

# INVESTIGATING WATER SUPPLY CHALLENGES IN THE ELIAS MOTSOLEDI MUNICIPALITY OF LIMPOPO PROVINCE, SOUTH AFRICA: A CASE OF MOTETEMA SETTLEMENT

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## PURPOSE:

The study discussed water supply challenges in rural South Africa and evaluated community perceptions of the municipal capacity.

## ABSTRACT

### Purpose

The study discussed water supply challenges in rural South Africa and evaluated community perceptions of the municipal capacity.

### Design/methodology/approach

Municipal planning documents described the targeted study area. Questionnaires by 98 randomly selected community respondents profiled the respondents and evaluated several aspects of water delivery in the community.

### Findings

The results reveal several operational challenges. Water delivery was sporadic and unreliable, the water quality was poor and the breakdowns response time was unacceptable.

### Research limitations/implications

The causes of the water delivery problems were not investigated. The study suggested solutions and was restricted to one municipal area only.

### Practical implications

The local municipality should response should focus on quality control, monitoring, training, funding and capacity building of their service delivery function. More efficient communication with the community is required.

### What is original/value of the paper

Several water service delivery challenges were revealed and will be of value to the municipality to mobilise, plan and structure a proper response to challenges.

**Keywords:** Limpopo, South Africa, Rural areas, Water quality, Water supply

## BACKGROUND

Water is a basic human need, but, it is a limited resource with quantitative limitations and qualitative vulnerability. The World Health Organisation confirms that inadequate access to water or unavailability thereof can seriously impact on human survival or may lead to loss of life<sup>1</sup>. The WHO estimates that more than 700 million people still lack ready access to improved sources of drinking water and nearly half of the estimated number live in sub-Saharan Africa. According to Oumar and Tewari<sup>2</sup> the provision of sufficient drinking water and sanitation services will remain a major international problem in the 21st century. South Africa is a water scarce country and demand for water is fast approaching the levels of supply. Dye argues that decisions by authorities on priority allocations to users of water will become ever more difficult in future, especially in years of drought<sup>3</sup>.

This study will focus on the Motetema Settlement located within Elias Motsoaledi Local Municipality (EMLM) in the Limpopo Province. The Sekhukhune District Municipality has jurisdiction over the area of study as Water Service Authority. EMLM is a water service provider and is faced with severe challenges of supplying reliable water services to its constituents. The EMLM annual report of 2013 confirmed that water supply challenges were experienced<sup>4</sup>The residents in Motetema often go without potable water for days and when the water is available, the quality of the water is often unacceptable. The reasons behind the unavailability and unreliability of water services were explored in this study .

Inability to access sufficient clean water has negative impact on communities. Kayaga et al<sup>5</sup> states that access to improved

service levels of water supply are not only vital for human health but are also necessary for people's convenience and dignity. The White Paper on Water Supply and Sanitation Policy of 1994<sup>6</sup> defines basic water supply as a minimum of 25 litres per person per day or 6000 litres per household of eight people per month within a maximum distance of 200m from dwellings. This study will explore if the water supply to Motetema township falls within these stated guidelines.

## THE STUDY

### Importance of the Study

South Africa is an arid to semi-arid region. Du Plessis<sup>7</sup> confirms that 21% of the country receives an average rainfall of less than 200mm per year with 44% receiving 200-500mm. This rainfall equates to only 60% of the world average. More than 65% of the country receives less rain than is required for dry-land farming. In 1994 the White Paper produced by the DWA already identified that the poor, rural areas of South Africa are particularly vulnerable to suffer from inadequate access to drinking water, especially in times of drought<sup>6</sup>. The EMLM 2013 annual report confirmed that most of the rural areas of the Limpopo Province still do not have access to reliable sources of water and often rely on unclean local rivers and streams for access which can be detrimental to human health due to the bacteria they carry<sup>4</sup>.

Water service delivery in the region has been facing many challenges over a period of time. In 2012 Maponya reported in the Sowetan on the communities of Tafelkop and Motetema that went on a violent protest barricading roads, burning tyres and looting shops belonging to foreign nationals in an attempt to get municipality's attention on water services delivery in their community. The district municipality at the time, confirmed that it was experiencing technical challenges with water supply<sup>8</sup>.

