decreased by 35–50% if the existing domestic water equipment is replaced by efficient water-saving equipment.

Popescu (2014:443) defines behaviour as a person's response to living conditions, which is influenced by environmental stimulation and internal tension of successive movements that are orientated in a significant way. Ao *et al.* (2020:2591) claim that people's attitudes have an impact on their behaviour. Kumari and Singh (2017:79) equally observe that water conservation attitudes are crucial for water conservation behaviour. However, the global household demand for water usage continues to rise, and concerns about scarcity and family attitudes about water use develops. As a result, it is critical not to waste the available domestic water. Mutsaa (2019:51) asserts that South Africa is over-exploiting its water sources, meaning the country uses more water than is reliably available from both surface and groundwater sources. He further avers that it is estimated that, based on current usage trends, water demand could exceed the availability of economically usable freshwater resources by 2025. Patidar and Patidar (2021:113) aver that educational programmes about the responsible use of water are needed in every country. By inference, educating residents about the need to conserve water would ultimately lead to reduced water bills for both the residents and the municipality.

Through a concerted effort at the household level, vast quantities of water can be conserved, resulting in reduced water bills through the implementation of the following water-saving tips:

- Turn the tap off between washing your face, brushing your teeth, or shaving
- Taking a five-minute shower instead of a bath will use a third of the water used to bathe in a bathtub. This saves up to 400 litres a week
- Use low-flow showerheads, dual-flush toilet mechanisms, and water-efficient washing machines
- Kettles should not be filled to the brim but with just enough water for your needs
- Reducing the toilet flush volume alone can save 20% of total water consumption.
- Use a bucket rather than a hose to wash your car. If you must use a hose, use a sprayer that can be turned off in between spraying the car
- Think about fitting a water tank to collect rainwater off your roof. Water tanks usually store about 2000 litres of water. The rainwater could then be used for watering plants in the yard

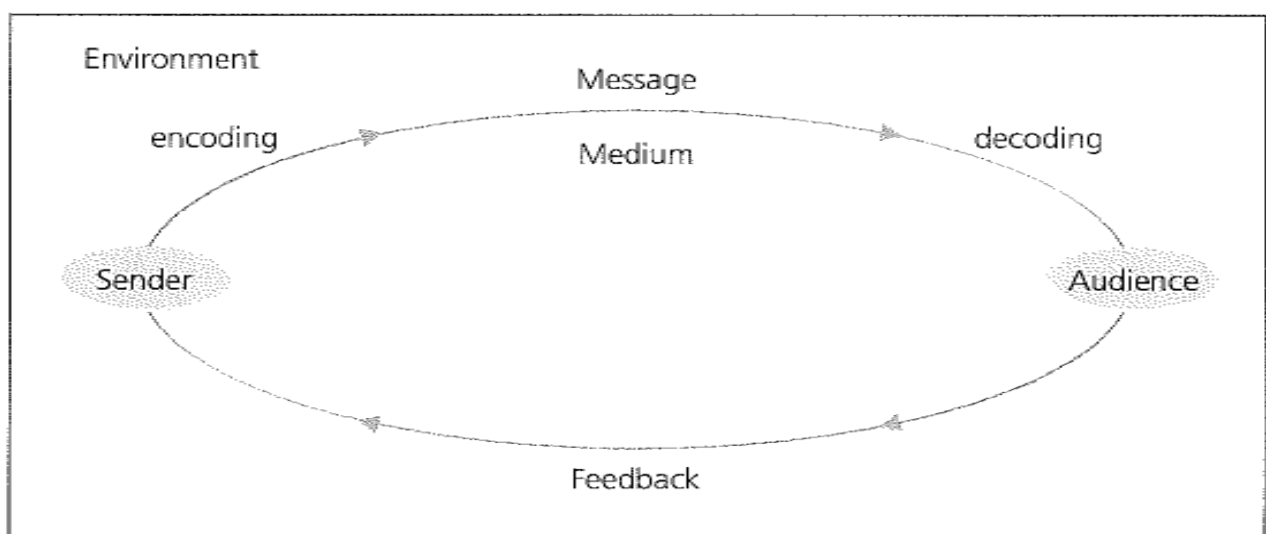
Source: Adapted from Seyranian *et al.*, (2015:85) and Novak *et al.*, (2017:128).

### 2.3.8 Communication

Communication is the process of generating meanings between two or more people via the expression and interpretation of messages (Cleary, 2021:1). Baran (2015:4) maintains that communication is the transfer of a message from a source to a receiver. Turner and West (2019:5) note that the word communication comes from a Latin word that means "to make common," and this idea of common or shared meanings is reflected in most definitions used by scholars and communicators.

Local municipalities should communicate to residents the need to pay for municipal services and fees through the proper channels and at the appropriate times (Enwereji, 2016:22). The Municipality can use call centres, emails, and social media platforms to communicate with the residents as discussed in section 2.3.2. When residents are unaware or misinformed about basic information related to the municipality, such as scheduled meetings, new ordinance information, or community resources, it causes tension. Those municipalities that stay connected with their residents can avoid this problem. Finally, like any communication, municipalities should be proactive when they give information to residents.

Cleary (2021:2) states that communication theorists have developed numerous communication models based on various theories of communication. Furthermore, most of these models share certain essential elements but differ in terms of how the elements interact. Figure 2.4 depicts the elements involved in the communication process.



## Figure 0.4: Interpersonal communication

Source: Cleary (2021:2)

The model shows that there is no single beginning and no single end to interactions. Both parties are engaged in sending and receiving messages simultaneously in iterative modalities. Cleary (2021:3) outlines the elements of communication as follows:

- Sender - the person who initiates the communication process and is sometimes referred to as a source or the communicator, or the encoder. The primary responsibility for the success of any communication lies with the sender.
- Encoding - encoding is the act of making an idea accessible to others, of putting an idea into a code so that it becomes perceptible to the receiver. It can be done using verbal code, and language, whether spoken or written, or non-verbal.
- Code - a code is a set of symbols that, when combined and used according to the rules agreed upon by the users, conveys meaning. The set of symbols used in the language is the alphabet.
- Message - the message is the content or subject matter that is, the coded idea or meaning the sender wishes to convey. If the message is not understood as intended by the sender, communication has been unsuccessful.
- Medium - the message must be conveyed to the receiver in a concrete form. This is achieved by using a medium.
- Audience- the audience or receiver is the person to whom the sender directs the message, and who thus must understand the message.
- Decoding - refers to the process of an audience receiving, interpreting, and understanding an encoded message.
- Feedback - This is the audience's response to the message. It is essential for effective communication because it provides for a two-way flow of messages. Feedback thus provides the sender with a way of ensuring that the message has been received, interpreted, and understood as the sender intended.

- Environment - this refers to the physical and social situation in which communication takes place.

Organisations should make good use of communication strategies to ensure optimum penetration and dissemination of messages. According to the model's guidelines, organisations should select appropriate channels for distributing messages to residents so that they are convincing, timely, and serve the intended purpose. Customers' comments should also be collected so that businesses can evaluate what measures to take next. As a result, communication becomes a continual process as businesses respond to feedback from their target audiences.

### **2.3.9 Medium of communication**

In the communication process, a medium is a channel or system of communication — how information (the message) is transmitted between a speaker or writer (the sender) and an audience (Nordquist, 2020:1). Choosing the appropriate media is critical for ensuring that messages reach the intended audience and that they comprehend the message's purpose and significance. Enwereji (2016:24) states that television, radio, email, social media, newspapers, letters, and flyers are the most often utilised communication media.

Television is the most widely used audio-visual communication medium in South Africa (Enwereji, 2016:25). It draws a vast audience of all ages. People could check in hourly or at any moment during the hour to find out the latest news, thanks to the emergence of 24-hour news programmes on satellite, which replaced the nocturnal news hour (Cushion *et al*, 2015:867). Television has become a strong communication tool. Even those in remote regions can get knowledge and amusement via television. It can reach the greatest number of people in the shortest of time while providing sound, pictures, and movement. Residents might get messages from the municipality via television infomercials, such as reminders to pay their water bills.

Radio was the first truly mass medium of communication, reaching millions of people instantly and altering social attitudes, family relationships, and how people relate to their environment (UK Essays, 2018:1). Radio is an attractive medium among the various mass communication media because of its special characteristics. This type of medium

is relevant when trying to reach a large population like the residents of the North West province.

Email can be a great way to interact with partners, stakeholders, and customers, and it is great for sharing information such as meeting notes, newsletters, or case studies (Julian, 2020:1). Community members expect their leaders to provide them with news and information as soon as possible, email allows governments to distribute information as soon as it is available (Marabella, 2020:1). No other medium provides effectiveness as a platform for mass communication like email and it is cost-effective.

Social media is an internet-based form of communication, that allows users to have conversations, share information, and create web content (University of South Florida, 2022). Social media now complements many parts of our lives. Facebook, Twitter, YouTube, and many other social networking sites allow users to share and interact with online content and to connect in a professional context (Osterrieder, 2013:1).

The newspaper is a printed source of information. It is one of the cheapest and oldest means of communication. Residents welcome newspapers daily at the dawn of day and they are a mirror that reflects current happenings and movements. Local municipalities have access to their local newspapers, such as the Mahikeng Mail. The municipality uses this communication medium to inform and educate Mahikeng residents about the development and remind them about their payment obligation for water services.

Letters are a type of written communication. Individuals or organisations can send or receive these. Special messengers, post offices, or private couriers can transport written communications in the form of letters to the recipients. For complaints, suggestions, and informational purposes, formal letters are still extensively employed. This service is incredibly simple to use because no special equipment is required. The letter's tangible record can be kept by the letter's recipient.

Posters and flyers are a cost-effective approach to getting your message out to the general audience. Posters and flyers can help you communicate with community members whether you are trying to gain support for a project, promote awareness for an event, or inform the public about a community issue. Flyers are inexpensive. In a matter of minutes, you can develop a basic flyer on your computer and either print the copies yourself or have them reproduced for a low cost. Municipalities might also use one

keyboard to e-mail their flier to a list of hundreds or thousands of people, and/or put it on their websites and other departments.

### **2.3.10 Summary**

The theoretical background to this study shows the five process steps that the municipalities should follow to alleviate constraints related to water bills and non-payment practices evident in the residents. Furthermore, the literature review examined the factors that deter residents from paying for their water consumption, public debt management, attitudes, and behaviour of residents regarding water usage. The chapter also examined the most controversial aspect of unaccounted-for water, the framing of the Municipal Finance Act (56 of 2003), and reviewed the communication practices of the municipality with the residents.

## **CHAPTER 3 METHODOLOGY**

### **3.1 Introduction**

This chapter describes the research methods utilised in the collection of data from the respondents to attain the objectives of this study. The research approach, design, population of the study, sampling techniques, data collection techniques, data analysis, and ethical matters that guided the research process are discussed.

### **3.2 Research approach**

Goundar (2012:3) asserts that research is a process of collecting, analysing, and interpreting information to answer specific questions. There are three main research approaches *viz* qualitative, quantitative, and mixed methods of research (Creswell, 2014:12). For this study mixed methods approach was adopted. Leavy (2017:9) states that the mixed method approach involves collecting, analysing, and integrating both quantitative and qualitative data in a single project to have an extensive understanding of the phenomenon under study. By analysing the findings from the residents' survey and the municipal officials' interviews, the mixed-method approach improved the depth and scope of the research findings. The quantitative and qualitative approaches are presented in sections 3.2.1 and 3.2.2 respectively.

#### **3.2.1 Quantitative research approach**

Apuke (2017:42) asserts that quantitative research involves the utilisation and analysis of numerical data using specific statistical techniques to answer questions like who, how much, what, where, when, how many, and how. Further, it also describes the methods of explaining an issue through gathering data in numerical form. Creswell (2014:34) concurs that quantitative research enables the researcher to test theories by examining the relationship among variables, measuring using detailed instruments, and analysing the data using statistical procedures. Using this technique, the researcher was able to draw statistical conclusions about the residents' payment practices from the information they provided.

### **3.2.2 Qualitative research approach**

Hennink *et al.* (2020:10) define qualitative research as an approach that allows the researcher to examine people's experiences in detail by using a specific set of research methods such as in-depth interviews, focus groups, observations, content analysis, visual methods, and life histories and biographies. Mohajan (2018:2) concurs that it is a type of social science research that collects and works with non-numerical data striving to interpret meanings from these data that help us to understand social life through the study of targeted populations. This research method helped the researcher to develop specific insights about the reasons why residents do not pay for their water services and also get an insight into their grievances.

### **3.3 Research design**

Asenahabi (2019:77) defines research design as a step-by-step procedure that is adopted by a researcher before the data collection and analysis process commences to validly achieve the research objectives. Furthermore, the research design translates a research problem into data for analysis to provide answers to research questions. Boru (2018:34) maintains that it is the overall plan for connecting the conceptual research problems with the pertinent (and achievable) empirical research. Asenahabi (2019:77) asserts the research design outlines the methods applied to collect and analyse data that answer the research questions. This study adopted the descriptive and interpretive research design.

#### **3.3.1 Descriptive research design**

Rillo and Alieto (2018:169) define descriptive research as a purposive process of gathering, analysing, classifying, and tabulating data about prevailing conditions, practices, processes, trends, and cause-effect relationships and then making an adequate and accurate interpretation of such data with or without or sometimes minimal aid of statistical methods. Siedlecki (2020:8) suggests that descriptive methods aim to create descriptions, meaningful images, and paintings systematically, factually, and accurately about the data, properties, and relationships of the phenomena studied. Nassaji (2015:129) states the goal of descriptive research is to describe a phenomenon and its characteristics. This research design allowed the researcher to collect data in a natural environment that gives high-quality and honest data collection.

### **3.3.2 Interpretive research design**

Putnam and Banghart (2017:117) suggest that interpretive approaches encompass social theories and perspectives that embrace a view of reality as socially constructed or made meaningful through actors' understanding of events. Rillo and Alieto (2018:170) maintain that interpretive studies seek to explore people's experiences and their views or perspectives of those experiences. Furthermore, interpretive studies are, typically inductive and often associated with qualitative approaches to gathering and analysis of data. Bhattacharjee (2012:103) posits that interpretive research assumes that social reality is not singular or objective but is determined by human experiences and is best studied by reconciling the subjective interpretations of various participants. This method helped the researcher get a good reflection of how the people truly feel about access to water and paying for its use.

### **3.4 Population of the study**

Burns and Bush (2014:238) define a population as the entire group under study as specified by the objectives of the research project. The study consisted of two population categories. Category 1 consisted of households that are billed for water, while Category 2 consisted of employees in the Department of Water and Sanitation in the five local municipalities under study.

Due to time and financial constraints, the study targeted households in three local municipalities, namely Ditsobotla, Mahikeng, and Ramotshere Moiloa. This decision was motivated by the fact that these three municipalities have the highest debt owed to Sedibeng Water according to Appendix 2. In these three local municipalities, 49 208 households are billed for water consumed (StatsSA, 2016). This number comprises the target population in Category 1. In Category 2, the population is 152 which is the number of managers working in the Water and Sanitation departments of the three local municipalities.

### **3.5 Sampling**

Sampling refers to the selection of units in a population from whom data is collected (Shona, 2020:170). Probability sampling uses random sampling techniques to create a sample since every member of the population has a known and equal chance of being

selected (Cook, 2018:37). Stephaine (2020:12) defines non-probability as a sampling technique in which the researcher selects samples based on the subjective judgment of the researcher rather than random selection. The latter is used in this study.

### **3.5.1 Sampling method**

The convenience sampling technique and judgemental sampling technique were applied for this study. Etikan *et al.* (2016:2) state that convenience sampling is a type of non-probability sampling in which members of the target population who meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a specific time, or willingness to participate, are included in the study. This sampling technique was applied when distributing the questionnaires to the respondents.

Alchemer (2018:2) states that judgmental sampling refers to a non-probability sampling technique where the researcher selects units based on their existing knowledge or professional judgment. Judgmental sampling was used when conducting interviews with municipal officials. The sampling process adhered to the requirements of the Protection of Personal Information Act (No 4 of 2021), and the NWU guidelines and complied with the Covid-19 standard operation procedures.

### **3.5.2 Sample size**

A sample is a subset of the population that suitably represents the entire group (Burns *et al.*, 2017:239). The sample represents the entire population to ensure that the study can generalise the findings from the research sample to the population.

The study applied the Raosoft sample size calculator to determine the sample size in Category 1. For a target population of 49,208 households, at a margin of error of 5%, and a confidence level of 95%, the computed sample size is 382 households. Only one respondent per household was required to complete the questionnaire.

One official from each of the three local municipalities was purposively selected, thus the sample size (n) in Category 2 was three (3). The officials were either the water and sanitation managers or the chosen representatives from the water and sanitation departments in the three local municipalities.

### **3.6 Data collection**

Data collection refers to the procedures utilised to gather data from a specified population to assess defined parameters, by gaining insights into the research problem (Kabir, 2016:202). In this study, data was collected from two population categories. In Category 1, the researcher used a self-administered questionnaire for the residents. And in Category 2, semi-structured interviews were conducted with the water services managers.

#### **3.6.1 Self-administered questionnaires**

A questionnaire is a series of questions asked to individuals to obtain statistically useful information about a given topic (Roopa & Rani, 2012:273). In this study, a self-administered questionnaire was given to the residents of the three local municipalities in NMMDM. The questionnaire included both hard copies and google forms questionnaire. The questionnaire was constructed in simple English and used close-ended questions to collect data from the residents. It was developed to obtain the behaviour and beliefs of residents regarding water usage and to examine the communication between the municipality and the residents. The researcher distributed the questionnaire to 400 households within the three municipalities over three months. 350 questionnaires were collected after completion, and 50 google forms were electronically submitted to the researcher. Given that the sample was 382, the response rate was 105%.

#### **3.6.2 Semi-structured interviews**

An interview is a data-gathering technique involving verbal communication between researchers and participants (Adhabi & Anozie, 2017:88). Adhabi and Anozie (2017:89) further state that in a semi-structured interview, the interviewer uses an interview guide to maintain the flow of the interview which helps to get new ideas and in-depth findings to the phenomenon under study. Kallio *et al.* (2016:2959) state that one of the main advantages is that the semi-structured interview method is successful in enabling reciprocity between the interviewer and participant and qualifying the interviewer to improvise follow-up questions based on participant's responses and permitting space for participants' verbal expressions.

Three water service managers from the three local municipalities were interviewed. The researcher made appointments with the managers and went to the municipality offices to conduct the interviews. The interview schedule is outlined in Table 3.1.

**Table 0.1: Interview schedule for water service managers**

| Date of the interview | Time        | Local Municipality |
|-----------------------|-------------|--------------------|
| 16-08-2022            | 09:00-10:00 | Municipality A     |
| 19-08-2022            | 14:30-15:30 | Municipality B     |
| 30-08-2022            | 09:00-10:00 | Municipality C     |

The researcher used open-ended questions and follow-up questions to collect data from the managers. A copy of the interview guide is attached as Appendix 2. The following ethical protocols were observed during the interviews:

- The researcher introduced himself and thanked the participants for availing themselves for the interviews. The nature and aim of the study were explained to the participants.
- Permission to audio-record the interviews was sought, but this was not granted. As such, the interviews were recorded with field notes to ensure the accuracy of data collection.
- Measures to ensure the confidentiality of the data and the anonymity of the respondents were elaborated on.
- The participants were informed that participation was voluntary and that they could, at any time, withdraw from the study.
- The researcher ensured that there was effective communication as the interviews were conducted in a simple English language that the respondents could understand.
- The researcher ensured that the duration of the interview was less than 30 minutes to eliminate boredom among the participants.
- At the end of the interviews, the researcher thanked the participants for their time, kindness, and their thoughtful responses.

### 3.7 Data analysis

Data analysis is a method of bringing facts and statistics together to solve a problem (Williamson, 2018:05). The data collected through semi-structured interviews and questionnaires in this study were analysed in response to the objectives of the study.