Sporadic water supply has a far more severe effect on poor households connected to a potable water supply than on households depending on natural sources of water. Communities depending on natural water sources, maintain and keep sources safe for human consumption. A 2009 study by Dungamaro found that when potable water service is available, natural sources of water are neglected and they become unsafe for human consumption<sup>9</sup>. The communities of EMLM often have to rely on other methods of water access such as buying or collecting from natural sources such as rivers and streams. In poor households, rivers and streams become the only source of water when the water service delivery is unavailable. If a municipality does not heed to the challenges that communities face as a result of unreliable water supply the result may be negative perceptions in the community about the municipality's capacity to deliver services. If the municipality also ineffectively communicates with communities on water service delivery issues, the negative perceptions in the community will probably be exacerbated. Part of this study was to understand community perceptions in this regard.

### Description of the Study Area

EMLM falls in the Limpopo Province and is the second largest municipality within the Sekhukhune District Municipality. According to StatsSA the geographical area is 3668.33km<sup>2</sup> with a total population size of 249 363 people<sup>10</sup>. EMLM is the Water Services Provider (WSP) in its area of jurisdiction. Motetema settlement is one of the closest settlements to the municipal offices in the municipal area. It is divided into three main settlement types: Motetema urban, Motetema rural known as "Skoti" and the informal settlement known as Shushumela meaning "push yourself in". The population of about 48,600 constitutes 20% of the total municipal population. Motetema Urban is located downstream and closer to the main reservoir,

Shushumela is located further away on hilly area and the rural part of the area is located in a largely flat area.

### The Problem

Motetema is deprived of natural water as the Lepelle River is located 30 km away and cannot be used by the residents as a source of water. The Motetema urban settlement is located the closest to the economic hub of the area and to the site of the municipal offices. The demand for rental property is high in the area and many people cannot afford to rent homes in the urban settlement. People that cannot afford rental stay in Shushumela. Due to the increasing population in the settlement the existing infrastructure is unable to cope with the demand. Dilapidated and fragile infrastructure and inadequate maintenance result in frequent pipe bursts in the area.

The seriousness of the situation is exacerbated by the fact that the municipality does not seem to understand the extent of the challenges that these communities face as a result of the sporadic water supply. This is intensified by ineffective communication between the communities and the municipality. The primary objective of the study is to analyse and describe the water supply and access challenges in the communities of Motetema.

The study is to understand community perceptions in this regard:

- How often is water unavailable?
- How often is water not available to you?
- Is the quality of water supply unacceptable?
- How good is the response to water supply breakdown?

## LITERATURE REVIEW

### International scenario

The United Nations International Conference on Environment and Development (Earth Summit) in 1992 adopted a programme of action to provide the poor with access to fresh water and sanitation for sustainable living. The World Health Organisation in collaboration with the United Nations Children's Fund (UNICEF) set a standard of minimum 25 litres of safe drinking water per day per person and also set the maximum distance to be travelled to a source of water to 200 meters. This water supply standard became the basis for Free Water Policy in South Africa<sup>1</sup>.

Local municipalities in South Africa are tasked with the function of providing water in their areas of jurisdiction. Due to funding and capacity challenges in many rural municipalities supply of sufficient and reliable drinking water is still a challenge. Without sufficient water communities cannot thrive; risk of waterborne diseases becomes high, people migrate to areas where better opportunities are evident, thereby losing skilled people to urbanised areas. As a result rural areas continue to lag behind in development issues.

Van Zyl et al<sup>11</sup> proposed that municipalities as custodians of water services infrastructure in their respective areas should provide an acceptable standard of services to their communities. This requires rigorous planning for municipal infrastructure which follows a life cycle management approach. The important role of municipalities is also highlighted by a study of Bhagwan et al<sup>12</sup>. The study emphasized the very important service delivery function of local government to ensure water security and meeting the water needs resulting from expanding socio-economic growth.

### South African scenario

South Africa has since made significant progress towards ensuring access to water especially in rural areas. In the State

of the Nation Address delivered on 3 June 2009 president Zuma confirmed that access to safe drinking water improved from 62% of the population in 1996 to 88% in 2008. The Department of Water Affairs 2010 Annual report indicated that 97% of the population had access to basic water supply<sup>13</sup>. The African Ministers Council on Water (AMCOW) Country Status Review Report<sup>14</sup> also confirmed that the Millennium Development Goal targets for water supply and sanitation had been met by South Africa.

However, the mere fact of water supply does not ensure quality in water delivery. Majuru et al<sup>15</sup> warns that the existence of water supply infrastructure does not equate to access to safe water, as these systems often do not work. Koestler et al agree and stated that maintenance is a challenge and providing new water supply infrastructure often takes precedence over ensuring continued access to water<sup>16</sup>. The report by DWA Progress Report on Water Access<sup>13</sup> confirmed serious challenges in rural communities relying on communal taps of poor standard. Rietveld et al<sup>17</sup> reported in 2009 on very poor rural water supply due to sub-standard construction.

In 2008 the South African government started the Blue Drop project to address the problem of monitoring and reporting on water service quality<sup>18</sup>. Since inception this initiative experienced problems mainly from rural municipalities that often relied on ad-hoc reporting with very little effect on identifying actual water delivery problems. Rivett et al agreed that rural municipalities often failed to comply to report on the required management of monitoring of water quality and rather reported on water quality alone. Rural municipalities are falling behind the national water service delivery guidelines resulting in a widening gap between water supply quality levels in urban and rural areas<sup>19</sup>. South African water research also revealed a distinct paradigm shift in confirming the changing nature of water supply challenges that confronts the country. A recent study by Siebrits et al<sup>20</sup> indicated that South African water research publications between 1977 and 1991 were dominated by research into technical and engineering solutions. More recent studies were typically on water pollution, water quality, governance and politics in water management. According to the WHO<sup>1</sup> the main causes of not meeting water services delivery targets are lack of priority given to the sector, lack of financial resources and lack of sustainability of water supply and sanitation services.

Mutamba<sup>21</sup> suggest that water demand management and water conservation may offer many benefits to alleviate South Africa's current water supply problems. Benefits may include better efficiency of water infrastructure, cost savings, consistency of water supply, improved water quality and increased income for water service providers. Bhagwan et al<sup>12</sup> also support the potential of water demand management and link this to a recent study of the Water Research Commission regarding the current status of water supply in South Africa.

#### EMLM situation

EMLM mission statement included in the annual report focuses on provision of services to communities in a sustainable manner that will promote social and economic development. The Millennium Development Goal (MDG) service delivery targets were access to basic water for all by 2008, access to basic sanitation at the Reconstruction and Development (RDP) level by 2010 and all schools and clinics to have access to water and sanitation by 2007<sup>4</sup>. There are no recent reports in the municipality which indicates whether the municipality was able to achieve its targets or not.

The data collected for the Water and Sanitation Sectoral Plan (WSSP) in 2008 revealed that the provision of free basic services fell below the standard provision for free basic services.

That is, 97.5% of households still fell below the RDP standard level of service. Water services backlog stood at 61.73%. According to the EMLM Annual Report (2012/13), the municipality has a 57% backlog for water services and 84% in sanitation. The report indicates that reliance on other government departments and the District is inhibiting the municipality from achieving success in the provision of water services infrastructure.

EMLM has a total of eleven (11) clinics of which eight are served with water through the borehole system and three (3) are serviced through reticulation and one (1) is serviced through a water tanker. The Municipality boasts 100% coverage in this area. The table below indicates that water backlogs are more prevalent in early learning centres and primary schools.

**Table 1: Access to Water at Institutional Level**

School Type	No. of schools	No. of pupils	RDP standard water, no. of schools	Water shortage, no. of schools
Early learning centres	70	4045	7	63
Primary	78	27951	23	55
Secondary	51	22544	21	30

Source: Elias Motsoaledi Local Municipality, 2008. Water and Sanitation Services Plan.

## METHODOLOGY

### Data Collection and Analysis

Out-dated municipal planning documents were used for planning of data collected and assumptions had to be made in this regard. The study targeted people who have been living in the area for at least 5 years. The data was collected by means of questionnaires through simple random sampling method of selecting respondents at social gatherings, leisure points and at community facilities such as clinics. The research process was explained to respondents to ensure that aspects such as confidentiality and voluntary participation were understood. The data collection process was conducted over a period of three days during December 2014.