Statistical Package for the Social Sciences (SPSS) was used to analyse the data collected from Category 1. The responses were coded into numeric values for proper statistical analysis using SPSS. Statistical techniques included descriptive statistics (frequency tables, percentages, and bar charts) and a few instances of inferential statistics as in the ANOVA segment.

Thematic analysis was adopted to analyse qualitative data for Category 2. Kiger and Varpio (2020:2) aver thematic analysis is an appropriate method of analysis for seeking to understand experiences, thoughts, or behaviours across a data set. Lorelli *et al.* (2017:2) concur that thematic analysis is useful for summarising key features of a large data set, as it requires the researcher to take a well-structured approach to handle data, helping to produce a clear and organised final report. Data collected through semi-structured interviews were transcribed from field notes and were coded into themes and categories.

Creswell (2014:247) identifies six steps researchers ought to follow in the process of qualitative data analysis. These steps are summarised in Figure 3.1 below.

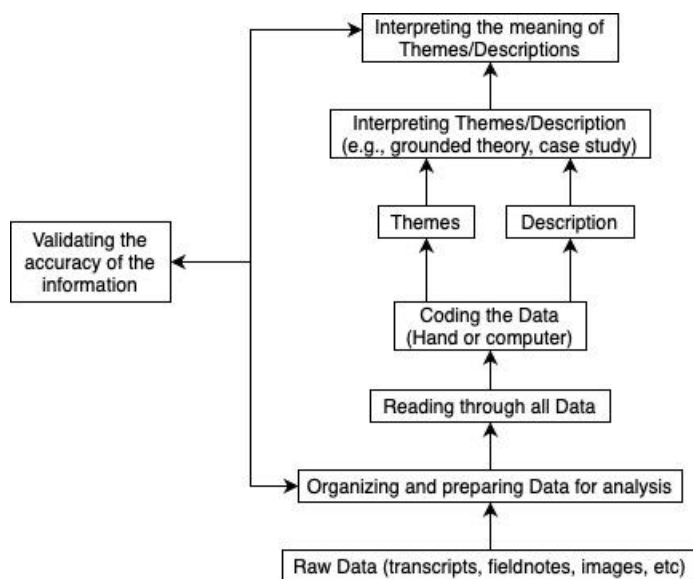


**Figure 0.1: Data analysis in qualitative research**

Source: Creswell (2014:247)

Data was analysed following the steps identified in Figure 3.1. The transcribing and organisation of data was done by the researcher using Atlas.ti software. And the results from the Atlas.ti software was interpreted by the researcher.

Trustworthiness of a study refers to the degree of credibility of an inquiry's findings (Elo *et al.*, 2014:2). Further, they aver, credibility, dependability, confirmability, and transferability are vital elements in ensuring trustworthiness in qualitative research. To ensure the trustworthiness of the study, the measures indicated in the checklist in Table 3.2 was implemented.

**Table 0.2: Checklist to enhance the trustworthiness of the study**

| Phase               | Questions to check                                              | Action/measures taken                                                              |
|---------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Preparation</b>  | Selecting the unit of analysis                                  |                                                                                    |
|                     | What are your strengths and weaknesses?                         | The researcher kept a self-appraisal journal for self-improvement to minimise bias |
|                     | Do you have a journal to keep an audit trail?                   | Kept records in a journal                                                          |
|                     | What is the unit of analysis?                                   | Heads of departments                                                               |
|                     | Is the unit of analysis suitable?                               | Selected the most appropriate participants                                         |
|                     | Sampling strategy                                               |                                                                                    |
|                     | What is the best sampling method for my study?                  | Applied the most appropriate method                                                |
|                     | What are the inclusion and exclusion criteria for participants? | Only officials in the water and sanitation department                              |
|                     | Who are the best informants for my study?                       | Heads of department                                                                |
|                     | Is the sample size okay?                                        | Ensured appropriate size                                                           |
|                     | Data collection method                                          |                                                                                    |
|                     | What do I need to do to collect the best data?                  | An interview guide had been developed                                              |
|                     | Is this the best way to answer the primary research question?   | Partly. It was augmented by a quantitative aspect                                  |
|                     | Should I use either open-ended or closed-ended questions?       | Used open-ended and further probing                                                |
|                     | Do I need to pilot my research instrument?                      |                                                                                    |
| <b>Organisation</b> | Categorisation and abstraction                                  |                                                                                    |
|                     | What informed the creation of constructs?                       | Experiences from other municipalities                                              |

|                  |                                                                                                  |                                                                                                                                                                                                                     |
|------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | Are the constructs appropriate?                                                                  | Yes                                                                                                                                                                                                                 |
|                  | Do the constructs overlap?                                                                       | No                                                                                                                                                                                                                  |
|                  | <b>Interpretation</b>                                                                            |                                                                                                                                                                                                                     |
|                  | How do you ensure the accuracy of data?                                                          | Note-taking of the interviews                                                                                                                                                                                       |
|                  | How will you ensure the reflection of knowledge in the analysis?                                 | Further explained the questions, and used follow-up questions for clarity                                                                                                                                           |
|                  | <b>Representativeness</b>                                                                        |                                                                                                                                                                                                                     |
|                  | How do you ensure the representativeness of the data set?                                        | paid attention to sampling adequacy ensured contextual completeness of the inquiry and used in-depth probing questions                                                                                              |
|                  | How reliable is the analysis process?                                                            | The Atlas. ti software is highly recommended. It minimises the bias of the researcher                                                                                                                               |
| <b>Reporting</b> | How will integrity be portrayed?                                                                 | The study depicted the checks and balances applicable to the aspects of trustworthiness                                                                                                                             |
|                  | How will explicitness be conveyed?                                                               | Methodological decisions were explained and justified. Evidence was provided to support interpretations and inferences                                                                                              |
|                  | How will you ensure congruence?                                                                  | The researcher ensured that the title of the study, the research questions, the objectives, and the research method are aligned. Further, the themes interrelate through their contribution to the research problem |
|                  | How will sensitivity to the social, cultural, and political contexts of participants be ensured? | All ethical prescripts commensurate with such studies were observed as explained in the letter of informed consent                                                                                                  |

Source: Adapted from Polit and Beck (2010:495) and Elo *et al.*, (2014:3)

### 3.8 Reliability and validity

Reliability refers to how consistently a method measures something. If the same results can be consistently achieved by using the same methods under the same

circumstances, then the measurement is considered reliable (Surucu & Maslakci, 2020:2694). Reliability in this study was attained by pilot testing the questionnaire on a random group of 20 individuals, after which the same instrument was administered to the entire sample. The respondents indicated that the questions were clear, simple, and easy to understand. It was discovered that it took less than thirty minutes to complete the questionnaire.

The Cronbach alpha test was conducted to assess the reliability of the measuring instrument. The results of the test are shown in Table 3.3.

**Table 0.3: Cronbach Alpha test**

| <b>Subscale</b>                 | <b>Cronbach's Alpha (<math>\alpha</math>)</b> | <b>N of Items</b> | <b>Mean</b> | <b>Standard Deviation</b> | <b>Internal consistency</b> |
|---------------------------------|-----------------------------------------------|-------------------|-------------|---------------------------|-----------------------------|
| <b>SECTION B:</b> Beliefs       | 0,73                                          | 14                | 2,98        | 0,34                      | Acceptable                  |
| <b>SECTION C:</b> Behaviour     | 0,72                                          | 25                | 2,66        | 0,36                      | Acceptable                  |
| <b>SECTION D:</b> Communication | 0,78                                          | 8                 | 2,07        | 0,31                      | Acceptable                  |

The Cronbach's alpha coefficients in Table 3.3 above are close to 1. This implies that the participants responded consistently to the questionnaire items. Kenny (2019:1018) avers that validity determines whether the research truly measures what it was intended to measure or how truthful the research results are. Content validity was ensured by constructing questionnaires based on experiences from other municipalities that have encountered the same conundrum. The questionnaire was constructed in simple English language to ensure that the questions were easy to understand.

### **3.9 Permission and informed consent**

Ethical approval was obtained from the North-West University Ethics Committee. A letter of informed consent accompanied the questionnaire and interview. Participants had to sign the letter of consent before proceeding with the questionnaires/interviews. Participants' rights to privacy and anonymity were respected. Participants were informed that they could withdraw at any stage should they wish. Refer to Appendix 10 for an attachment on ethics application.

### **3.10 Summary**

The study adopted a mixed-method approach and followed the descriptive and interpretive research designs. The population of the study comprised two categories namely residents that paid for water supplied and municipal officials in the departments of water and sanitation. Data were collected using a questionnaire and a semi-structured interview guide. The data collection process adhered to the standard operating protocols of the Covid 19 pandemic. Thematic analysis was applied to analyse qualitative data while quantitative data were analysed using the SPSS software. The study obtained ethical clearance from the Faculty of Economic and Management Sciences and abided by the ethics prescripts of the North-West University.

## CHAPTER 4 PRESENTATION OF FINDINGS

### 4.1 Introduction

This chapter presents the empirical findings of the study following the order of inquiry as set in the research instruments. The outcomes are presented graphically in charts, figures, tables, and narrative form. The results from the questionnaire of the residents are presented in Section 4.2 while the results from the interview with the water service managers of the municipalities are presented in Section 4.7.

### 4.2 Results from the questionnaire for residents

The researcher distributed 400 questionnaires across the three municipalities. All the questionnaires were completed, making a 105% response rate. For the sample size  $n = 382$  respondents, the Statistical Package for Social Science (SPSS) was used to analyse the responses from the respondents.

#### 4.2.1 The residents' local municipality

The residents were asked to indicate their local municipality and the results are displayed in Figure 4.1

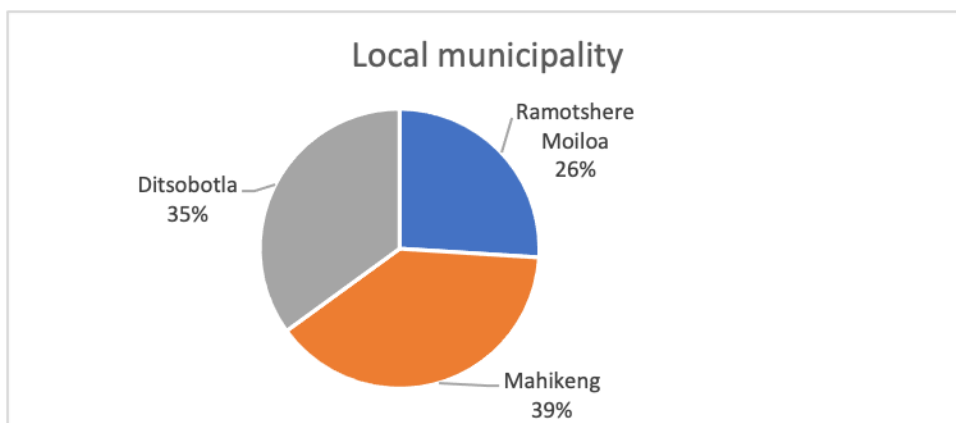


**Figure 0.1: The residents' local municipality**

The majority of the respondents were from Mahikeng Local Municipality (39%), which has the highest population in NMMDM.

#### 4.2.2 Average monthly water consumption

The respondents were asked to indicate their average monthly water consumption and the results are exhibited in Figure 4.2.

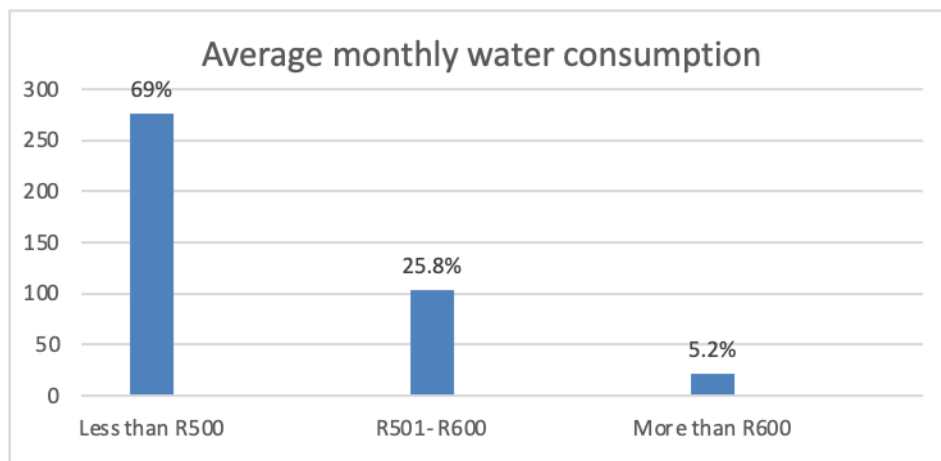


**Figure 0.2: Average monthly water consumption**

The results show that the majority of the residents spend less than R500 on water consumption.

#### 4.2.3 Type of Accommodation

The residents were asked to indicate the type of accommodation they lived in and the results are shown in Figure 4.3.

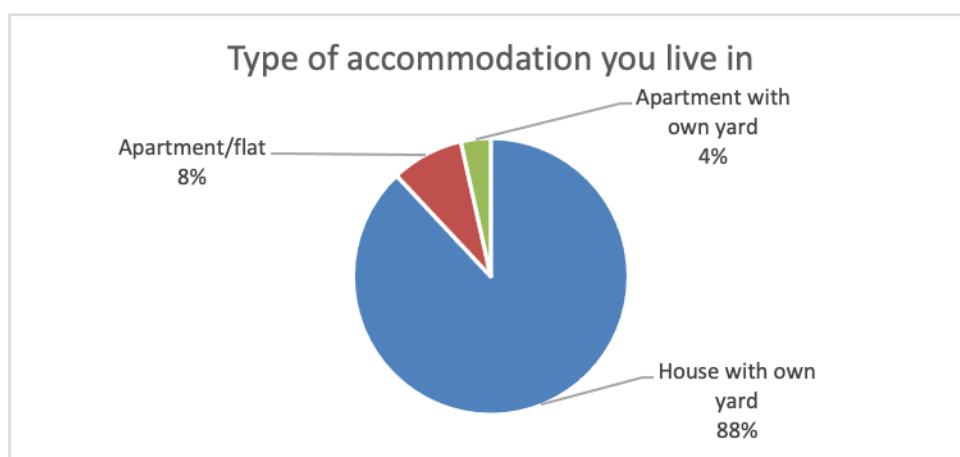


**Figure 0.3: Type of accommodation**

The results show that the majority (88%) of the respondents have yards on their premises while a minority live in apartments that do not have much space.

**4.2.4 Number of people staying in the house**

The residents were asked to indicate how many people stayed in their households and the results are shown in Figure 4.4.

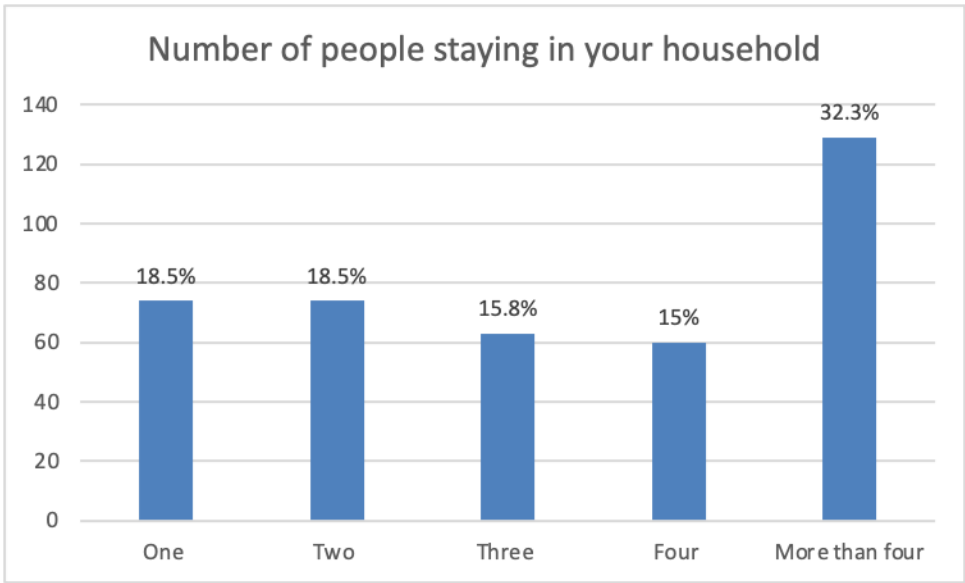


**Figure 0.4: Number of people staying in your household**

The results show that the majority of the respondents have more than four people living in their households.

**4.2.5 Employment status**

The respondents were asked to indicate their employment status, the results are shown in Figure 4.5

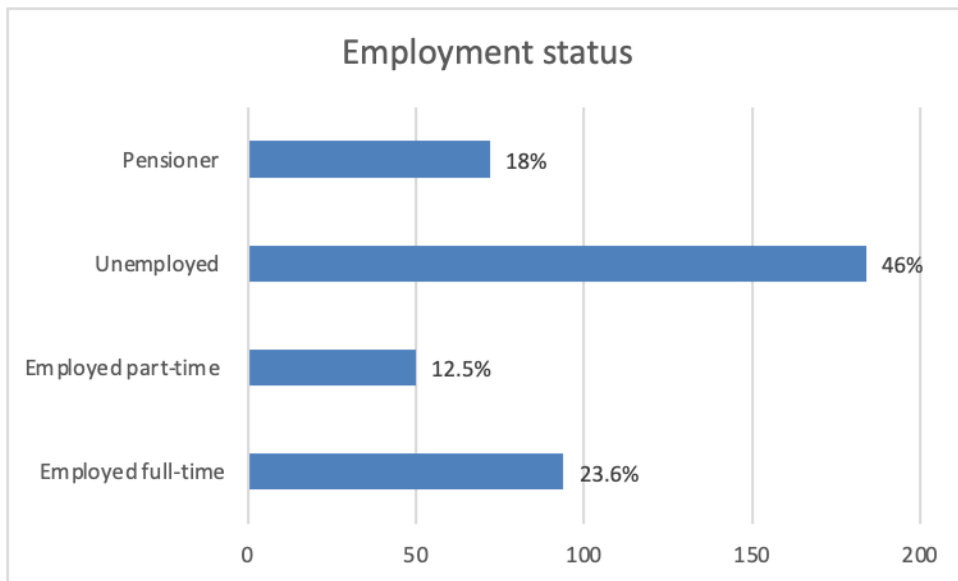


**Figure 0.5: Employment status**

The results show that only 41.6% of the respondents received a regular income.

#### **4.2.6 Monthly income**

The respondents were asked to indicate their monthly income, as shown in Figure 4.6

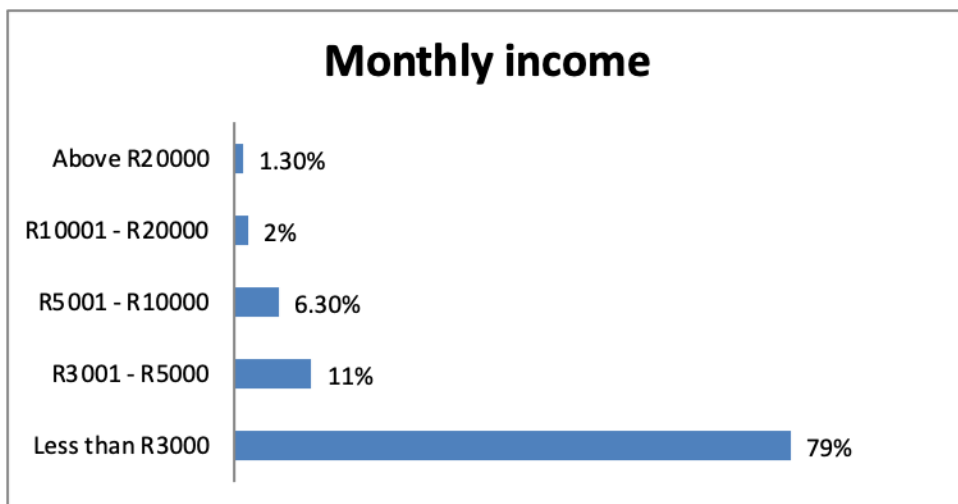


**Figure 0.6: Monthly income**

The results show that the majority of the respondents (90%) survive on a monthly income of R5000 or less.