A total of 110 questionnaires were distributed and 98 were collected from the respondents - 55 questionnaires were collected from Motetema Urban as the biggest area, 25 from Motetema Rural and 18 from the Informal settlement of Shushumela.

## DATA ANALYSIS

### Respondent profile

Of all respondents 51% were female and 49% were male. From the discussions and comments with respondents during completion of the questionnaires the women in general were more passionate in their responses than men. This was probably because women carry the responsibility of household maintenance and as such water issues affect them more directly than men. The results reveal that 57% of the households are comprised of between 4 to 8 people, 23% have between 9 to 12 people whilst 20% comprise of between 1 to 3 people. The household average is 5 people per household. The results show that 98% of the total respondents receive portable water from the municipality and 2% don't have access to portable water. It was established that the 2% were mostly from the newly extended formed informal settlement and the municipality was in the process of extending communal taps to that section.

**Location of water supply**

A total of 89% of the respondents receive water in their household or in the yard through a tap whereas 9% receive water through a communal tap. The remaining 2% of the respondents indicated that they receive water through a municipal tanker. In some instances the distance between the communal taps or the municipal tankers may have exceeded the 200m target set by the Water Act. However it can be concluded that water delivery met the Water Act requirement of 200m in at least 89% of cases evaluated.

**Availability**

The availability of water is detailed in Figure 1. 46% Of the respondents receive water less than 9 hours per day, 31% receive water between 9 and 15 hours a day, 20% of the respondents have available water almost always 3% always have water. On average the respondents only have access to water for 40-45% of the day.

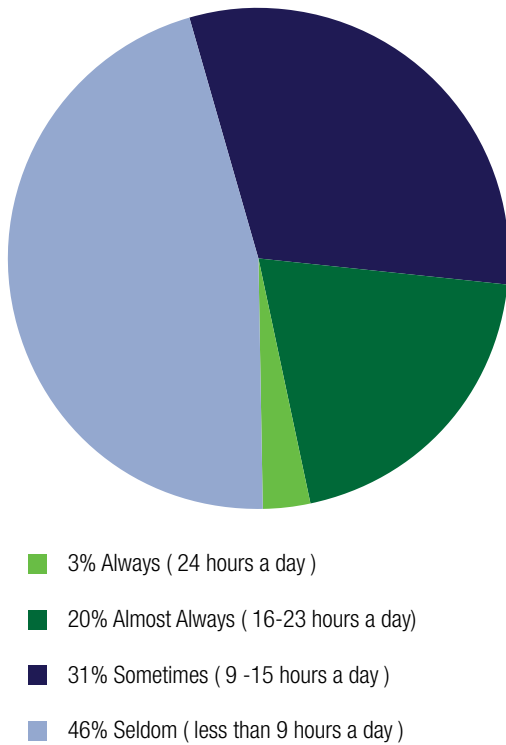


Figure 1: Water Availability Period

**Water Pressure**

Figure 2 indicated that 73% of the respondents were satisfied with water pressure when water is available, but 19 %, mostly from the informal settlement complained about low pressure while 8% indicated poor or totally insufficient water pressure. It was concluded from the response that the poorer, upper parts of the informal area did not have adequate and efficient water supply.

**Volume of water supply**

The Motetema urban respondents received a minimum of 250 litres per day or 7500 litres of water per household per month. Motetema rural respondents receive about 150 litres per day or 4500 litres of water per household per month. The average supply for Motetema rural and the Informal settlement are below the reserve amount of 6000 litres per household per month, as per the basic water regulations.

**Breakdown response time**

According to Figure 3 a total of 31% of the respondents indicated that it took on average 2-3 days or water supply to be restored after a system breakdown and 54% of the respondents indicated that

it took more than 7 days for the water to be restored. The average time taken to restore water services is between 5 and 14 days).

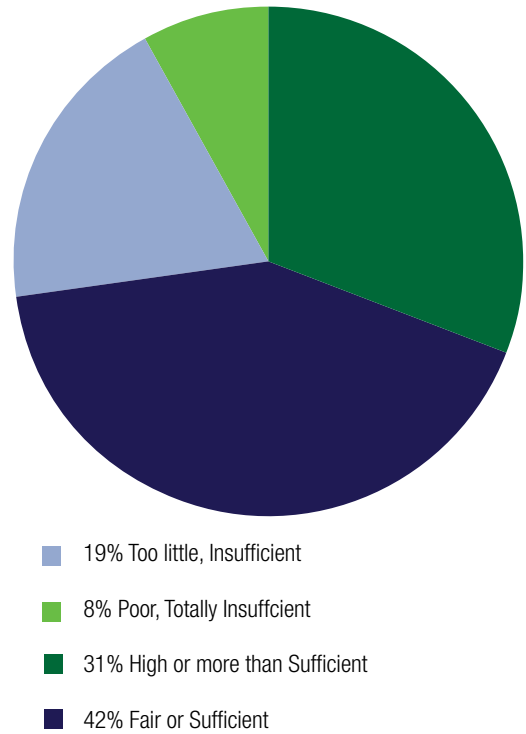


Figure 2: Water Pressure

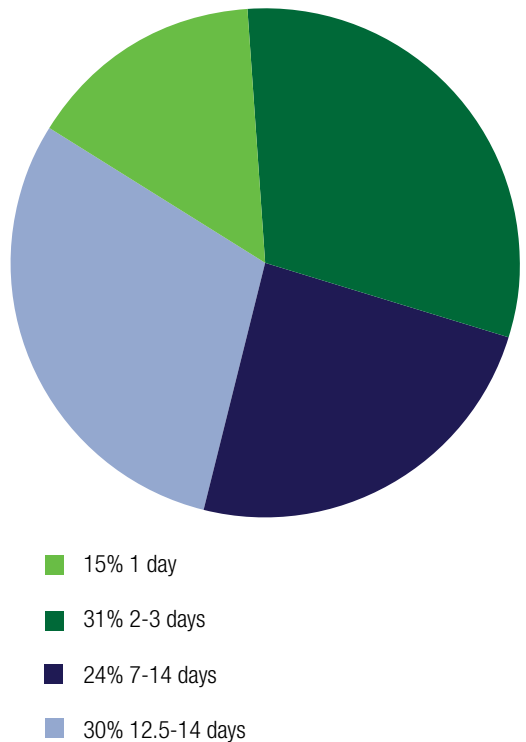


Figure 3: Response time

**Quality of water**

The data from the questionnaires revealed that only 37% of respondents were satisfied with the quality of the water received. 31% Of respondents were dissatisfied stating unacceptable colour, smell and taste as the main reason. A further 26% of respondents cited colour as the main element and 7% cited taste. Most respondents added by saying that the water tasted like mud and that it was often brownish in colour. The overall

opinion on water quality is described by Figure 4 below. It shows that 80% of the respondents regard the quality of the water received as bad. The bad quality of water was confirmed by the health workers at the clinic who referred to frequent outbreaks of diarrhoea in the community due to the unsafe drinking water.

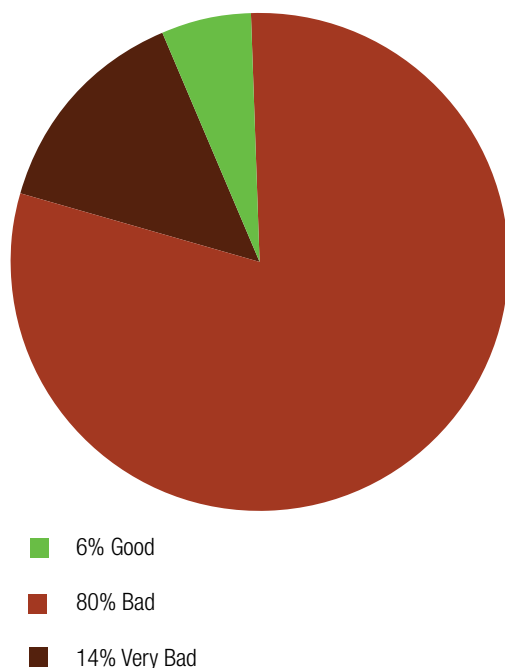


Figure 4: Water Quality

Additional comments to the questionnaires received from respondents indicated that theft of water infrastructure such as taps and valves (indicated 54 respondents) is considered the main cause for water unavailability in the area. Old infrastructure indicated by 28 respondents and inadequate maintenance by 10 respondents as other main causes for water unavailability. When questioned on the technical capacity of the municipal staff a total of 71% of respondents did not have confidence in the municipality's capacity. Comments received in this regard referred to lack of training of municipal officials, slow response to water breakdown complaints, negative attitudes of municipal officials due to lack of management support and lack of suitable training and too few skilled officials.. A total of 64% of the respondents also answered that they did not know how to report water related issues. Reporting water delivery issues is important for record keeping in the municipality and for performance monitoring and evaluation purposes.