#### 4.2.7 Status of ownership of the house

The respondents were asked to indicate the status of ownership of their houses, and the results are displayed in Figure 4.7.

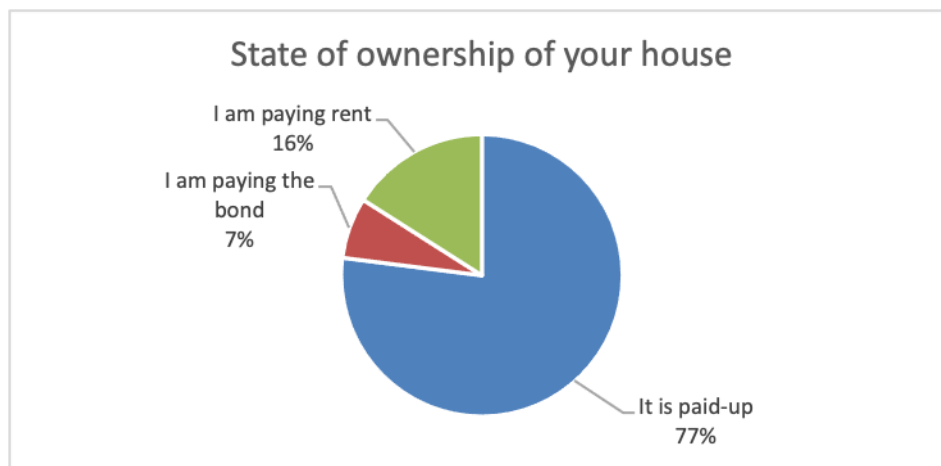


**Figure 0.7: State of ownership of your house**

The results show that 16% of the respondents live in rented premises while the majority (84%) own the houses in which they live.

#### 4.3 Section B: Beliefs

In this section, respondents were asked about their reasons for non-payment of water consumed. The responses are captured on a 4-point Likert scale with the following response options: 4 = strongly agree, 3 = agree, 2 = disagree, and 1 = strongly disagree.

##### 4.3.1 Reasons for the non-payment of water bills by members of the community?

The responses are shown in Table 4.1 in Appendix 16. The results show that the majority of the respondents agree with the reasons stated for the non-payment of water consumed. The most prevalent responses were poverty, unemployment, and the conviction that residents should not pay for water.

#### **4.3.2 Level of agreement with statements**

The respondents were asked to indicate their level of agreement with the statements provided in the table and the responses are captured in Table 4.2 in Appendix 17. The responses did not portray specific inclinations. However, most of the respondents were of the view that water should not be paid for and should be provided free of charge.

#### **4.4 Section C: Behaviour**

In this section, respondents were asked questions regarding their traits concerning water consumption and payment. A 4-point Likert scale with the response options of 4 = strongly agree, 3 = agree, 2 = disagree, and 1 = strongly disagree was applied.

##### **4.4.1 Reasons for reluctance to pay for water**

The respondents were asked to indicate their level of agreement with the statement provided in the table and the responses are shown in Table 4.3 in Appendix 18. The results show that the majority of the respondents agree with these statements. In essence, the participants have various reasons for not paying their water bills.

##### **4.4.2 Strategies for minimising wastage of water**

The respondents were asked to indicate their level of agreement with the following statement as captured in Table 4.4 in Appendix 19. The results show no specific inclination towards water conservation by the respondents. There are several strategies suggested in this question and the results are spread across the conservation strategies.

##### **4.4.3 Filling washing machine before use**

The respondents were asked if they filled their washing machines with water before use. The various responses are shown in Table 4.5 in Appendix 20. The results show that the majority of the respondents (54.6%) do not fill their washing machines with water before use.

#### 4.4.4 Uses of water by respondents

The respondents were asked to answer yes or no to the statements provided, the results are shown in Table 4.6 in Appendix 21. The results show that most of the respondents practice some form of water conservation according to the statements provided in Table 4.6

#### 4.4.5 Level of awareness among residents

The respondents were asked to indicate their level of agreement with the statement provided in Table 4.7 in Appendix 22. The results indicate that there is general mistrust in the meter reading and billing processes as reflected in the diversity of levels of awareness here.

#### 4.4.6 Matters on water bills

The respondents were asked to indicate their level of agreement with these statements in Table 4.8.

**Table 0.1: Matters on water bills**

| Responses                                                                                         | Strongly Disagree (%) | Disagree (%) | Agree (%) | Strongly Agree (%) |
|---------------------------------------------------------------------------------------------------|-----------------------|--------------|-----------|--------------------|
| C6.1 I understand the entries and computations on my water bills                                  | 34.5                  | 40.5         | 13.5      | 11.5               |
| C6.2 The figures entered on my bills are a reasonable reflection of water consumption in my house | 33.5                  | 33.8         | 23.3      | 9.5                |
| C6.3 I have outstanding arrears on my water account                                               | 16                    | 27           | 30.3      | 26.8               |
| C6.4 I believe my arrears should be written off as a bad debt                                     | 10.8                  | 24           | 29.5      | 35.8               |
| C6.5 I am willing to sign a debit order for my water bills.                                       | 20                    | 31.3         | 21.5      | 27.3               |
| C6.6 I am willing to enter an arrangement                                                         | 25.3                  | 37.5         | 12.8      | 24.5               |

|                                  |  |  |  |  |
|----------------------------------|--|--|--|--|
| to pay the arrears to my account |  |  |  |  |
|----------------------------------|--|--|--|--|

The responses obtained did not portray any specific inclination. However, most of the respondents (40.5) indicate that they do not understand the entries and computations on their water bills.

#### **4.4.7 Matters related to water in general**

The respondents were asked to indicate their level of agreement with the statements in Table 4.9, results are shown in Table 4.9

**Table 0.2: Matters related to water in general**

| <b>Responses</b>                                                                         | <b>Strongly Disagree (%)</b> | <b>Disagree (%)</b> | <b>Agree (%)</b> | <b>Strongly Agree (%)</b> |
|------------------------------------------------------------------------------------------|------------------------------|---------------------|------------------|---------------------------|
| C7.1 I feel I must pay for water consumed in my house                                    | 53                           | 25                  | 10               | 12                        |
| C7.2 We are always experiencing water shortages in my area                               | 15                           | 21                  | 35               | 29                        |
| C7.3 We are always alerted about planned water outages due to the maintenance of systems | 35.8                         | 27                  | 24.3             | 13                        |
| C7.4 I am satisfied with the quality of the water supplied                               | 29.8                         | 23.3                | 31               | 16                        |
| C7.5 I am satisfied with the pressure of the water in my house                           | 27.8                         | 24.3                | 28               | 20.1                      |

The results indicate that the majority of the respondents (62.8%) are not informed about water outages in their areas.

#### 4.4.8 Methods used to pay for water bills

Respondents were asked to indicate the method they use to pay for their water bills, and the results are shown in Table 4.10.

**Table 0.3: Method used to pay water bills**

|                                                    |      |
|----------------------------------------------------|------|
| C8.1 I pay at municipality offices                 | 23.6 |
| C8.2 I pay through electronic funds transfer (EFT) | 5.8  |
| C8.3 I pay at the post office                      | 3    |
| C8.4 I pay in shopping stores                      | 2.3  |
| C8.5 I do not pay my water bills                   | 65.5 |

The results show that the majority of the respondents (65.5%) do not pay their water bills, while the few who pay water bills do so at municipal offices.

#### 4.5 Section D: Communication

This section evaluated the effectiveness of the communication between the municipality and the residents, and the methods municipalities employ to communicate with the residents.

##### 4.5.1 Issuing bills to residents

The respondents were asked to indicate how they receive their water bills from the municipality, and the results are displayed in Table 4.11

**Table 0.4: I receive my water bills through**

|                              |      |
|------------------------------|------|
| D1.1 Residential address     | 43.3 |
| D1.2 Personal postal address | 2.5  |
| D1.3 Email address           | 2.8  |
| D1.4 Work postal address     | 2.3  |

|                                                     |     |
|-----------------------------------------------------|-----|
|                                                     |     |
| D1.5 My mobile phone                                | 4.3 |
| D1.6 I never receive my water account bill          | 45  |
| D1.7 Other<br>If other, please indicate your answer | 0   |

The results indicate that most of the respondents (45%) never receive water bills from the municipality even though there are various possibilities that the municipalities could utilise in this regard.

#### **4.5.2 The preferred method for receiving the municipality account**

The respondents were asked to indicate their preferred method of receiving the municipality account, and the results are shown in Table 4.12

**Table 0.5: The preferred method to receive municipality account**

|                                                     |      |
|-----------------------------------------------------|------|
| D2.1 Residential address                            | 82.5 |
| D2.2 Personal postal address                        | 4.5  |
| D2.3 Email address                                  | 3.3  |
| D2.4 My work postal address                         | 5.3  |
| D2.5 My mobile phone                                | 2.8  |
| D2.6 Other<br>If other, please indicate your answer | 1.8  |

The results show that 82.5% of the respondents prefer to receive their municipality account at their residential addresses.

#### **4.5.3 Medium of communication**

The respondents were asked to indicate their level of agreement with the medium used by the municipality to make them aware of the need to pay for their water account and

to conserve water. The results are displayed in Table 4.13. Scale: 4 = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree

**Table 0.6: Medium of communication used**

| Responses                | Strongly Disagree (%) | Disagree (%) | Agree (%) | Strongly Agree (%) |
|--------------------------|-----------------------|--------------|-----------|--------------------|
| D3.1 Radio programs      | 17                    | 38           | 12.8      | 32.3               |
| D3.2 Television programs | 18.3                  | 39.8         | 15.3      | 26.8               |
| D3.3 Billboards          | 37.3                  | 48.3         | 10.8      | 3.8                |
| D3.4 Fliers              | 38.5                  | 41.5         | 16.5      | 3.5                |
| D3.5 Social media        | 31                    | 43.3         | 13.8      | 12                 |
| D3.6 Reminders by SMS    | 35.5                  | 44           | 15        | 5.5                |
| D3.7 Reminders by e-mail | 36                    | 46.3         | 11.3      | 6.5                |
| D3.8 Newspapers          | 34.8                  | 45.5         | 10.3      | 9.5                |

The results show that most of the respondents disagree with the medium stated in Table 4.13, suggesting that the municipality does not communicate with residents effectively.

#### **4.6 Analysis of Variance (ANOVA)**

ANOVA was used to compare the attitudes and behaviours of residents (account holders) from Mahikeng, Ramotshere Moiloa, and Ditsobotla Local municipalities toward payment for water consumed. The results are depicted in Table 4.14 in Appendix 23

ANOVA results

Factor: Local Municipality

Dependent variable: Attitude towards payment for water consumed

Scale: 4 = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree

Since the p-values in the above SPSS output are less than 0.05 level of significance, it means that there is a significant difference in the average responses of residents from various local municipalities (Mahikeng, Ramotshere Moiloa, and Ditsobotla) regarding attitudes towards payment for water. According to the mean scores of their responses (Appendix 23), most residents tend to disagree, and others tend to slightly agree with the items listed in the questionnaire.

#### **4.7 Results from the interview with the water service managers**

This section presents the findings from the interviews conducted with the water service managers of the three municipalities. A 100% response rate was achieved since all the managers were interviewed. The data were analysed through participants' responses, and the field notes, then organising the data, reading through all data, coding the data into themes and categories, inferring the themes, and discussing the findings. The terms municipality and local municipality are used to refer to the same entity.

##### **4.7.1 Factors leading to defaults in payment**

The respondents were asked to identify the factors that lead to default in payment of the residents within their municipalities and results are shown in Figure 4.8

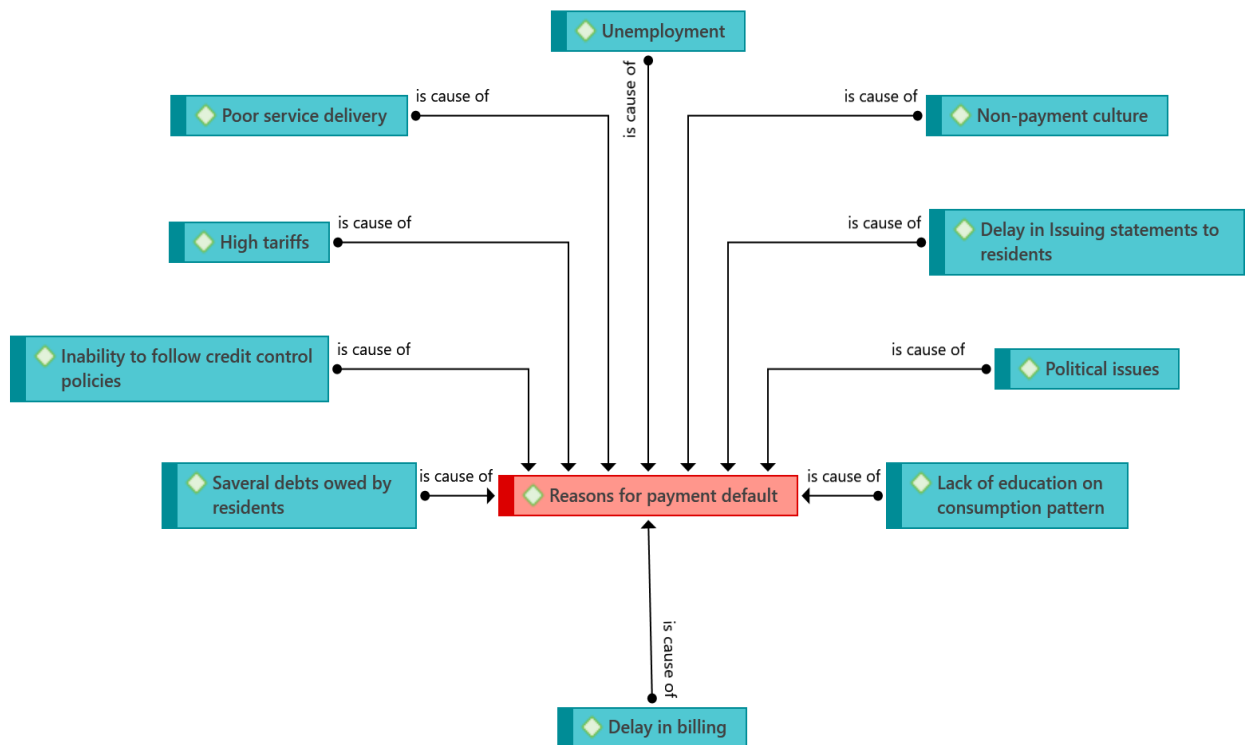


**Figure 0.8: Factors leading to defaults in payment**

In Figure 4.8, the participants submitted that the reasons for payment default include unemployment, the non-payment culture of the residents, delay in issuing statements to residents, political issues, lack of education on consumption patterns, delay in billing, several debts owed by the residents, inability to follow credit control policies, high tariffs, and poor service delivery. These submissions were not in any hierarchy, but cumulatively demonstrate the major reasons for non-payment.

#### **4.7.2 Measures that the municipality has put in place to mitigate contributory factors for defaulting**

The respondents were asked about the measures they put in place to eradicate the debts and their responses are summarised in Figure 4.9 below.

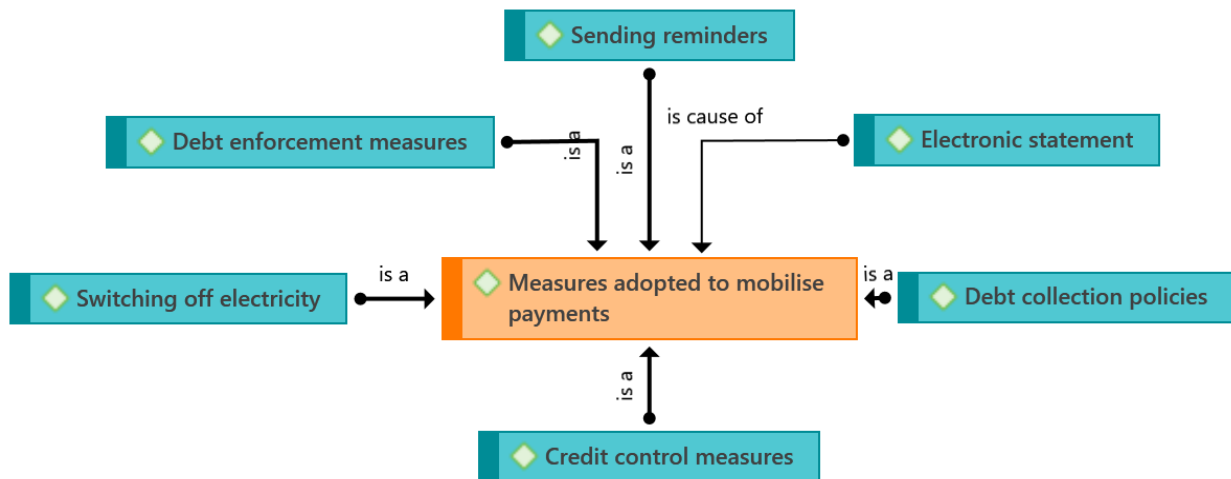


**Figure 0.9: Measures to mitigate factors of non-payment by residents**

In Figure 4.9, the participants submitted that the measures adopted to collect debts from the residents include the application of credit control policies, sending electronic statements, debt collection policies, debt enforcement measures, sending reminders, and switching off electricity. Follow-up questions on measures to mitigate factors of non-payment by residents their responses are summarised below in Table 4.15

**Table 0.7: Measures to mitigate factors of non-payment by residents**

| No  | Questions                                                            | Municipality A                                                                                       | Municipality B                                                                | Municipality C                      |
|-----|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------|
| 3.6 | Do you have effective Byelaws to collect the outstanding water debt? | No, we are using old Byelaws. We have not developed new Byelaws; the current ones are not effective. | No, the Byelaws are not effective as we have accumulated a lot of water debt. | No, we do have the Byelaws in place |

|     |                                                                           |                                                             |                                                                                                                                                         |                                                                                                                |
|-----|---------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 3.7 | Do you have sufficient financial resources to implement the Byelaws?      | No, we cannot implement them because of budget constraints. | No, getting the budget to implement the Byelaws has proven to be difficult, as there are a lot of discussions that take place and it is time-consuming. | Yes, we do have the financial capacity to implement the Byelaws, but due to political interference, we cannot. |
| 3.8 | Do you have a legal unit to enforce the Byelaws?                          | Yes, we have two legal officers                             | No, we normally outsource legal services.                                                                                                               | No, we outsource                                                                                               |
| 3.9 | Do you have the adequate human resources capacity to enforce the Byelaws? | No, it is not adequate                                      | No, we have limited staff due to budget constraints.                                                                                                    | Yes, we have inspectors, financial officers, meter readers, and a technical team.                              |

The findings indicate that the local municipalities cannot enforce payment for water due to obsolete legal instruments, budgetary constraints, and insufficient human resources.

#### 4.7.3 Installation of pre-paid meters

The respondents were asked if they installed pre-paid meters in their municipalities and their responses are shown below in Table 4.16.

**Table 0.8: Installation of pre-paid meters**

| Municipality A | Municipality B | Municipality C |
|----------------|----------------|----------------|
| No             | Yes            | No             |

The responses from Table 4.16 show that only Municipality B has installed pre-paid water meters in their municipality. Other municipalities such as Municipality A and Municipality C have not installed such meters. This may suggest that Municipality B is ahead of other municipalities in finding solutions to manage their water debt.