## FINDINGS AND DISCUSSION

### Water Supply Challenges

The municipality should be commended for supplying water infrastructure in the community. Only the informal settlement that is expanding rapidly does not have access to water. However, the existing infrastructure has deteriorated and needs urgent maintenance and upgrading. The provision of new water infrastructure without maintaining the existing infrastructure is ineffective management of public assets. Asset management and maintenance plans for water infrastructure in the municipality are urgently needed.

The slow response time to breakdowns also support the finding that maintenance needs urgent management attention. The low pressure/volume of supply suggests that the capacity of the water supply infrastructure may be inadequate. The quality of the water also merits urgent technical and management attention. Various causes may be at the root of this problem. The

study proposes that the population growth in the area may be in part responsible for this problem.

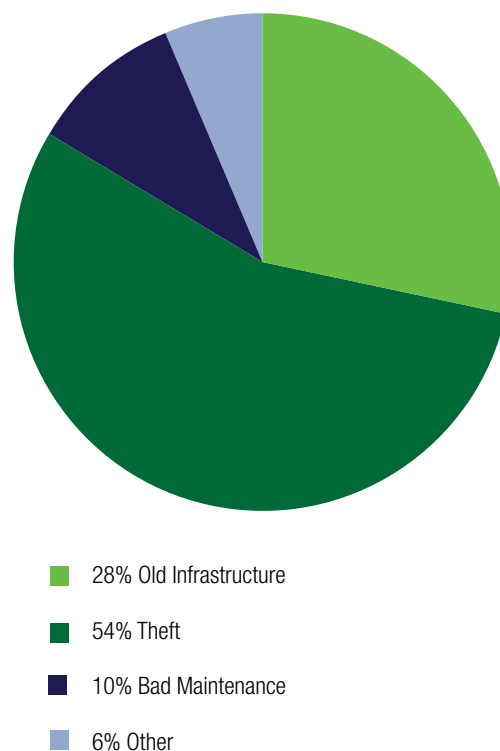


Figure 5: Causes of Water Unavailability

### Efficiency and Reliability of Water Supply

The results from the analysed data indicate that water supply in Motetema is inefficient and unreliable. The quality and integrity of the water supply system are under severe pressure with pipe bursts and leakages common occurrence throughout the settlement. This could become costly in the long run to refurbish should the municipality not take immediate steps in addressing the problems. A substantial number of complaints were received during data collection relating to the persistent unreliability of water supply. As much as 46% of the respondents have access to water for less than 9 hours per day and a further 31% have access for between 9 to 15 hours per day. These results therefore suggest that water supply is irregular and erratic, therefore unreliable.

### Institutional Arrangements

The findings indicate a weak technical capacity in the municipality to sustain water supply to the satisfaction of the residents. A number of respondents specified the lack of technical skills in the municipality. They also reported that the municipal officials have a negative attitude because they are not fully qualified to handle the technical challenges as they arise.

Interpretation of the data from the questionnaires in combination with the additional comments received indicates that significant information gaps seem to exist between end users and the municipality.. It emerged that 64% of the respondents did not know the process to report water challenges including dysfunctional water meters. The results also indicate that 63% of the respondents were not satisfied with the quality of water received. The majority 58% cited colour as their main concern and the negative health effects that untreated water brings. The overall ratings on water quality indicate that 80% of the respondents consider the water to be of bad quality. Municipal health workers also linked the frequent outbreak of diarrhoea in the area to poorly treated water or unsafe drinking water which is a common occurrence.