#### 4.7.4 Reasons for not installing meters

The respondents were asked for the reasons they did not install pre-paid meters, and their responses are shown below in Figure 4.10

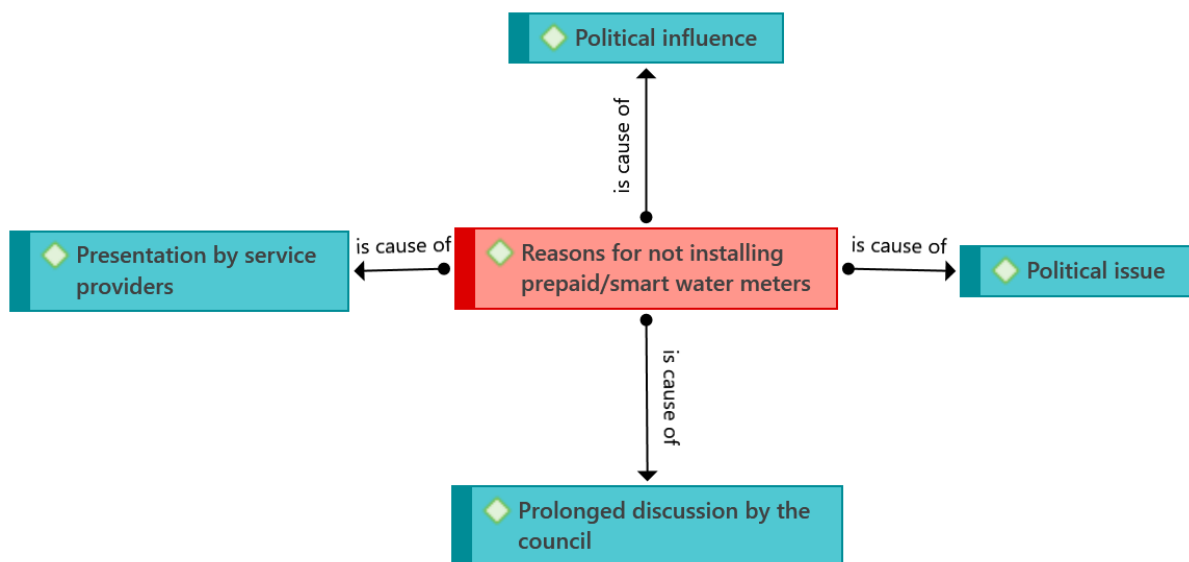


**Figure 0.10: Reasons for not installing pre-paid meters**

Figure 4.10 portrays that the reasons for not installing pre-paid water meters include political influences, political issues, prolonged discussions by the council, and several presentations by the council.

#### 4.7.5 Measures applied by the three municipalities to enforce payments

The respondents were asked several questions about the measures they use to enforce payment from the residents and responses are displayed below in Table 4.17

**Table 0.9: Measure applied by the municipalities to enforce payments**

| No.   | Questions                                                                                                                | Municipality A         | Municipality B               | Municipality C         |
|-------|--------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------|------------------------|
| 2.2   | Have you appointed independent revenue collectors for your municipality?                                                 | Yes                    | No- Internal computation     | Yes                    |
| 2.2.1 | How has it impacted water payment?                                                                                       | Effective              | Effective                    | Not effective          |
| 2.3   | Have you embarked on campaigns to encourage a culture of payment for municipal services?                                 | Yes                    | Yes                          | No- planning stage     |
| 2.3.1 | How has it impacted water payment?                                                                                       | Positive impacts       | Positive impacts             | Not yet                |
| 2.4   | Have you improved on the municipality's systems and infrastructure to ensure the sustainability of services and finance? | No- Budget constraints | Yes                          | No- Budget constraints |
| 2.4.1 | How has it impacted water payment?                                                                                       | Not applicable         | Increased revenue collection | Not applicable         |

In Table 4.17, it could be observed that Municipality A and Municipality C have appointed independent revenue collectors to handle debt collection, while Municipality B has embarked on internal computation. Considering the measures adopted by Municipality A and Municipality B, they testified that these methods have been effective while the engagement of an independent debt collector in Municipality C has not been effective. Regarding campaigns to encourage a culture of payment for municipal services, Municipality A and Municipality B have applied such techniques which have yielded positive impacts. Also, Municipality C is yet to implement such a technique as they are in its planning stage. Municipality B affirmed that they have improved the municipality's systems and infrastructure to ensure the sustainability of services and

this has proved a huge success in revenue collection. However, Municipality A and Municipality C have not implemented this technique due to budget constraints.

#### 4.7.6 Debt measures applied by the three municipalities

The respondents were asked questions about the debt measures they have in place to solve the rising debt in their municipalities and the results are shown below in Table 4.18

**Table 0.10: Debt management measures**

| No.   | Questions                                                                                                                       | Municipality A                  | Municipality B                  | Municipality C                       |
|-------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------|--------------------------------------|
| 3.1   | Have you enforced strict management of payment default with firm action such as limiting water flowing to defaulting residences | Yes                             | No-<br>Water shortage issue     | Yes                                  |
| 3.1.1 | How has it impacted water payment?                                                                                              | Positive impacts                | N/A                             | Positive impacts                     |
| 3.2   | Have you prosecuted defaulters in a court of law?                                                                               | No                              | No                              | No                                   |
| 3.2.2 | What are the reasons for not implementing this recommendation?                                                                  | Not the function of the manager | No debt collection measures     | External lawyers, no legal unit here |
| 3.3   | Have you considered the restructuring of debt?                                                                                  | Yes                             | Yes                             | Yes                                  |
| 3.3.1 | How has it impacted water payment?                                                                                              | Positive impacts                | Positive impacts                | Positive impacts                     |
| 3.4   | Have you considered offering incentives to defaulters to clear their debts?                                                     | Yes                             | Yes                             | Yes                                  |
| 3.4.1 | How has it impacted water payment?                                                                                              | Suffered a loss                 | Increased revenue               | Increased revenue                    |
| 3.5   | Have you considered debt selling?                                                                                               | No                              | No                              | No                                   |
| 3.5.1 | What are the reasons for not implementing this recommendation?                                                                  | Lack of information             | Concentrating on credit control | Considering the residents            |

In Table 4.18, Municipality A and Municipality C attested that they have enforced strict management of payment default with firm action such as limiting water flowing to defaulting residences. They also confirmed that this measure has yielded a positive outcome. Municipality B highlighted that they have not adopted such measures due to the water shortage issue. Regarding the prosecution of payment defaulters in court, all the municipalities confirmed that they have not applied such a remediation technique. Municipality A states that it is not the function of the municipal manager, Municipality B confirmed that they do not adopt it as a debt collection measure while Municipality C affirms that they contract external lawyers due to their inability to incorporate a legal unit in the municipality.

Regarding the restructuring of debts, all the municipalities confirmed that they have considered the concept and testified that it has made positive impacts on debt mobilisation. Regarding offering incentives to debtors, the municipalities confirmed that they have applied the technique. Concerning the offering of incentives, Municipality A states that they suffered a loss while the other two municipalities confirmed that it increased their revenue. Finally, the respondents were asked if they had ever considered debt selling and they confirmed that such a technique has not been considered in their various municipalities due to a lack of information, concentration on their credit control policies, and considering the residents who are liable to lose their houses.

#### **4.7.7 Measures adopted by the three municipalities to monitor leakages**

The respondents were asked about the measures they have in place to deal with water leakages within their municipalities, and the responses are shown in Figure 4.11

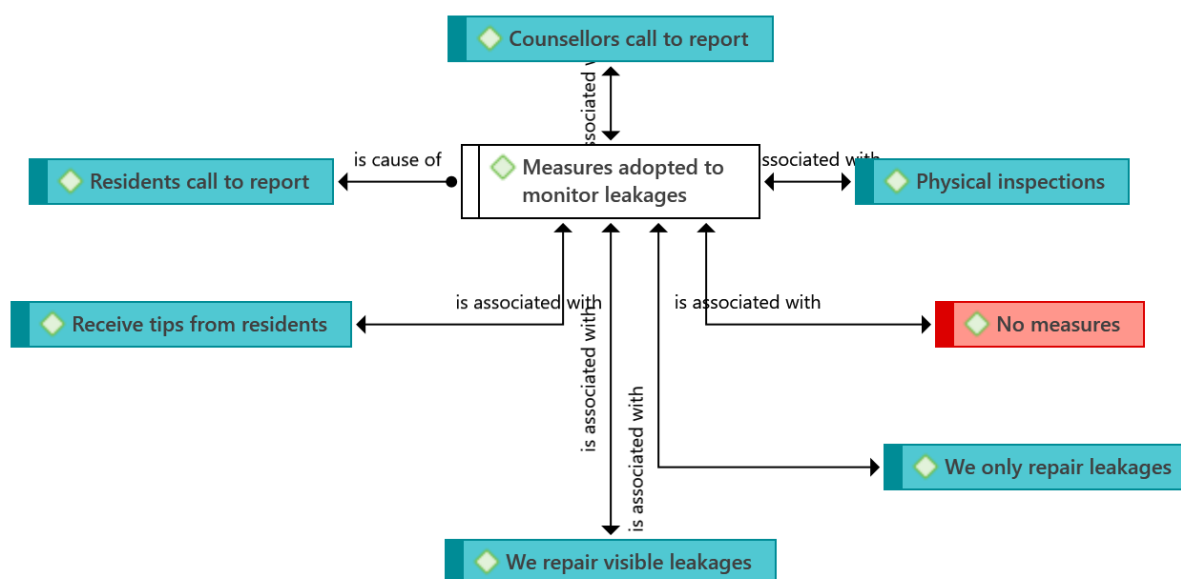


**Figure 0.11: Measures adopted to monitor leakages**

The municipalities attested that they do not have a specified automated technique to monitor water leakages other than physical inspection, tips from residents, and information from councillors. They also confirmed that they repair leakages immediately after they get the information.

#### 4.7.8 Measures undertaken to conserve water by both the residents and the municipality

The respondents were asked questions regarding the measures they applied to conserve water and their responses are captured in Table 4.19

**Table 0.11: Measures undertaken to conserve water by both the residents and the municipalities**

| No.   | Questions                                                           | Municipality A     | Municipality B                                 | Municipality C       |
|-------|---------------------------------------------------------------------|--------------------|------------------------------------------------|----------------------|
| 4.1   | Quantity of the non-revenue water and the amount in Rands.          | No data            | No data                                        | No data              |
| 4.2   | Do you have meters installed at all your communal water tap points? | No                 | No                                             | No                   |
| 4.2.2 | Explain why this is the case                                        | Budget constraints | Provision of in-house water, provision of Jojo | Still on the project |

|       |                                                                                         |                     |                                |                        |
|-------|-----------------------------------------------------------------------------------------|---------------------|--------------------------------|------------------------|
|       |                                                                                         |                     | tanks                          |                        |
| 4.3   | Do you plan to install meters at communal tap points?                                   | Yes                 | Yes                            | Yes                    |
| 4.3.1 | When do you plan to do so?                                                              | Next financial year | Soon, depending on the finance | Next financial year    |
| 4.4   | Do you have push button taps installed on communal taps?                                | No                  | No                             | No                     |
| 4.4.2 | Why have you not implemented this water-saving measure?                                 | Never thought of it | Budget constraints             | Budget constraints     |
| 4.5   | Do you have meters installed at all points where water tankers are supplied with water? | No-                 | No                             | No                     |
| 4.5.1 | Explain why this is the case                                                            | Budget constraints  | Budget constraints             | Political interference |

This section provides the measures undertaken to conserve water by both the residents and the municipalities. In Table 4.19, the municipalities confirmed that they do not have data showing the quantity of the non-revenue water and the amount in Rand. They further confirmed that they do not have meters installed at all communal water tap points due to budget constraints, and the provision of in-house water. However, Municipality C highlighted that they are still on the project.

The study further asked if the municipalities plan to install meters at communal tap points and all the municipalities were positive about the initiative and declared that they would embark upon the project by the next financial year. The respondents confirmed that they do not have push button taps installed on communal taps due to budget constraints and a lack of information about the technique. Finally, the respondents attested that they do not have meters installed at all points where water tankers are supplied with water due to budget constraints and political issues.

#### **4.7.9 Water control measures**

The respondents were asked questions related to water control measures and their submissions are shown below in Table 4.20

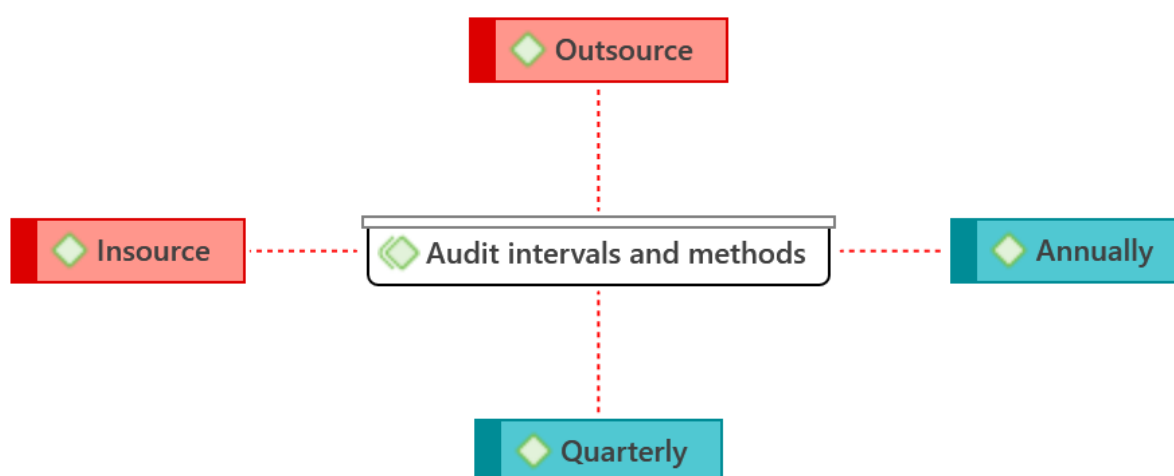
**Table 0.12: Water control measures**

|                                 | Municipality A       | Municipality B       | Municipality C       |
|---------------------------------|----------------------|----------------------|----------------------|
| Scenario                        | Number of households | Number of households | Number of households |
| Number of meters installed      | 2900                 | 24 423               | 21 768               |
| Pre-paid water meters           | 0                    | 21 981               | 0                    |
| Non-functional billing meters   | 1 000                | 2 000                | 340                  |
| Faulty billing meters           | 1 000                | 2 000                | 2 710                |
| Fully functional billing meters | 1 900                | 22 423               | 18 718               |

The water control measures as presented in Table 4.20 confirm that Municipality B holds the highest number of residents who have prepaid water meters in their residences. Table 4.20 further illustrates that Municipality B has the highest number of non-functional billing meters. Also, it could be deduced that the municipalities have few faulty billing meters and more fully functional meters.

#### 4.7.10 Conducting of audits

The respondents were asked if they insource or outsource their audit teams and when they do, the results are presented in Figure 4.12



### Figure 0.12: Audit intervals and methods

According to Figure 4.12, respondents concurred that they conduct audits quarterly and annually. However, Municipality A and Municipality B confirmed that they use their employees for the audits while Municipality C affirms that they outsource the audits to external contractors.

#### 4.7.11 The medium used by the municipalities to communicate their messages to the residents

The respondents were asked questions about the medium they used to communicate with their residents, the results are shown below in Table 4.21

**Table 0.13: Means of communication**

| Message                  | Post office | SMS | Email | Social media | Call centre | Print media | TV/Radio |
|--------------------------|-------------|-----|-------|--------------|-------------|-------------|----------|
| Bills                    | X X         | N/A | X X X | N/A          | X           | X           | X        |
| Reminders to pay         | X X         | X   | X X   | N/A          | X           | N/A         | N/A      |
| Conservation tips        | X           | X   | X X   | X            | X           | X X         | X X X    |
| Service disruption       | X           | X   | X X   | X            | N/A         | X           | X X X    |
| Incentive for defaulters | X X         | N/A | X X X | N/A          | N/A         | N/A         | X X X    |

Key:

**X: Municipality A**

**X: Municipality B**

**X: Municipality C**

In Table 4.21, the various means of communication used by the municipality to communicate its messages to the residents were documented. Concerning sending

bills, e-mails were the most means of communication followed by the Post Office. Other communication means adopted are the call centre, print media, and television or radio.

Concerning sending reminders to pay debts, post offices, emails, SMS, and call centres were adopted. The three municipalities use television and radio to advertise water conservation tips. Other measures adopted include emails, print media, post offices, SMS, social media, and call centres. To communicate service disruption, the municipalities mostly adopt television and radio as means of communication. Other channels used include emails, post offices, SMS, social media, and print media. Finally, the incentive for defaulters is communicated through emails, television and radio, and post offices.

#### **4.8 Summary**

The study's empirical findings were reported in this chapter. Quantitative and qualitative research was the focus of the empirical study. The quantitative study presented the findings in terms of the residents' biographical information, the factors leading to non-payment for water consumption, and the residents' attitudes and behaviour concerning water usage. The semi-structured interviews from the qualitative study were coded into themes and categories, and the main concepts were then identified and discussed. The final chapter concludes the study, discussing the findings in the context of the research problem and ultimately deriving recommendations for both the municipalities and future research.

## **CHAPTER 5 DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter discusses the results presented in Chapter 4 concerning the research questions and research objectives. It recommends measures for improving water revenue collection and minimising the water debt owed by Ngaka Modiri Molema Municipality (NMMDM). Finally, it provides the conclusion of the study and provides the recommendations and conclusion of the study.

The primary research question is- what needs to be done to improve the payment of water bills by households and to minimise the wastage of water? The secondary research questions were:

- What are the factors that deter residents from paying their water bills?
- What measures need to be implemented to improve the water payment rates by residents?
- How effective are the measures applied to recover the outstanding water debt from residents?
- What needs to be done to minimise water wastage?
- How effective is the communication between the local municipalities and the residents?

### **5.2 Factors that deter residents from paying their water bills**

Studies that were earlier undertaken, and are reviewed in Section 2.3.5, indicate that in parts of South Africa where consumers have enjoyed a free supply of water, the costs have been borne by the state usually through the local municipalities (van Koppen & Schreiner, 2014:544). Kanyane (2014:310), Manyaka (2014:128) and Hanjahanja and Omuto (2018:1), as well as Liu *et al.* (2020:2), indicate that the reasons for the non-payment for water in South African municipalities include:

- Unemployment
- Poverty
- Entitlement issues

- Political issues
- Socio-demographic factors
- Inaccurate billing system

The empirical findings captured in Table 4.1 and Figure 4.8 agree with the reasons for non-payment stated in Section 2.3.5. Predominant in the responses in Table 4.1 are poverty (85.3%) and unemployment (83%). The local municipalities have no control over socioeconomic factors such as poverty, unemployment, and low wages. Nevertheless, the local municipalities cannot cite socioeconomic factors as the reasons for failing to pay for the bulk water supplied. Under the circumstances, they have no alternative but to invoke the strict management measure of limiting water flowing to the defaulting households.

In the literature investigation, Section 2.3.5.4 reveals that political issues date back to the 1940s when political organisations, such as the African National Congress (ANC), advocated for the non-payment of services as a means of weakening apartheid's control on black-dominated areas by making them ungovernable. In Section 2.3.7.4, Popescu (2014:443) reveals that a person's behaviour is influenced by environmental stimulation. The political approach of the gone by days acted as a stimulus for the community to develop a negative attitude toward payment for water and services. This attitude continues regardless of who is in power. The observation by Ao *et al.* (2020:2591) that people's attitudes have an impact on their behaviour becomes valid when the belief expressed in Table 4.2 that water should be supplied free of charge is operationalised in Table 4.10 where 65.5% of the respondents stated that they do not pay for water. From the above discussion, it emerges that the non-payment for water by residents is not only due to poverty and unemployment but is also due to deeply entrenched attitudinal and behavioural issues. Local municipalities may have some control over the attitudinal and behavioural issues, however, it is a tall order.