## CONCLUSIONS AND RECOMMENDATIONS

The conclusions reached and the recommendations made is done from the following point of departure - a water supply installation is a technical and often complex system requiring the appropriate management skills and maintenance programmes to be sustainable and dependable over the longer term. If such a system has to supply an informal, expanding and unregulated community, the challenge of consistent, high quality water supply becomes a much more complicated task.

### Improving Water Operations

It is suggested that EMLM implement the following strategies to improve water operations:

- Upgrading of water treatment technologies with advanced or alternative treatments to improve the quality of water supplied.
- Implementing pro-active measures or an early warning system to identify changes in the quality and quantity of water supplied.
- Launch a Technical Skills Development Programme, with assistance from state agencies responsible for capacitating local government.
- Effective implementation of water conservation and water demand strategies to reduce losses and wastage.
- Public education or awareness for water conservation and management especially at household level.
- Regular maintenance of water supply systems, including metering equipment, to reduce the level of unaccounted for water.
- Regular monitoring of water source quality and quantity.

### Institutional Arrangements

Water supply management is an integrated process involving different institutions who have to work together in providing a good service. The process should take account of existing arrangements between the municipality and the community and to strengthen those relationships for the benefit of the water service. In order for operations to run smoothly, the municipality needs to recognise the important linkages between the following functions:

- The management of the bulk system,
- The management of the branch and local systems,
- Coordination, both horizontally and vertically,
- Regulatory and operations functions,
- Active multidisciplinary professional support services.

EMLM should strengthen communication channels between the municipality and the residents by establishing water management committees within the different areas to support operations i.e. report water issues as they arise. A clear separation of roles between the WSP and WSA will also improve coordination which is a necessity in operations management.

### Investment in Water Infrastructure

As discussed in the paper, water infrastructure in this settlement is on the verge of collapse. This is evidenced by frequent bursts of water pipes, dysfunctional meters and also visible water leakages throughout the area. The municipality should:

- Address water infrastructure theft.
- Conduct an infrastructure audit to inform the basis for investment in the area.
- Refurbish existing infrastructure to reduce losses and wastage.
- Acquire an accurate database on connections and meters. This database should be linked to the billing and collection database to improve municipal revenue.
- Invest in the development of boreholes and other groundwater sources.
- Invest in an operations and management system, linked to asset management system to prolong the life of the infrastructure.

Similar findings and conclusions were made by the studies of Majuru et al<sup>15</sup> and Hoffman et al<sup>22</sup> in other areas of Limpopo Province which indicate that the above mentioned problems may be wide spread and systemic in many municipalities in the rural areas of South Africa. The Motetema municipality need to consider taking immediate measures to deal with the identified challenges, since the challenges are of an urgent nature. Such interventions will require revising and updating the municipal planning instruments such as the Water Services and Sanitation Plan to ensure sustainable water services supply to the people of Motetema. The suggested interventions are also supported by the findings of a study by Jack et al<sup>23</sup> on emergency response plans for water security in rural areas of three other provinces of South Africa. The study by Jack et al proposes that emergency response plans be in place to identify water delivery emergencies such as unavailability or contamination of water supply, how to communicate such emergencies and how to respond appropriately thereto.

However, it should be noted that the Motetema Municipality will struggle to achieve success if the recommended interventions are not complemented by technical skills development programmes and training at all levels of the municipality. An efficient, effective and reliable water services operation is dependent on mutual cooperation from all involved parties including the private parties dealing with implementation. The Motetema Municipality may benefit to heed the findings of a study by Akinboade et al<sup>24</sup> advising early communication and consultation with the community, prompt action to be taken on justified complaints and to avoid making empty political statements that only serve to fuel unrealistic expectations.

## CONCLUSION

Provision of water and sanitation services remains a key priority for government. Adequate water supply is a prerequisite to sustainable development and for drawing capital investment into areas that require economic development. Supply of clean water is essential for sustaining healthy societies, for human dignity and improved quality of life. This study has established that water supply in the Motetema area is experiencing severe challenges and recommendations have been given for consideration by the municipality in order to effectively deal with the challenges.

The study revealed challenges relating to:

- Overall operational challenges of the supply system which has an impact on the quality of water supplied,
- Technical skills shortages or capacity challenges,
- Inadequate planning and investment into water infrastructure maintenance,
- Inefficient communication channels between the community and the municipality.

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