An analysis of the responses in Tables 4.3, 4.7, 4.8, and 4.9 reveals an element of mistrust of the local municipalities by the residents. The pointers to the mistrust are outlined below.

Pointers to the mistrust by residents. The residents point out the following

- A questionable billing process

- Faulty meters
- No bills received
- Lack of action against defaulters
- Meter readings not taken
- The amount billed is not a true reflection of the water consumed
- Irregular water supply
- No notification about planned system maintenance
- Poor water quality

Source: Own compilation

It is, therefore, imperative that the local municipalities should address the pointers identified and rebrand themselves to gain the trust of the residents.

Considering these factors, one would recommend the following measures to tackle non-payment of municipal water bills:

- The municipalities should rebrand themselves to gain the trust of the residents
- The three tiers of government should embark on massive public awareness campaigns to dissociate politics from payment for water
- The municipalities should manage the indigent policy and ensure that it is applied deserving to households to avoid exploitation of the policy
- The residents should be made aware of the benefits of paying their water bills and the consequences of defaulting
- The municipalities must adopt the strategy of sending electronic statements to their residents for better and faster delivery of service bills.
- There must be consequences for defaulters
- The municipalities should improve on service delivery and report any disruptions or shortages in the water supply to residents in advance

### **5.3 The revenue management strategy**

This section addresses Research questions 2 and 3. When asked about the revenue management strategies for their municipalities, all three officials had similar answers that are thematised in Figure 4.9. It was clear the answers were recited from the

revenue enhancement model (Figure 2.3) that was developed by SALGA. Further probing revealed that in all three local municipalities:

- The relevant Byelaws were obsolete and new effective Byelaws were required
- The drafting of effective Byelaws was negatively impacted by political interference
- There were inadequate financial or human resources to enforce effective debt-collection measures
- The funding of debt collection enforcement measures was negatively impacted by political interference
- The legal departments were either non-existent or were under-staffed

From the above discussion, it emerges that whereas there are good policies and procedures in place to manage revenue collection, the local municipalities lack both the financial and human resources to effectively enforce revenue collection.

Analyses of Tables 4.17, 4.18, and 4.20 reveal the following:

- Outsourcing revenue collection to private companies yielded positive results, however, this measure has not been fully implemented in the three local municipalities
- Campaigns to promote the culture of payment for services yielded positive results, however, this measure has not been fully implemented in the three local municipalities
- Systems improvement and maintenance of infrastructure yield positive results; however, this measure has not been fully implemented in the three local municipalities
- Implementation of water-flow restrictions yielded positive results; however, this measure has not been fully implemented in the three local municipalities
- Defaulters are not prosecuted due to obsolete Byelaws and the lack of enforcement staff
- Debt restructuring yielded positive results; however, this measure has not been fully implemented in the three local municipalities
- Debt selling has never been considered an option for recovering debts

- There are records of water consumption at communal taps
- There are no records of the quantity of water supplied to water tankers
- Prepaid meters were installed in 45% of the residences
- Faulty and non-functional meters were reported in the three local municipalities

Given the above revelations, the researcher recommends as follows:

- The three tiers of government must endeavour to dissociate the payment for water and services from politics
- Effective Byelaws that give clout to law enforcement should be passed
- Revenue collection should be outsourced to private entities that have the power to prosecute and attach property
- Prepaid meters must be installed at all residences
- The water reticulation infrastructure should be improved and regularly maintained
- Water-flow restrictions must be implemented against defaulters
- Outstanding debts should be sold off to private debt collectors
- The local municipalities must keep records of the quantity of water distributed through communal water points and water tankers

#### **5.4 Minimising the wastage of water**

In Section 2.3.7.3, Kumari and Singh (2017:76), define water conservation as an action; behavioural change; technological change; improved design; or process implemented to reduce water loss. In this study, the term water wastage is used to describe the action of causing the loss of water whether deliberately or otherwise. In the context of this study, water wastage occurs at different levels for instance:

- At the domestic level, water is wasted when you wash only one shirt in a washing machine
- At the community level, water may be lost through carelessness when taps at communal water points are not properly closed or are left open during periods of water outages
- At the municipality level, water is wasted when a water loss occurs through burst pipes during reticulation
- At the municipality level, water is wasted when water tankers supply water intended for domestic consumption to farms and construction sites

The results from the survey presented in Tables 4.4, 4.5, and 4.6 show the residents were not inclined toward the water-saving tips reviewed in Section 2.3.7.5. One can infer that there is water wastage at the domestic level. This implies that there is a need for behavioural change at the domestic level.

The municipalities were asked about the monitoring of water pipe leakages. The findings thematised in Figure 4.11 indicate that the municipalities do not rely on technology to monitor water leakages. They rely on physical inspection, tips from residents, and councilors. The researcher considers these methods to be unsuitable for the reasons:

- Physical inspection is not cost-effective
- Tips from residents cannot be relied on when there are no toll-free numbers

The officials were asked about the different methods for monitoring and minimising water loss. The findings presented in Table 4.19 indicate that all three local municipalities do not keep records of either water consumed at communal water points or distributed through water tankers. By keeping records of consumption, red flags, indicating either leakages or malpractices, are raised.

The following are the recommendations that both the municipalities and residents ought to follow in trying to practice water conservation:

- The three tiers of government must embark on public campaigns and Imbizos to raise awareness of water conservation
- Residents should install water-saving faucets in their households
- Residents should take short showers and reduce singular bathtub use as this saves a lot of water
- Residents should collect rainwater and use it to water gardens or use it to wash cars
- The municipalities should apply technological measures to monitor leakages
- Residents should regularly check their taps and toilets for leakages
- Residents should not rinse their dishes under a running tap
- Run the dishwasher or washing machine only with a full load

- Residents should reuse the water from their laundry to water their gardens or use it to flush the toilet
- Use the broom to clean driveways, and not a running hose
- Cover swimming pools to reduce evaporation
- Municipalities should educate customers on how to read and understand their water bills. An explicit water bill should identify the volume of usage, rates, charges, and other relevant information.
- Municipalities should replace faulty or leaking water meters
- The municipalities should monitor unaccounted-for water, by installing automated sensors. Remote sensors and monitoring software alert operators of leaks, fluctuations in pressure, problems with equipment integrity, and other concerns.

### **5.5 Communication between the local municipalities and the residents**

Section 2.3.8 reviews the concept of communication. Communication is the process of generating meanings between two or more people via the expression and interpretation of messages (Cleary, 2021:1). Lessons learned from the literature include:

- Communication is a continuous process as businesses need to respond to feedback from their target audiences
- Choosing an appropriate communication medium is critical for ensuring that messages reach the intended audience and that they comprehend the message's purpose and significance

The study investigated the use of the popularly utilised communication media by the local municipalities. From the results in Tables 4.11, 4.12, and 4.21, it can be deduced that:

- There is poor communication between the local municipalities and the residents
- Communication between the local municipalities and the residents is mainly through residential addresses
- Call centres are not used in all local municipalities
- The use of electronic media for communication is at a bare minimum
- The preferred choice for receiving bills is through residential addresses

Given the low level of communication noted above, one may assume that many residents may not be knowing how much they owe and the consequences. As such, they do not pay their bills and are wasteful when using water. The researcher believes good communication by the local municipalities to the residents can lead to behavioural change resulting in an increase in revenue collection and improved water conservation.

Issuing water bills through residential addresses has attendant problems that include:

- Bills may not be delivered to the right addresses
- Some residences do not have proper mailboxes and the mail is blown away by the wind
- The account holders, of rented properties, may not receive the bills and they assume that the tenants are up to date with the payment

Considering the problems identified above, one can infer that the issuance of water bills through residential addresses is a compounding factor in the escalating water bills.

There is a need for the local municipalities to improve their communication with the residents. To achieve this goal, it is recommended that they undertake the following measures:

- Take cognisance of the computer skills of individuals and gradually implement the migration from paper to electronic media communication
- Use local radio stations to sensitise the public on issues concerning water conservation, free water, and the obligation to pay for water
- Have a call centre for following up on overdue accounts
- Have an interactive website with a Chatbot to answer queries
- Provide a toll-free number for queries
- Use marketing tools such as billboards and infomercials to raise awareness of water conservation

## **5.6 Conclusions**

This study set out to answer a primary research question and five secondary questions. The five were explored to address the primary question. The conclusions made for each secondary question are outlined in Table 5.2.

**Table 0.1: Conclusions arising from secondary questions**

| <b>Secondary question</b>                                                                                                                                                                       | <b>Conclusions</b>                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. What are the factors that deter residents from paying their water bills?                                                                                                                     | The six factors identified in Section 2.3.5 apply to this study. A seventh factor – is a lack of trust in the municipalities by residents        |
| 2. What measures need to be implemented to improve the water payment rates by residents?<br><br>3. How effective are the measures applied to recover the outstanding water debt from residents? | Good policies and procedures exist on paper; however, the municipalities lack both financial and human resources to enforce revenue collection   |
| 4. What needs to be done to minimise water wastage?                                                                                                                                             | Water loss occurs at the domestic, community, and municipal levels. As such, a multi-pronged approach is necessary.                              |
| 5. How effective is the communication between the local municipalities and the residents?                                                                                                       | Communication between the two parties is poor. The use of electronic media should be promoted. Establish call centre in all local municipalities |

The recommendations suggested for each secondary research question address the primary research question - What needs to be done to improve the payment of water bills by households and to minimise the wastage of water? Given that the study addressed the primary and secondary questions, one can conclude that the aim and objectives of the study were achieved.

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## APPENDIX 1: QUESTIONNAIRE



### FOSTERING SUSTAINABLE DOMESTIC WATER DEBT MANAGEMENT IN NGAKA MODIRI MOLEMA DISTRICT MUNICIPALITY

Dear Participant,

I am conducting a research project, under the supervision of Prof KFR Kadama as part of the requirements for completing my MCom in Business Management at the North-West University. The target population of the study comprises residents that receive water from the municipality and get billed for water consumed and municipality officials. The purpose of this research is to identify factors that deter residents from paying for water consumed. Your input into addressing this study's objective is valuable given that it requires participation from the residents and municipality officials.

It would be greatly appreciated if you could assist me by completing the attached questionnaire. Participation in this study is completely voluntary and you may withdraw from the study at any point. The questionnaire is user-friendly and should take approximately 25 minutes to complete. Confidentiality of all information enclosed in this questionnaire is guaranteed. There are no personal questions linking you to this specific questionnaire included (e.g., name or address), therefore, your anonymity is guaranteed. You may withdraw from the study at any point. Demographical questions will be used for sample description purposes. Attached is a letter of informed consent that details the ethical protocols that are observed in this study. Before you complete the questionnaire, please read and sign the attached letter of informed consent to indicate that you have not been forced to participate in the study.

Thank you most sincerely. Your assistance and contribution will be highly appreciated.

Yours Sincerely

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I have read the above description of this research study. I have been informed that it is a low-risk study and I am aware of the purpose of the study. I voluntarily agree to take part in this study and by continuing and completing this questionnaire, I consent to the information being used in aggregate form.

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### Screening questions

Please answer the question below by crossing (X) in the relevant box to each question

Yes      No

1. Are you the account holder of the municipality water bill?

☐
☐

**NB:** If you have answered no to the above, do not continue with the questionnaire.

Thank you for your participation.

### SECTION A: DEMOGRAPHIC DATA

Please answer the questions below by selecting the response with which you agree by crossing (X) in the relevant box to each question. Please cross only one box for each question.

#### A 1 What local municipality do you fall under?

|      |                                      |  |
|------|--------------------------------------|--|
| A1.1 | Mahikeng Local Municipality          |  |
| A1.2 | Ramotshere Moiloa Local Municipality |  |
| A1.3 | Ditsobotla Local Municipality        |  |

#### A2 What is your average monthly water consumption?

|      |                |  |
|------|----------------|--|
| A2.1 | Less than R500 |  |
| A2.2 | R501- R600     |  |
| A2.3 | R601- R700     |  |
| A2.4 | R701- R800     |  |
| A2.5 | R801- R900     |  |

|      |             |  |
|------|-------------|--|
|      |             |  |
| A2.6 | R901- R1000 |  |
| A2.7 | Above R1000 |  |

**A3 What type of house do you live in?**

|      |                         |  |
|------|-------------------------|--|
| A3.1 | With own yard           |  |
| A3.2 | Apartment/flat          |  |
| A3.3 | Apartment with own yard |  |

**A4 What is the number of people staying in your household?**

|      |                |  |
|------|----------------|--|
| A4.1 | One            |  |
| A4.2 | Two            |  |
| A4.3 | Three          |  |
| A4.4 | Four           |  |
| A5.5 | More than four |  |

**A5 Employment status of the respondent?**

|      |                    |  |
|------|--------------------|--|
| A5.1 | Employed full-time |  |
| A5.2 | Employed part-time |  |
| A5.3 | Unemployed         |  |
| A5.4 | Pensioner          |  |

**A6 What is the monthly income bracket you fall under?**

|      |                 |  |
|------|-----------------|--|
| A6.1 | Less than R3000 |  |
| A6.2 | R3001- R5000    |  |
| A6.3 | R5001- R10000   |  |
| A6.4 | R10001-R20000   |  |

|      |              |  |
|------|--------------|--|
| A6.5 | Above R20000 |  |
|------|--------------|--|

**A7 What is the state of ownership of your house?**

|      |                      |  |
|------|----------------------|--|
| A7.1 | It is paid-up        |  |
| A7.2 | I am paying the bond |  |
| A7.3 | I am paying the rent |  |

**In the sections that follow, please indicate your answer to each statement/question with a cross (X) in the relevant box.**

**SECTION B: BELIEFS**

B1. What do you think are the reasons for the non-payment of water bills by members of the community?

| <b>Responses</b>                                     | <b>Strongly Disagree<br/>1</b> | <b>Disagree<br/>2</b> | <b>Agree<br/>3</b> | <b>Strongly Agree<br/>4</b> |
|------------------------------------------------------|--------------------------------|-----------------------|--------------------|-----------------------------|
| B1.1 Unemployment                                    | 1                              | 2                     | 3                  | 4                           |
| B1.2 Poverty                                         | 1                              | 2                     | 3                  | 4                           |
| B1.3 The belief that water should not be paid for    | 1                              | 2                     | 3                  | 4                           |
| B1.4 Discouraged due to political reasons            | 1                              | 2                     | 3                  | 4                           |
| B1.5 High water tariffs which regularly increase     | 1                              | 2                     | 3                  | 4                           |
| B1.6 Poor quality water provided by the municipality | 1                              | 2                     | 3                  | 4                           |
| B1.7 Inaccurate billing for water consumed           | 1                              | 2                     | 3                  | 4                           |

|                                                                                                      |   |   |   |   |
|------------------------------------------------------------------------------------------------------|---|---|---|---|
| B1.8 Water bills are not sent regularly, as such consumers accumulate arrears that they cannot clear | 1 | 2 | 3 | 4 |
|------------------------------------------------------------------------------------------------------|---|---|---|---|

B2. Please indicate your level of agreement with these statements:

| <b>Response</b>                                                                                                            | <b>Strongly Disagree<br/>1</b> | <b>Disagree<br/>2</b> | <b>Agree<br/>3</b> | <b>Strongly Agree<br/>4</b> |
|----------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------|--------------------|-----------------------------|
| B2.1 It is reasonable to require people to pay for water                                                                   | 1                              | 2                     | 3                  | 4                           |
| B2.2 Water should be supplied free of charge                                                                               | 1                              | 2                     | 3                  | 4                           |
| B2.3 Consumers in different areas should pay different prices for water based on the cost of supplying water to their area | 1                              | 2                     | 3                  | 4                           |
| B2.4 If the cost of supplying water increases, it is reasonable to require the consumers to pay more for the water         | 1                              | 2                     | 3                  | 4                           |
| B2.5 The price of water should be progressive. The more you consume the more you pay                                       | 1                              | 2                     | 3                  | 4                           |
| B2.6 The current water price is fair                                                                                       | 1                              | 2                     | 3                  | 4                           |
| B2.7 The water quality supplied is good                                                                                    | 1                              | 2                     | 3                  | 4                           |
| B2.8 I am willing to install toilets with the dual flushing mechanism                                                      | 1                              | 2                     | 3                  | 4                           |
| B2.9 I am willing to install a water tank to collect rainwater                                                             | 1                              | 2                     | 3                  | 4                           |
| B2.10 All consumers in the country should pay the same amount for water                                                    | 1                              | 2                     | 3                  | 4                           |

## SECTION C: BEHAVIOUR

Please indicate your level of agreement with these statements:

C1. I am reluctant to pay for water because of the following reasons:

| <b>Responses</b>                        | <b>Strongly Disagree<br/>1</b> | <b>Disagree<br/>2</b> | <b>Agree<br/>3</b> | <b>Strongly Agree<br/>4</b> |
|-----------------------------------------|--------------------------------|-----------------------|--------------------|-----------------------------|
| C1.1 I do not trust the billing process | 1                              | 2                     | 3                  | 4                           |
| C1.2 The meter is faulty                | 1                              | 2                     | 3                  | 4                           |
| C1.3 I do not receive water bills       | 1                              | 2                     | 3                  | 4                           |
| C1.4 I cannot afford to pay             | 1                              | 2                     | 3                  | 4                           |
| C1.5 I am unhappy with the service      | 1                              | 2                     | 3                  | 4                           |
| C1.6 Other people do not pay            | 1                              | 2                     | 3                  | 4                           |

C2 I try to minimise the wastage of water by implementing the following measures:

| <b>Responses</b>                                                    | <b>Strongly Disagree<br/>1</b> | <b>Disagree<br/>2</b> | <b>Agree<br/>3</b> | <b>Strongly Agree<br/>4</b> |
|---------------------------------------------------------------------|--------------------------------|-----------------------|--------------------|-----------------------------|
| C2.1 I have a tank to collect rainwater                             | 1                              | 2                     | 3                  | 4                           |
| C2.2 I have installed efficient shower heads                        | 1                              | 2                     | 3                  | 4                           |
| C2.3 I have installed reducer fittings on all the taps in the house | 1                              | 2                     | 3                  | 4                           |
| C2.4 I rinse dishes in a plugged sink                               | 1                              | 2                     | 3                  | 4                           |
| C2.5 I do not rinse dishes under running water                      | 1                              | 2                     | 3                  | 4                           |

|                                                            |   |   |   |   |
|------------------------------------------------------------|---|---|---|---|
| C2.6 I reduce the frequency at the toilet is flushed       | 1 | 2 | 3 | 4 |
| C2.7 I reuse wastewater from the kitchen in the garden     | 1 | 2 | 3 | 4 |
| C2.8 I reuse wastewater from laundry in the garden         | 1 | 2 | 3 | 4 |
| C2.9 I turn off the tap while brushing my teeth            | 1 | 2 | 3 | 4 |
| C2.10 I turn off the shower when applying soap to the body | 1 | 2 | 3 | 4 |

C3 Answer these questions if you have a washing machine.

| <b>Responses</b>                           | <b>Strongly Disagree<br/>1</b> | <b>Disagree<br/>2</b> | <b>Agree<br/>3</b> | <b>Strongly Agree<br/>4</b> |
|--------------------------------------------|--------------------------------|-----------------------|--------------------|-----------------------------|
| C3.1 I fill the washing machine before use | 1                              | 2                     | 3                  | 4                           |

C4 Please answer the following by selecting a yes/no

| <b>Responses</b>                                       | <b>Yes<br/>1</b> | <b>No<br/>2</b> |
|--------------------------------------------------------|------------------|-----------------|
| C4.1 I use municipal water to water the garden/lawn    | 1                | 2               |
| C4.2 I use a swimming pool cover to reduce evaporation | 1                | 2               |
| C4.3 I wash my car at home                             | 1                | 2               |
| C4.4 I use a hosepipe when washing the car             | 1                | 2               |

C5 Please indicate your level of agreement with these statements:

| <b>Responses</b>                                                                                   | <b>Strongly Disagree<br/>1</b> | <b>Disagree<br/>2</b> | <b>Agree<br/>3</b> | <b>Strongly Agree<br/>4</b> |
|----------------------------------------------------------------------------------------------------|--------------------------------|-----------------------|--------------------|-----------------------------|
| C5.1 I am aware that meter readings are taken at my house every month                              | 1                              | 2                     | 3                  | 4                           |
| C5.2 Meter readers can access the meter in my yard without anyone having to open the gate for them | 1                              | 2                     | 3                  | 4                           |
| C5.3 There is always someone at home to open the gate for meter readers                            | 1                              | 2                     | 3                  | 4                           |
| C5.4 I compare the meter reading on new bills with the previous bills                              | 1                              | 2                     | 3                  | 4                           |
| C5.5 There are dogs in my yard that may scare off the meter readers                                | 1                              | 2                     | 3                  | 4                           |
| C5.6 The meter in my yard is in a good working condition                                           | 1<br>1                         | 2<br>2                | 3<br>3             | 4<br>4                      |

Please indicate your level of agreement with these statements:

C6 Matters on water bills.

| <b>Responses</b>                                                                                  | <b>Strongly Disagree<br/>1</b> | <b>Disagree<br/>2</b> | <b>Agree<br/>3</b> | <b>Strongly Disagree<br/>4</b> |
|---------------------------------------------------------------------------------------------------|--------------------------------|-----------------------|--------------------|--------------------------------|
| C6.1 I understand the entries and computations on my water bills                                  | 1                              | 2                     | 3                  | 4                              |
| C6.2 The figures entered on my bills are a reasonable reflection of water consumption in my house | 1                              | 2                     | 3                  | 4                              |
| C6.3 I have outstanding arrears on my water account                                               | 1                              | 2                     | 3                  | 4                              |
| C6.4 I believe my arrears should be written off as a bad debt                                     | 1                              | 2                     | 3                  | 4                              |

|                                                                            |   |   |   |   |
|----------------------------------------------------------------------------|---|---|---|---|
|                                                                            |   |   |   |   |
| C6.5 I am willing to sign a debit order for my water bills.                | 1 | 2 | 3 | 4 |
| C6.6 I am willing to enter an arrangement to pay the arrears to my account | 1 | 2 | 3 | 4 |

C7 Matter related to water in general:

| <b>Responses</b>                                                                         | <b>Strongly Disagree<br/>1</b> | <b>Disagree<br/>2</b> | <b>Agree<br/>3</b> | <b>Strongly Agree<br/>4</b> |
|------------------------------------------------------------------------------------------|--------------------------------|-----------------------|--------------------|-----------------------------|
| C7.1 I feel I must pay for water consumed in my house                                    | 1                              | 2                     | 3                  | 4                           |
| C7.2 We are always experiencing water shortages in my area                               | 1                              | 2                     | 3                  | 4                           |
| C7.3 We are always alerted about planned water outages due to the maintenance of systems | 1                              | 2                     | 3                  | 4                           |
| C7.4 I am satisfied with the quality of the water supplied                               | 1                              | 2                     | 3                  | 4                           |
| C7.5 I am satisfied with the pressure of the water in my house                           | 1                              | 2                     | 3                  | 4                           |

Please indicate your answer with a cross (X) in the relevant box.

C8 What method do you use to pay for your water bills?

|                                                    |  |
|----------------------------------------------------|--|
| C8.1 I pay at municipality offices                 |  |
| C8.2 I pay through electronic funds transfer (EFT) |  |
| C8.3 I pay at the post office                      |  |
| C8.4 I pay in shopping stores                      |  |
| C8.5 I do not pay water bills                      |  |

## SECTION D: COMMUNICATION

Please indicate your answer with a cross (X) in the relevant box.

D1 I receive my municipality account through:

|                                                     |  |
|-----------------------------------------------------|--|
| D1.1 Residential address                            |  |
| D1.2 Personal postal address                        |  |
| D1.3 Email address                                  |  |
| D1.4 Work postal address                            |  |
| D1.5 My mobile phone                                |  |
| D1.6 I never receive my water account bill          |  |
| D1.7 Other<br>If other, please Indicate your answer |  |

D2 I prefer to receive my municipality account through:

|                                                     |  |
|-----------------------------------------------------|--|
| D2.1 Residential address                            |  |
| D2.2 Personal postal address                        |  |
| D2.3 Email address                                  |  |
| D2.4 My work postal address                         |  |
| D2.5 My mobile phone                                |  |
| D2.6 Other<br>If other, please indicate your answer |  |

Please indicate your level of agreement with these statements:

D3 The municipality makes me aware of the need to pay for my water account and to conserve water through:

| Responses                | Strongly<br>Disagree<br>1 | Disagree<br>2 | Agree<br>3 | Strongly<br>Disagree<br>3 |
|--------------------------|---------------------------|---------------|------------|---------------------------|
| D3.1 Radio programs      | 1                         | 2             | 3          | 4                         |
| D3.2 Television programs | 1                         | 2             | 3          | 4                         |
| D3.3 Billboards          | 1                         | 2             | 3          | 4                         |
| D3.4 Fliers              | 1                         | 2             | 3          | 4                         |
| D3.5 Social media        |                           |               |            |                           |

|                          |   |   |   |   |
|--------------------------|---|---|---|---|
|                          | 1 | 2 | 3 | 4 |
| D3.6 Reminders by SMS    | 1 | 2 | 3 | 4 |
| D3.7 Reminders by e-mail | 1 | 2 | 3 | 4 |
| D3.8 Newspapers          | 1 | 2 | 3 | 4 |

**Thank you for your participation.**

## APPENDIX 2: INTERVIEW GUIDE



### FOSTERING SUSTAINABLE DOMESTIC WATER DEBT MANAGEMENT IN NGAKA MODIRI MOLEMA DISTRICT MUNICIPALITY

Dear Participant,

I am conducting a research project, under the supervision of Prof KFR Kadama as part of the requirements for completing my MCom in Business Management at the North-West University. The target population of the study comprises residents that are billed for water in their residences and municipality officials. The purpose of this research is to identify factors that deter residents from paying for water consumed. Your input into addressing this study's objective is valuable given that it requires participation from the residents and municipality officials.

It would be greatly appreciated if you could assist me by granting me the opportunity for an interview with you. For quality purposes, I humbly request that you permit me to audio record the interview and also take notes. The interview will take about 30 minutes. Participation in this study is completely voluntary and you may withdraw from the study at any point. Confidentiality of all matters discussed in the interview is guaranteed and no personal questions linking you to the interview will be raised (e.g., name, address, or the municipality you work for). Your anonymity, as well as the anonymity of the municipality you work for, is guaranteed. You may withdraw from the study at any point. Attached is a letter of informed consent that details the ethical protocols that are observed in this study. Before you take the interview, please read and sign the attached letter of informed consent to indicate that you have not been forced to participate in the study.

Thank you most sincerely. Your assistance and contribution will be highly appreciated.  
Yours Sincerely

Kearabilwe Motsosi

Email: [kearabilwemotsosi@gmail.com](mailto:kearabilwemotsosi@gmail.com)

Cell: 072 603 0000

North-West University (Mahikeng Campus)

Faculty of Economic and Management Sciences

**Supervisor:**

Prof KFR Kadama

Email: Frazer.Kadama@nwu.ac.za

I have read the above description of this research study. I have been informed that it is a low-risk study and I am aware of the purpose of the study. I voluntarily agree to take part in this study and by continuing and completing this questionnaire, I consent to the information being used in aggregate form.

---

## INTERVIEW GUIDE

### Questions for Managers

#### 1. Factors leading to non-payment of accounts

According to the three-year financial statements from your municipality, the payment of accounts by the residents has been deteriorating.

1.1 What are the main factors leading to defaults in payment?

1.2 What are the measures that the municipality has put in place to mitigate these factors?

#### 2. Measures to improve payment rates

In this section, among others, we interrogate the resolutions by the joint meeting of the Portfolio Committee on Human Settlements, Water and Sanitation, and the Portfolio Committee on Cooperative Governance and Traditional Affairs held on 05/11/2019, on how to address municipal debt to water boards.

2.1 Have you installed pre-paid/smart water meter in your municipality?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered "Yes":

2.1.1 What is the percentage of households that have pre-paid water meters in your municipality?

If you answered "No":

2.1.2 What are the reasons for not implementing this recommendation?

2.2 Have you appointed independent revenue collectors for your municipality?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered "Yes":

2.2.1 How has it impacted water payment?

If you answered "No":

2.2.2 What are the reasons for not implementing this recommendation?

2.3 Have you embarked on campaigns to encourage a culture of payment for

municipal services

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered "Yes":

2.3.1 How has it impacted water payment?

If you answered "No":

2.3.2 What are the reasons for not implementing this recommendation?

2.4 Have you improved on the municipality's systems and infrastructure to ensure the sustainability of services and finances?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered "Yes":

2.4.1 How has it impacted water payment?

If you answered "No":

2.4.2 What are the reasons for not implementing this recommendation

### 3. Measures to recover outstanding debt

The Municipal System Act No 32 of 2000 regulates that all monies due and payable to the municipality are collected in full and used to deliver municipal services in the best interest of the community, residents, and ratepayer and in a financially sustainable manner.

3.1 Have you enforced strict management of payment default with firm action such as limiting water flowing to defaulting residences?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered "Yes":

3.1.1 How has it impacted water payment?

If you answered "No":

3.1.2 What are the reasons for not implementing this recommendation?

3.2 Have you prosecuted defaulters in courts of law?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered "Yes":

3.2.1 How has it impacted water payment?

If you answered “No”:

3.2.2 What are the reasons for not implementing this recommendation?

3.3 Have you considered the restructuring of debts?  
municipal services

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered “Yes”:

3.3.1 How has it impacted water payment?

If you answered “No”:

3.3.2 What are the reasons for not implementing this recommendation?

3.4 Have you considered offering incentives to defaulters to clear their debt?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered “Yes”:

3.4.1 How has it impacted water payment?

If you answered “No”:

3.4.2 What are the reasons for not implementing this recommendation?

3.5 Have you considered debt selling (the transfer of debt from one creditor to another)?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered “Yes”:

3.5.1 How has it impacted water payment?

If you answered “No”:

3.5.2 What are the reasons for not implementing this recommendation?

3.6 Do you have effective Byelaws to collect the outstanding water debt?

3.7 Do you have the sufficient financial resource to implement the Byelaws?

3.8 Do you have a legal unit to enforce the Byelaws?

3.9 Do you have the adequate human resources capacity to enforce the Byelaws?

#### **4. Measures to minimise water wastage through unaccounted-for-water**

Non-revenue water is all the water that is lost through physical leakage, communal taps, water tankers, or commercial losses (meter under-registration, faulty meters, billing errors, and theft) as well as any unbilled, unauthorised consumption.

4.1 Please provide information to complete the table below

| Year | Quantity of non-revenue water | Rand amount |
|------|-------------------------------|-------------|
| 2019 |                               |             |
| 2020 |                               |             |
| 2021 |                               |             |

4.1.1 What measures have you put in place to monitor for leakages within your infrastructure?

4.2 It is essential to monitor the rate of consumption at each delivery point. Do you have meters installed at all your communal water tap points?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered "Yes",

4.2.1 Please complete the table below

| Year | Quantity of water supplied at communal tap points | Rand amount |
|------|---------------------------------------------------|-------------|
| 2019 |                                                   |             |
| 2020 |                                                   |             |
| 2021 |                                                   |             |

If you answered "No" to 4.2,

4.2.2 Explain why this is the case.

4.3 Do you plan to install meters at the communal tap points?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If your answer is "Yes"

4.3.1 When do you plan to do so?

**4.3.2 If you answered "No" to 4.3, explain why this is the case.**

4.4 Do you have push-button taps installed on communal taps?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If you answered "Yes",

4.4.1 What percentage of your communal taps are push-button?

If you answered “No”,

4.4.2 Why have you not implemented this water-saving measure?

4.5 Do you have meters installed at all points where water tankers are supplied with water?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

4.5.1 If your answer is “Yes”, please complete the table below

| Year | Quantity of water supplied to water tankers | Rand amount |
|------|---------------------------------------------|-------------|
| 2019 |                                             |             |
| 2020 |                                             |             |
| 2021 |                                             |             |

4.5.2 If you answered “No” to 4.3, explain why this is the case.

4.6 The table below describes different scenarios regarding water meters in households that are supposed to be billed for water. Please complete the table to reflect the position in your municipality as of December 2021.

| Scenario                        | Number of households |
|---------------------------------|----------------------|
| No meter installed              |                      |
| Pre-paid water meters           |                      |
| Non-functional billing meters   |                      |
| Faulty billing meters           |                      |
| Fully functional billing meters |                      |
| <b>Total</b>                    |                      |

4.7 How often do you conduct audits to ensure that all water supply points have functional meters installed?

If your answer is in the affirmative:

4.7.1 Do you insource or outsource the audit teams referred to in 4.6?

If your answer is negative:

4.7.2 Why do you neglect this important activity?

## 5. Communication between the municipality and residents

Strong communication in local government creates trust in its residents, in hope that this trust will inspire residents to become involved in their communities (Eisenstein, 2019).

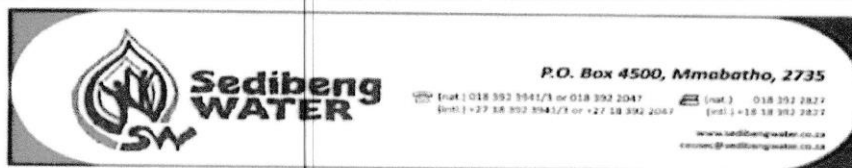
Complete the table below to indicate the medium used by the municipality to communicate its messages to the residents.

| Message                   | Post office | SMS | Email | Social media | Call centre | Print media | TV/ radio |
|---------------------------|-------------|-----|-------|--------------|-------------|-------------|-----------|
| Bills                     |             |     |       |              |             |             |           |
| Reminders to pay          |             |     |       |              |             |             |           |
| Conservation tips         |             |     |       |              |             |             |           |
| Service disruptions       |             |     |       |              |             |             |           |
| Incentives for defaulters |             |     |       |              |             |             |           |

**Thank you for your participation.**

**The end**

## APPENDIX 3: SEDIBENG LETTER



### GENERAL NOTICE

**ATTENTION: ALL STAFF – MAHIKENG REGION**

**DATE: 25 MAY 2021**

**SUBJECT: NON-PAYMENT AND SUSPENSION OF OPERATION AND MAINTENANCE SERVICES IN NGAKA MODIRI MOLEMA DISTRICT MUNICIPALITY**

The above subject refers.

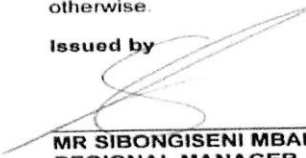
Following unproductive oral and written engagements with Ngaka Modiri Molema District Municipality to service their ever-growing debt for the Operations and Maintenance service by Sedibeng Water.

Sedibeng Water has taken a firm decision to suspend all the Operations and Maintenance services to the municipality, until the district municipality change their posture on their refusal to pay for the afore mentioned services. Sedibeng Water cannot continue to offer services for free at the detriment of its financial health.

You are therefore directed to suspend all Operations and Maintenance services at Lehurutshe, Mahikeng and Ratlou Local Municipalities, as of the 1<sup>st</sup> June 2021. Further suspension of services for Bulk Water Supply must be effected at Ditsobotla Local Municipality's Itsoseng Plant, effective from 1<sup>st</sup> July 2021.

This enforcement shall remain in place until further notice or when directed otherwise.

Issued by

  
**MR SIBONGISENI MBADAMANA – Pr Tech Eng**  
**REGIONAL MANAGER - MAHIKENG**

DATE: 25/05/2021

Page 1 of 1

# APPENDIX 4: MUNICIPALITY B JULY 2019 MONTHLY ANALYSIS

## MONTHLY ANALYSIS 2019

| MONTH  | BALANCE B/F      | LEVIES         | JOURNALS       | RECEIPTS        | BALANCE C/F      | COL RATE | TOTAL BILLING  |
|--------|------------------|----------------|----------------|-----------------|------------------|----------|----------------|
| Jul-18 | 1 207 375 118.81 | 60 271 535.81  | -3 267 466.07  | -21 987 365.62  | 1 242 391 822.93 | 39%      | -57 004 069.74 |
| Aug-18 | 1 242 391 822.93 | 59 256 410.74  | -3 274 477.09  | -23 753 987.07  | 1 274 619 789.51 | 42%      | -55 981 933.65 |
| Sep-18 | 1 274 619 789.51 | 59 724 851.14  | -2 767 003.73  | -67 559 146.25  | 1 234 018 470.67 | 171%     | -56 957 847.41 |
| Oct-18 | 1 234 018 470.67 | 62 254 539.01  | -2 571 516.87  | -32 143 478.84  | 1 261 558 013.97 | 54%      | -59 683 022.14 |
| Nov-18 | 1 261 558 013.97 | 60 577 517.08  | -2 049 176.99  | -27 109 432.21  | 1 292 976 921.85 | 46%      | -58 528 340.09 |
| Dec-18 | 1 292 976 921.85 | 59 517 836.78  | -981 407.24    | -19 947 656.84  | 1 331 565 694.55 | 34%      | -58 536 429.54 |
| Jan-19 | 1 331 565 694.55 | 60 979 498.31  | -5 573 987.69  | -20 144 383.60  | 1 366 826 821.57 | 36%      | -55 405 510.62 |
| Feb-19 | 1 366 826 821.57 | 62 291 815.67  | -11 509 699.08 | -34 484 807.02  | 1 383 124 131.34 | 68%      | -50 782 116.79 |
| Mar-19 | 1 383 124 131.34 | 64 204 703.81  | -3 772 549.41  | -36 550 064.00  | 1 407 636 201.74 | 80%      | -50 432 154.40 |
| Apr-19 | 1 407 636 201.74 | 66 850 974.19  | -8 289 002.54  | -22 940 120.10  | 1 442 658 053.29 | 39%      | -58 561 971.65 |
| May-19 | 1 442 658 053.29 | 62 123 289.25  | -3 560 427.93  | -24 248 111.89  | 1 476 972 812.72 | 41%      | -58 562 871.32 |
| Jun-19 | 1 476 972 812.72 | 59 818 624.76  | 2 720 588.90   | -20 055 338.71  | 1 519 456 687.67 | 32%      | -62 539 213.66 |
|        | 1 519 456 687.67 | 737 871 606.75 | -44 896 125.74 | -380 893 912.15 |                  |          |                |

TOTAL DEBT MOVEMENT 312 081 568.86

TOTAL COLLECTION RATE

COMPILED BY: THEREBE K A

CHECKED BY:

SIGNED BY:

TOTAL COLLECTION RATE

COLLECTION RATE



# APPENDIX 5: MUNICIPALITY B JULY 2020 MONTHLY ANALYSIS

## MONTHLY ANALYSIS 2019

| MONTH  | BALANCE B/F      | LEVIES         | JOURNALS       | RECEIPTS        | BALANCE C/F      | COL RATE | TOTAL BILLING  |
|--------|------------------|----------------|----------------|-----------------|------------------|----------|----------------|
| Jul-18 | 1 207 375 118.81 | 60 271 535.81  | -3 267 466.07  | -21 987 365.62  | 1 242 391 822.93 | 39%      | -57 004 069.74 |
| Aug-18 | 1 242 391 822.93 | 59 256 410.74  | -3 274 477.09  | -23 753 987.07  | 1 274 619 769.51 | 42%      | -55 981 933.65 |
| Sep-18 | 1 274 619 769.51 | 59 724 851.14  | -2 767 003.73  | -97 559 146.25  | 1 234 018 470.67 | 17%      | -56 957 847.41 |
| Oct-18 | 1 234 018 470.67 | 62 254 539.01  | -2 571 516.87  | -32 143 478.84  | 1 261 558 013.87 | 54%      | -59 683 022.14 |
| Nov-18 | 1 261 558 013.87 | 60 577 517.08  | -2 049 176.99  | -27 109 432.21  | 1 292 976 921.85 | 46%      | -58 528 340.09 |
| Dec-18 | 1 292 976 921.85 | 59 517 836.78  | -981 407.24    | -19 947 656.84  | 1 331 565 694.55 | 34%      | -58 536 429.54 |
| Jan-19 | 1 331 565 694.55 | 60 979 498.31  | -5 573 987.69  | -20 144 383.60  | 1 366 826 821.57 | 36%      | -55 405 510.62 |
| Feb-19 | 1 366 826 821.57 | 62 291 815.67  | -11 509 699.08 | -34 484 807.02  | 1 383 124 131.34 | 68%      | -50 782 116.79 |
| Mar-19 | 1 383 124 131.34 | 64 204 703.81  | -3 772 549.41  | -36 520 064.60  | 1 407 696 204.74 | 60%      | -50 432 154.40 |
| Apr-19 | 1 407 696 204.74 | 66 850 974.19  | -8 289 002.54  | -22 940 120.10  | 1 442 658 053.29 | 39%      | -58 561 971.65 |
| May-19 | 1 442 658 053.29 | 62 123 299.25  | -3 560 427.93  | -24 248 111.89  | 1 476 972 812.72 | 41%      | -58 562 871.32 |
| Jun-19 | 1 476 972 812.72 | 59 818 624.76  | 2 720 588.90   | -20 055 338.71  | 1 519 456 687.67 | 32%      | -62 539 213.66 |
|        | 1 519 456 687.67 | 737 871 606.75 | -44 896 125.74 | -380 893 912.15 |                  |          |                |

TOTAL DEBT MOVEMENT 312 081 568.86

TOTAL COLLECTION RATE

COMPILED BY: THEREBE K A

CHECKED BY:

SIGNED BY:

TOTAL COLLECTION RATE

COLLECTION RATE



# APPENDIX 6: MUNICIPALITY B JULY 2021 MONTHLY ANALYSIS

## MONTHLY ANALYSIS 2021

| MONTH  | BALANCE B/F      | LEVIES         | JOURNALS        | RECEIPTS        | BALANCE C/F      | COL. RATE | TOTAL BILLING  |
|--------|------------------|----------------|-----------------|-----------------|------------------|-----------|----------------|
| Jul-20 | 1 784 120 061.78 | 54 734 753.32  | -932 373.09     | -15 843 349.22  | 1 822 079 092.79 | 29%       | -53 802 380.23 |
| Aug-20 | 1 822 079 092.79 | 54 049 114.25  | -2 424 137.02   | -28 104 203.73  | 1 845 599 866.29 | 54%       | -51 624 977.23 |
| Sep-20 | 1 845 599 866.29 | 55 398 797.13  | -22 879 907.69  | -136 618 016.23 | 1 741 500 739.50 | 420%      | -32 518 889.44 |
| Oct-20 | 1 741 500 739.50 | 53 313 573.96  | -4 142 235.91   | -23 487 411.75  | 1 767 184 665.80 | 48%       | -49 171 338.05 |
| Nov-20 | 1 767 184 665.80 | 61 468 126.00  | -2 492 273.38   | -21 757 112.72  | 1 804 403 405.70 | 37%       | -58 975 852.62 |
| Dec-20 | 1 804 403 405.70 | 61 351 317.37  | -2 925 961.63   | -21 898 148.62  | 1 840 930 612.82 | 37%       | -58 425 355.74 |
| Jan-21 | 1 840 930 612.82 | 63 498 707.23  | -2 248 458.24   | -23 234 491.64  | 1 878 946 370.17 | 38%       | -61 280 248.99 |
| Feb-21 | 1 878 946 370.17 | 61 158 152.92  | -4 453 318.84   | -29 381 672.49  | 1 906 269 531.76 | 52%       | -56 704 834.08 |
| Mar-21 | 1 906 269 531.76 | 64 318 876.97  | -87 680 806.37  | -25 849 263.85  | 1 857 056 398.61 | 111%      | 23 361 929.40  |
| Apr-21 | 1 857 056 398.61 | 61 167 216.44  | -3 217 652.79   | -24 370 964.65  | 1 890 636 947.81 | 42%       | -57 949 563.65 |
| May-21 | 1 890 636 947.81 | 62 713 134.42  | -2 179 114.10   | -33 438 625.94  | 1 917 732 342.19 | 55%       | -60 534 020.32 |
| Jun-21 | 1 917 732 342.19 | 62 029 591.58  | -4 693 062.58   | -18 894 823.45  | 1 956 174 007.74 | 33%       | -57 336 489.00 |
|        | 1 956 174 007.74 | 715 201 321.59 | -140 269 301.64 | -402 878 073.99 |                  |           |                |

TOTAL DEBT MOVEMENT 172 053 945.96

TOTAL COLLECTION RATE

COMPILED BY: THERE K A

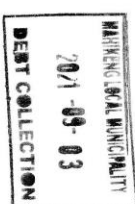
CHECKED BY:

574 932 019.95 SIGNED BY

TOTAL COLLECTION RATE

-70%

COLLECTION RATE AVERAGE PER YEAR



# APPENDIX 7: MUNICIPALITY A JULY 2019 MONTHLY ANALYSIS

| MONTHS         | OPENING BALANCE | BILLING       | CLOSING BALANCE | BILLING       | CALCULATIONS    |                 |        |         | %   |
|----------------|-----------------|---------------|-----------------|---------------|-----------------|-----------------|--------|---------|-----|
| JULY 2018      | R192,376,507.99 | R7,481,277.07 | R194,522,386.10 | R7,481,277.07 | R199,857,785.06 | R5,335,398.96   | R0.71  | 71.32   | 74% |
| AUGUST 2018    | R194,522,386.10 | R7,856,628.93 | R200,557,254.42 | R7,856,628.93 | R202,379,015.03 | R1,821,760.61   | R0.23  | 23.19   | 35% |
| SEPTEMBER 2018 | R126,161,309.79 | R7,691,155.81 | R150,297,874.12 | R7,691,155.81 | R133,852,465.60 | -R16,445,408.52 | -R2.14 | -213.82 | 22% |
| OCTOBER 2018   | R150,297,874.12 | R8,324,608.14 | R153,433,134.12 | R8,324,608.14 | R158,622,482.26 | R5,189,348.14   | R0.62  | 62.34   | 22% |
| NOVEMBER 2018  | R153,433,134.12 | R7,445,491.61 | R152,947,226.15 | R7,445,491.61 | R160,878,625.73 | R7,931,399.58   | R1.07  | 106.53  | 74% |
| DECEMBER 2018  | R152,947,226.15 | R7,992,176.31 | R156,998,423.60 | R7,992,176.31 | R160,939,402.46 | R3,940,978.86   | R0.49  | 49.31   | 74% |
| JANUARY 2019   | R156,998,423.60 | R8,431,382.33 | R168,305,634.95 | R8,431,382.33 | R165,429,805.93 | -R2,875,829.02  | -R0.34 | -34.11  | 35% |
| FEBRUARY 2019  | R168,305,634.95 | R7,996,646.12 | R163,820,474.53 | R7,996,646.12 | R176,302,281.07 | R12,481,806.54  | R1.56  | 156.09  | 22% |
| MARCH 2019     | R163,820,474.53 | R7,751,364.77 | R166,609,689.19 | R7,751,364.77 | R171,571,839.30 | R4,962,150.11   | R0.64  | 64.02   | 22% |
| APRIL 2019     | R166,609,689.19 | R7,784,986.51 | R167,325,056.89 | R7,784,986.51 | R174,394,675.70 | R7,069,618.81   | R0.91  | 90.81   | 35% |
| MAY 2019       | R167,325,056.89 | R7,813,896.04 | R169,689,002.46 | R7,813,896.04 | R175,138,952.93 | R5,449,950.47   | R0.70  | 69.75   | 22% |
| JUNE 2019      | R169,689,002.46 | R7,633,819.79 | R170,538,746.38 | R7,633,819.79 | R177,322,822.25 | R6,784,075.87   | R0.89  | 88.87   | 22% |

**RAMOTSHERE MOILOA**  
 2021-09-10  
 P.O. BOX 92, ZEERUST, 2865  
**LOCAL MUNICIPALITY**

# APPENDIX 8: MUNICIPALITY A JULY 2020 MONTHLY ANALYSIS

| MONTHS         | OPENING BALANCE | BILLING       | CLOSING BALANCE | BILLING       | CALCULATIONS    |                 |        |         | %   |
|----------------|-----------------|---------------|-----------------|---------------|-----------------|-----------------|--------|---------|-----|
|                |                 |               |                 |               |                 |                 |        |         |     |
| JULY 2019      | R192,376,507.99 | R8,290,233.96 | R194,522,386.10 | R8,290,233.96 | R200,666,741.95 | R6,144,355.85   | R0.74  | 74.12   | 74% |
| AUGUST 2019    | R194,522,386.10 | R7,492,695.21 | R200,557,254.42 | R7,492,695.21 | R202,015,081.31 | R1,457,826.89   | R0.19  | 19.46   | 35% |
| SEPTEMBER 2019 | R126,161,309.79 | R7,252,489.24 | R150,297,874.12 | R7,252,489.24 | R133,413,799.03 | -R16,884,075.09 | -R2.33 | -232.80 | 22% |
| OCTOBER 2019   | R152,596,811.53 | R9,373,419.96 | R179,436,956.21 | R9,373,419.96 | R161,970,231.49 | -R17,466,724.72 | -R1.86 | -186.34 | 22% |
| NOVEMBER 2019  | R179,436,956.21 | R9,066,226.12 | R182,860,496.64 | R9,066,226.12 | R188,503,182.33 | R5,642,685.69   | R0.62  | 62.24   | 74% |
| DECEMBER 2019  | R182,860,496.64 | R9,391,771.50 | R188,834,002.72 | R9,391,771.50 | R192,252,268.14 | R3,418,265.42   | R0.36  | 36.40   | 74% |
| JANUARY 2020   | R188,834,002.72 | R8,887,752.30 | R189,949,031.74 | R8,887,752.30 | R197,721,755.02 | R7,772,723.28   | R0.87  | 87.45   | 35% |
| FEBRUARY 2020  | R189,949,031.74 | R9,307,872.55 | R192,376,507.99 | R9,307,872.55 | R199,256,904.29 | R6,880,396.30   | R0.74  | 73.92   | 22% |
| MARCH 2020     | R192,376,507.99 | R8,318,152.38 | R194,522,386.10 | R8,318,152.38 | R200,694,660.37 | R6,172,274.27   | R0.74  | 74.20   | 22% |
| APRIL 2020     | R194,522,386.10 | R9,307,419.36 | R200,557,254.42 | R9,307,419.36 | R203,829,805.46 | R3,272,551.04   | R0.35  | 35.16   | 35% |
| MAY 2020       | R200,557,254.42 | R7,889,352.19 | R201,901,895.78 | R7,889,352.19 | R208,446,606.61 | R6,544,710.83   | R0.83  | 82.96   | 22% |
| JUNE 2020      | R201,901,895.78 | R8,390,334.42 | R204,887,564.32 | R8,390,334.42 | R210,292,230.20 | R5,404,665.88   | R0.64  | 64.42   | 22% |

**RAMOTSHERE MOHLA**  
 2021-09-10  
 P.O. BOX 92, ZEERUST, 2365  
 LOCAL MUNICIPALITY

# APPENDIX 9: MUNICIPALITY A JULY 2021 MONTHLY ANALYSIS

## REVENUE COLLECTION RATES

| MONTHS | OPENING BALANCE | BILLING        | CLOSING BALANCE | BILLING        | CALCULATIONS    |               |      |  |  | %   |
|--------|-----------------|----------------|-----------------|----------------|-----------------|---------------|------|--|--|-----|
| Feb-20 | R189,949,031.74 | R9,307,872.55  | R192,376,507.99 | R9,307,872.55  | R199,256,904.29 | R6,880,396.30 | 0.74 |  |  | 74% |
| Mar-20 | R192,376,507.99 | R8,318,152.38  | R194,522,386.10 | R8,318,152.38  | R200,694,660.37 | R6,172,274.27 | 0.74 |  |  | 74% |
| Apr-20 | R194,522,386.10 | R9,307,419.36  | R200,557,254.42 | R9,307,419.36  | R203,829,805.46 | R3,272,551.04 | 0.35 |  |  | 35% |
| May-20 | R200,557,254.42 | R7,889,352.19  | R201,901,895.78 | R7,889,352.19  | R208,446,606.61 | R6,544,710.83 | 0.83 |  |  | 83% |
| Jun-20 | R201,901,895.78 | R8,390,334.42  | R204,887,564.32 | R8,390,334.42  | R210,292,230.20 | R5,404,665.88 | 0.64 |  |  | 64% |
| Jul-20 | R204,887,564.32 | R18,894,421.85 | R213,953,134.43 | R18,894,421.85 | R223,781,986.17 | R9,828,851.74 | 0.52 |  |  | 52% |
| Aug-20 | R213,953,134.43 | R9,354,011.91  | R220,174,696.34 | R9,354,011.91  | R223,307,146.34 | R3,132,450.00 | 0.33 |  |  | 33% |
| Sep-20 | R220,174,696.34 | R8,746,821.81  | R221,305,386.16 | R8,746,821.81  | R228,921,518.15 | R7,616,131.99 | 0.87 |  |  | 87% |
| Oct-20 | R221,305,386.16 | R8,739,187.07  | R224,978,073.73 | R8,739,187.07  | R230,044,573.23 | R5,066,499.50 | 0.58 |  |  | 58% |
| Nov-20 | R224,978,073.73 | R8,963,234.50  | R226,409,105.22 | R8,963,234.50  | R233,941,308.23 | R7,532,203.01 | 0.84 |  |  | 84% |
| Dec-20 | R226,409,105.22 | R8,754,700.57  | R228,853,806.57 | R8,754,700.57  | R235,163,805.79 | R6,309,999.22 | 0.72 |  |  | 72% |
| Jan-21 | R228,853,806.57 | R9,028,309.99  | R231,451,766.48 | R9,028,309.99  | R237,882,116.56 | R6,430,350.08 | 0.71 |  |  | 71% |
| Feb-21 | R231,451,766.48 | R8,811,858.02  | R234,507,247.53 | R8,811,858.02  | R240,263,624.50 | R5,756,376.97 | 0.65 |  |  | 65% |
| Mar-21 | R234,507,247.53 | R8,567,039.64  | R236,537,112.98 | R8,567,039.64  | R243,074,287.17 | R6,537,174.19 | 0.76 |  |  | 76% |
| Apr-21 | R236,537,112.98 | R8,886,173.32  | R238,824,588.05 | R8,886,173.32  | R245,423,286.30 | R6,598,698.25 | 0.74 |  |  | 74% |
| May-21 | R238,824,588.05 | R10,178,604.22 | R241,338,743.48 | R10,178,604.22 | R249,003,192.27 | R7,664,448.79 | 0.75 |  |  | 75% |
| Jun-21 | R241,338,743.48 | R9,308,933.91  | R245,107,936.37 | R9,308,933.91  | R250,647,677.39 | R5,539,741.02 | 0.60 |  |  | 60% |

RAMOTSHERE MOILOA

2021-09-10

P.O. BOX 92, ZEERUST, 2865

LOCAL MUNICIPALITY

## APPENDIX 10: ETHICS APPROVAL LETTER



1/2

Private Bag X1290, Potchefstroom  
South Africa 2520

Tel: 018 299-1111/2222  
Fax: 018 299-4910  
Web: <http://www.nwu.ac.za>

**Senate Committee for Research Ethics**  
Tel: 018 299-4849  
Email: [nkosinathi.machine@nwu.ac.za](mailto:nkosinathi.machine@nwu.ac.za)

25 April 2022

### ETHICS APPROVAL LETTER OF STUDY

Based on approval by the **Economic and Management Sciences Research Ethics Committee (EMS-REC)** on 22/04/2022, the Economic and Management Sciences Research Ethics Committee hereby **approves** your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-RERC) grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

**Study title: Fostering sustainable domestic water debt management in Ngaka Modiri Molema District Municipality**  
**Study Leader/Supervisor (Principal Investigator)/Researcher: Prof KFR Kadama – MCom in Business Management**  
**Student: Motsosi, K (27803325)**

**Ethics number:**

|             |   |   |   |              |   |   |   |   |   |   |      |   |        |   |
|-------------|---|---|---|--------------|---|---|---|---|---|---|------|---|--------|---|
| N           | W | U | - | 0            | 0 | 6 | 4 | 1 | - | 2 | 2    | - | A      | 4 |
| Institution |   |   |   | Study Number |   |   |   |   |   |   | Year |   | Status |   |

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

**Application Type:**

**Commencement date: 25/04/2022**

**Expiry date: 25/04/2023**

**Risk:**

Low

**Approval of the study is initially provided for a year, after which continuation of the study is dependent on receipt and review of the annual (or as otherwise stipulated) monitoring report and the concomitant issuing of a letter of continuation.**

**Special in process conditions of the research for approval (if applicable):**

•

#### **General conditions:**

*While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:*

- The study leader/supervisor (principle investigator)/researcher must report in the prescribed format to the EMS-REC:
  - annually (or as otherwise requested) on the monitoring of the study, whereby a letter of continuation will be provided, and upon completion of the study; and
  - without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.
- The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the study leader/researcher must apply for approval of these amendments at the EMS-REC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.
- Annually a number of studies may be randomly selected for an external audit.
- The date of approval indicates the first date that the study may be started.  
In the interest of ethical responsibility, the NWU-SCRE and EMS-REC reserves the right to:
  - request access to any information or data at any time during the course or after completion of the study;

- 
- to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;
  - withdraw or postpone approval if:
    - any unethical principles or practices of the study are revealed or suspected;
    - it becomes apparent that any relevant information was withheld from the EMS-REC or that information has been false or misrepresented;
    - submission of the annual (or otherwise stipulated) monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and / or
    - new institutional rules, national legislation or international conventions deem it necessary.
  - Please note that the ethics approval of this application is subject to the Covid-19 protocols.

The EMS-REC would like to remain at your service as scientist and researcher, and wishes you well with your study. Please do not hesitate to contact the EMS-REC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely,

**Mark Rathbone**

Digitally signed by Mark Rathbone  
DN: cn=Mark Rathbone, o=North-West University, ou=Business management, email=mark.rathbone@nwu.ac.za, c=ZA  
Date: 2022.04.25 16:54:53 +02'00'

**Prof Mark Rathbone**  
**Chairperson: NWU Economic and Management Sciences Research Ethics Committee**

## APPENDIX 11: NGAKA MODIRI MOLEMA APPROVAL LETTER



# NGAKA MODIRI MOLEMA DISTRICT MUNICIPALITY

Cnr. Carrington Str and 1st Avenue, Industrial Site, Mahikeng, 2745 | Tel: (018) 381 9400 | Fax (018) 381 4300  
Private Bag X2167, Mahikeng, 2745 | www.nmmdm.gov.za

## OFFICE OF THE MUNICIPAL MANAGER

**22 July 2021**

Mr K Motsosi  
P O Box 619  
ZEERUST  
2865

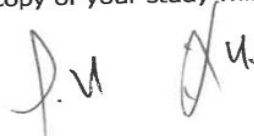
Dear Mr Motsosi

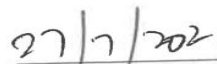
**RE: REQUEST FOR ASSISTANCE – APPROVAL OF STUDY (WATER DEBT MANAGEMENT IN NGAKA MODIRI MOLEMA DISTRICT MUNICIPALITY)**

We are in receipt of your letter dated 01 July 2021 requesting approval of your study on Water Debt Management in Ngaka Modiri Molema District Municipality.

Permission is granted for Ngaka Modiri Molema District Municipality only. Other requests to be individually sent to Ramotshere Moiloa Local Municipality, Ditsobotla Local Municipality and Mahikeng Local Municipality.

A copy of your study will be appreciated.

  
**O.A. Losaba (Mr)**  
**Municipal Manager**

  
**Date**

"Leaders in integrated municipal governance"



## APPENDIX 12: RAMOTSHERE MOILOA APPROVAL LETTER



### RAMOTSHERE MOILOA LOCAL MUNICIPALITY

P.O. Box 92,  
C/o President & Coetzee Street  
ZEERUST  
2865

Tel : 018 – 642 1081 ext.202  
Fax : 018 – 642 2618/ 018 642 1175  
Email : [sec.admin@ramotshere.gov.za](mailto:sec.admin@ramotshere.gov.za)  
[rmlm.admin@ramotshere.gov.za](mailto:rmlm.admin@ramotshere.gov.za)



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#### OFFICE OF THE MUNICIPAL MANAGER

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12 April 2022

Mr K Motsosi  
P.O.BOX  
ZEERUST  
2880

**RE: REQUEST FOR ASSISTANCE –APPROVAL OF STUDY (WATER DEBT  
MANAGEMENT IN RAMOTSHERE MOILOA LOCAL MUNICIPALITY**

We are in receipt of your letter dated 31 May 2021 requesting approval of your study on water on Water Debt Management in Ramotshere Moiloa Local Municipality .

Permission is granted for the research to be conducted at Ramotshere Moiloa Local Municipality.

A copy of your study will be appreciated

Kind regards

**F.T. MABOKELA**  
**MUNICIPAL MANAGER**

## APPENDIX 13: DITSOBOTLA APPROVAL LETTER



**Ditsobotla**

☎ 018-633 3800 – 633 3999  
Faks/Fax: 018-632 5247

**Plaaslike Munisipaliteit  
Local Municipality**

✉ 17  
Burgersentrum/Civic Centre  
Dr Nelson Mandela Rylaan/Drive  
Lichtenburg 2740

Our ref. MJL/AMM

**Mr Kearabilewe Motsosi**

Private Bag x 2046

Mmabatho

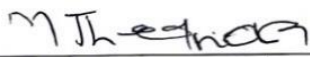
2735

Date: 13 April 2022

**Dear Sir/ Madam**

Approval is granted to Mr Kearabilewe Motsosi to undertake research on Water Debt Management in our Municipality.

The Municipality will ensure that he is supported fully to successfully conduct his research.

  
**Ms M J LEDWABA** 13/04/2022  
**ACTING MUNICIPAL MANAGER**

## APPENDIX 14: MAHIKENG APPROVAL LETTER



# MAHIKENG LOCAL MUNICIPALITY

Municipal Manager and other Departments:

P/Bag X63

Mmabatho

2735

Tel: (018) 389-0111

Fax: (018) 384-4830

Cnr University Drive &

Hector Petersen Road

Mmabatho, 2735

Our ref : K A Thebe/Debt Collection

Your ref : Prof K Kamada

13 April 2022

**Mr Kearabilwe Motsosi**

Private Bag X2046

Mmabatho

2735

Dear Sir

Kindly note that approval to undertake research on Water Debt Management at Mahikeng Local Municipality has been granted.

We assure you of our best service at all time

For any enquiry please contact Mr Thebe at 018 3890325

Hope you find the above in order.

Yours faithfully

**N M Mokgwamme**

**Municipal Manager**



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PLEASE ADDRESS ALL CORRESPONDENCE TO THE MUNICIPAL MANAGER



## APPENDIX 15: LANGUAGE EDITING

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Office: 0183892451

FACULTY OF EDUCATION

Cell: 0729116600

Date: 15<sup>th</sup> November, 2022

TO WHOM IT MAY CONCERN

CERTIFICATE OF EDITING

I, Muchativugwa Liberty Hove, confirm and certify that I have read and edited the entire dissertation, **Fostering sustainable domestic water debt management in Ngaka Modiri Molema District Municipality**, submitted by **Kearabilwe Motsosi**, <http://orcid.org/0000-0002-7096-5858>, in fulfilment of the requirements for the degree **Master of Commerce in Business Management, North-West University**

**Kearabilwe Motsosi** was supervised by **Professor K.R.F. Kadama** of the North-West University.

I hold a PhD in English Language and Literature in English and am qualified to edit such a thesis for cohesion and coherence. The views expressed herein, however, remain those of the researcher/s.

Yours sincerely

Professor M.L. Hove (PhD, MA, PGDE, PGCE, BA Honours – English)



**APPENDIX 16: TABLE 4.1. REASONS FOR THE NON-PAYMENT OF WATER BILLS  
BY MEMBERS OF THE COMMUNITY**

| <b>Responses</b>                                                                                     | <b>Strongly<br/>Disagree<br/>(%)</b> | <b>Disagree<br/>(%)</b> | <b>Agree<br/>(%)</b> | <b>Strongly<br/>Agree<br/>(%)</b> |
|------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------|----------------------|-----------------------------------|
| B1.1 Unemployment                                                                                    | 6                                    | 11                      | 19.8                 | 63.2                              |
| B.1.2 Poverty                                                                                        | 4.8                                  | 10                      | 19.8                 | 65.5                              |
| B1.3 The conviction that water should not be paid for                                                | 11                                   | 15.3                    | 17.3                 | 56.5                              |
| B1.4 Discouraged due to political reasons                                                            | 11.8                                 | 30.8                    | 23.3                 | 34.3                              |
| B1.5 High water tariffs which regularly increase                                                     | 5.5                                  | 19.3                    | 35.3                 | 40                                |
| B1.6 Poor quality water provided by the municipality                                                 | 6                                    | 16.8                    | 34                   | 43.3                              |
| B1.7 Inaccurate billing for water consumed                                                           | 4.5                                  | 23.8                    | 30                   | 41.8                              |
| B1.8 Water bills are not sent regularly, as such consumers accumulate arrears that they cannot clear | 7.5                                  | 18                      | 33.5                 | 41                                |

# **APPENDIX 17:TABLE 4.2. LEVEL OF AGREEMENT WITH PROPOSED STATEMENTS**

| Response                                                                                                                   | Strongly Disagree (%) | Disagree (%) | Agree (%) | Strongly Agree (%) |
|----------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------|-----------|--------------------|
| B2.1 It is reasonable to require people to pay for water                                                                   | 32.5                  | 28           | 23.5      | 16                 |
| B2.2 Water should be supplied free of charge                                                                               | 12.3                  | 11           | 34.5      | 42.3               |
| B2.3 Consumers in different areas should pay different prices for water based on the cost of supplying water to their area | 12.5                  | 14           | 26        | 47.5               |
| B2.4 If the cost of supplying water increases, it is reasonable to require the consumers to pay more for the water         | 43                    | 30           | 12        | 15                 |
| B2.5 The price of water should be progressive. The more you consume, the more you pay                                      | 55                    | 10           | 13        | 22                 |
| B2.6 The current water price is fair                                                                                       | 43                    | 23           | 10        | 24                 |
| B2.7 The water quality supplied is good                                                                                    | 21.8                  | 23.5         | 32.8      | 22                 |
| B2.8 I am willing to install toilets with a dual flushing mechanism                                                        | 9.3                   | 14           | 37.3      | 39.5               |
| B2.9 I am willing to install a water tank to collect rainwater                                                             | 11.5                  | 14           | 37.5      | 37                 |
| B2.10 All consumers in the country should pay the same amount for water                                                    | 23.8                  | 16.3         | 36.8      | 23.3               |

# **APPENDIX 18: TABLE 4.3. I AM RELUCTANT TO PAY FOR WATER BECAUSE**

| Responses                               | Strongly Disagree (%) | Disagree (%) | Agree (%) | Strongly Agree (%) |
|-----------------------------------------|-----------------------|--------------|-----------|--------------------|
| C1.1 I do not trust the billing process | 11.5                  | 19.5         | 26.8      | 42.1               |
| C1.2 The meter is faulty                | 7                     | 12           | 35        | 46                 |
| C1.3 I do not receive water bills       | 10                    | 11           | 20        | 69                 |
| C1.4 I cannot afford to pay             | 7.5                   | 12           | 34.8      | 45.8               |
| C1.5 I am unhappy with the service      | 6                     | 15.8         | 32.5      | 45.8               |
| C1.6 Other people do not pay            | 10.3                  | 14.5         | 35        | 40.3               |

## APPENDIX 19: TABLE 4.4. MINIMISING WATER WASTAGE

| Responses                                                           | Strongly Disagree (%) | Disagree (%) | Agree (%) | Strongly Agree (%) |
|---------------------------------------------------------------------|-----------------------|--------------|-----------|--------------------|
| C2.1 I have a tank to collect rainwater                             | 46                    | 14           | 15        | 25                 |
| C2.2 I have installed efficient shower heads                        | 58                    | 35           | 5         | 3                  |
| C2.3 I have installed reducer fittings on all the taps in the house | 49                    | 32           | 14        | 5                  |
| C2.4 I rinse dishes in a plugged sink                               | 30.3                  | 9.3          | 42.5      | 18                 |
| C2.5 I do not rinse dishes under running water                      | 27.6                  | 10.5         | 40.6      | 21.3               |
| C2.6 I reduce the frequency of flushing the toilet                  | 12.8                  | 12           | 36.3      | 39.1               |
| C2.7 I reuse wastewater from the kitchen in the garden              | 9.5                   | 10           | 38.8      | 41.8               |
| C2.8 I reuse wastewater from laundry in the garden                  | 9                     | 11           | 37.3      | 42.8               |
| C2.9 I turn off the tap while brushing my teeth                     | 15                    | 11.5         | 38        | 35.5               |
| C2.10 I turn off the shower when applying soap to the body          | 28.7                  | 12.8         | 36.8      | 21.8               |

# APPENDIX 20: TABLE 4.5. FILLING THE WASHING MACHINE BEFORE USE

| Responses                                  | Strongly Disagree (%) | Disagree (%) | Agree (%) | Strongly Agree (%) |
|--------------------------------------------|-----------------------|--------------|-----------|--------------------|
| C3.1 I fill the washing machine before use | 25.3                  | 29.3         | 23        | 22.5               |

**APPENDIX 21: TABLE 4.6. WATER USAGE**

| <b>Responses</b>                                       | <b>Yes<br/>(%)</b> | <b>No<br/>(%)</b> |
|--------------------------------------------------------|--------------------|-------------------|
| C4.1 I use municipal water to water the garden/lawn    | 37.8               | 62.2              |
| C4.2 I use a swimming pool cover to reduce evaporation | 7.8                | 92.3              |
| C4.3 I wash my car at home                             | 11.3               | 88.8              |
| C4.4 I use a hosepipe when washing the car             | 10.5               | 89.5              |

## APPENDIX 22: TABLE 4.7. LEVEL OF AGREEMENT WITH THESE STATEMENTS

| Responses                                                                                          | Strongly<br>Disagree<br>(%) | Disagree<br>(%) | Agree<br>(%) | Strongly<br>Agree<br>(%) |
|----------------------------------------------------------------------------------------------------|-----------------------------|-----------------|--------------|--------------------------|
| C5.1 I am aware that meter readings are taken at my house every month                              | 20.5                        | 44.5            | 18.3         | 16.8                     |
| C5.2 Meter readers can access the meter in my yard without anyone having to open the gate for them | 11                          | 31              | 23.5         | 34.5                     |
| C5.3 There is always someone at home to open the gate for meter readers                            | 10.5                        | 23.5            | 30.8         | 35.3                     |
| C5.4 I compare the meter reading on new bills with the previous bills                              | 26.3                        | 29.8            | 24.5         | 19.5                     |
| C5.5 There are dogs in my yard that may scare off the meter readers                                | 47                          | 21              | 12           | 20                       |
| C5.6 The meter in my yard is in a good working condition                                           | 24                          | 28              | 23.8         | 24.3                     |

# APPENDIX 23: TABLE 4.14. ANALYSIS OF VARIANCE (ANOVA)

|                                                         |       | N   | Mean | Std. Deviation | p-values |
|---------------------------------------------------------|-------|-----|------|----------------|----------|
| I do not trust the billing process (V26)                | 1     | 155 | 2.81 | .988           |          |
|                                                         | 2     | 104 | 2.94 | 1.139          |          |
|                                                         | 3     | 140 | 3.24 | .974           |          |
|                                                         | Total | 399 | 2.99 | 1.039          | .001     |
| I cannot afford to pay (V29)                            | 1     | 156 | 3.04 | .879           |          |
|                                                         | 2     | 104 | 2.88 | 1.112          |          |
|                                                         | 3     | 140 | 3.59 | .623           |          |
|                                                         | Total | 400 | 3.19 | .919           | .000     |
| I am unhappy with the service (V30)                     | 1     | 156 | 3.01 | .902           |          |
|                                                         | 2     | 104 | 3.11 | .985           |          |
|                                                         | 3     | 140 | 3.42 | .805           |          |
|                                                         | Total | 400 | 3.18 | .908           | .000     |
| Other people do not pay (V31)                           | 1     | 156 | 2.95 | .900           |          |
|                                                         | 2     | 104 | 2.87 | 1.080          |          |
|                                                         | 3     | 140 | 3.31 | .936           |          |
|                                                         | Total | 400 | 3.05 | .978           | .000     |
| I rinse dishes in a plugged sink (V35)                  | 1     | 156 | 2.76 | 1.010          |          |
|                                                         | 2     | 104 | 2.64 | 1.088          |          |
|                                                         | 3     | 140 | 2.05 | 1.088          |          |
|                                                         | Total | 400 | 2.48 | 1.104          | .000     |
| I do not rinse dishes under running water (V36)         | 1     | 156 | 2.81 | .998           |          |
|                                                         | 2     | 104 | 2.64 | 1.105          |          |
|                                                         | 3     | 139 | 2.21 | 1.145          |          |
|                                                         | Total | 399 | 2.56 | 1.108          | .000     |
| I reduce the frequency the toilet is flushed (V37)      | 1     | 156 | 3.11 | .927           |          |
|                                                         | 2     | 104 | 2.63 | 1.124          |          |
|                                                         | 3     | 140 | 3.19 | .944           |          |
|                                                         | Total | 400 | 3.02 | 1.011          | .000     |
| I reuse wastewater from the kitchen in the garden (V38) | 1     | 156 | 3.19 | .864           |          |
|                                                         | 2     | 104 | 2.66 | 1.111          |          |
|                                                         | 3     | 140 | 3.41 | .738           |          |
|                                                         | Total | 400 | 3.13 | .940           | .000     |
| I reuse wastewater from laundry in the garden (V39)     | 1     | 156 | 3.17 | .893           |          |
|                                                         | 2     | 104 | 2.70 | 1.105          |          |
|                                                         | 3     | 140 | 3.43 | .711           |          |
|                                                         | Total | 400 | 3.14 | .939           | .000     |
| I turn off the tap while brushing my teeth              | 1     | 156 | 3.02 | .987           |          |
|                                                         | 2     | 104 | 2.66 | 1.058          |          |

|                                                                                                     |       |     |      |       |      |
|-----------------------------------------------------------------------------------------------------|-------|-----|------|-------|------|
| (V40)                                                                                               | 3     | 140 | 3.06 | 1.037 |      |
|                                                                                                     | Total | 400 | 2.94 | 1.034 | .006 |
| I turn off the shower when applying soap to the body (V41)                                          | 1     | 156 | 2.83 | 1.009 |      |
|                                                                                                     | 2     | 104 | 2.37 | 1.115 |      |
|                                                                                                     | 3     | 140 | 2.27 | 1.174 |      |
|                                                                                                     | Total | 400 | 2.52 | 1.124 | .000 |
| I am aware that meter readings are taken at my house every month (V47)                              | 1     | 156 | 2.62 | .953  |      |
|                                                                                                     | 2     | 104 | 2.21 | .982  |      |
|                                                                                                     | 3     | 140 | 2.04 | .920  |      |
|                                                                                                     | Total | 400 | 2.31 | .981  | .000 |
| Meter readers can access the meter in my yard without anyone having to open the gate for them (V48) | 1     | 156 | 3.03 | .853  |      |
|                                                                                                     | 2     | 104 | 2.55 | 1.131 |      |
|                                                                                                     | 3     | 140 | 2.77 | 1.088 |      |
|                                                                                                     | Total | 400 | 2.82 | 1.031 | .001 |
| I compare the meter reading on the new bills with the previous bills (V50)                          | 1     | 156 | 2.68 | .990  |      |
|                                                                                                     | 2     | 104 | 2.39 | 1.083 |      |
|                                                                                                     | 3     | 140 | 2.01 | 1.052 |      |
|                                                                                                     | Total | 400 | 2.37 | 1.073 | .000 |
| The meter in my yard is in good working condition (V52)                                             | 1     | 156 | 2.71 | .984  |      |
|                                                                                                     | 2     | 104 | 2.60 | 1.170 |      |
|                                                                                                     | 3     | 140 | 2.14 | 1.103 |      |
|                                                                                                     | Total | 400 | 2.48 | 1.104 | .000 |
| I understand the entries and computations on my water bills (V53)                                   | 1     | 156 | 2.12 | .946  |      |
|                                                                                                     | 2     | 104 | 2.33 | 1.065 |      |
|                                                                                                     | 3     | 140 | 1.68 | .816  |      |
|                                                                                                     | Total | 400 | 2.02 | .971  | .000 |
| The figures entered on my bills are a reasonable reflection of water consumption in my house (V54)  | 1     | 156 | 2.17 | .915  |      |
|                                                                                                     | 2     | 104 | 2.33 | 1.009 |      |
|                                                                                                     | 3     | 140 | 1.82 | .947  |      |
|                                                                                                     | Total | 400 | 2.09 | .971  | .000 |
| I have outstanding arrears on my water account (V55)                                                | 1     | 156 | 2.87 | .937  |      |
|                                                                                                     | 2     | 104 | 2.48 | 1.043 |      |
|                                                                                                     | 3     | 140 | 2.61 | 1.110 |      |
|                                                                                                     | Total | 400 | 2.68 | 1.037 | .009 |
| I believe my arrears should be written off as a bad debt (V56)                                      | 1     | 156 | 3.06 | .859  |      |
|                                                                                                     | 2     | 104 | 2.63 | 1.071 |      |
|                                                                                                     | 3     | 140 | 2.93 | 1.084 |      |
|                                                                                                     | Total | 400 | 2.90 | 1.010 | .004 |
| I am willing to sign a debit order for my                                                           | 1     | 156 | 2.97 | .912  |      |
|                                                                                                     | 2     | 104 | 2.28 | 1.083 |      |

|                                                                                           |       |     |      |       |      |
|-------------------------------------------------------------------------------------------|-------|-----|------|-------|------|
| water bills (V57)                                                                         | 3     | 140 | 2.31 | 1.151 |      |
|                                                                                           | Total | 400 | 2.56 | 1.093 |      |
| I am willing to enter an arrangement to pay the arrears to my account (V58)               | 1     | 156 | 2.67 | 1.011 | .000 |
|                                                                                           | 2     | 104 | 2.18 | 1.130 |      |
|                                                                                           | 3     | 140 | 2.16 | 1.127 |      |
|                                                                                           | Total | 400 | 2.37 | 1.109 | .000 |
| We are always alerted about planned water outages due to the maintenance of systems (V61) | 1     | 156 | 2.28 | 1.007 |      |
|                                                                                           | 2     | 104 | 2.29 | 1.121 |      |
|                                                                                           | 3     | 140 | 1.89 | 1.001 |      |
|                                                                                           | Total | 400 | 2.15 | 1.050 | .002 |
| I am satisfied with the quality of the water supplied (V62)                               | 1     | 156 | 2.69 | .935  |      |
|                                                                                           | 2     | 104 | 2.32 | 1.100 |      |
|                                                                                           | 3     | 140 | 1.96 | 1.072 |      |
|                                                                                           | Total | 400 | 2.34 | 1.073 | .000 |