



A sustainable governance model for water,
sanitation and hygiene provision: The case of
Capricorn District Municipality in the Limpopo
Province of South Africa

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degree *Doctor of Philosophy in Social Sciences with Public
Management and Governance* at the North-West University

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DECLARATION

I Raesibe Anna Mothapo (Student number 26771233) do solemnly declare that this thesis entitled:

**A Sustainable Governance Model of Water, Sanitation and Hygiene Provision:
The case of Capricorn District Municipality in Limpopo Province of South Africa**

Submitted in fulfilment of the requirements of the degree Doctor of Philosophy in Social Sciences with Public Management and Governance at the North-West University, Potchefstroom Campus, is my own work and has not previously been submitted by me to any University. I further declare that all material and sources used in this study have been duly acknowledged by means of complete in-text source references.

I understand that the copies of this dissertation submitted for examination will remain the property of the North-West University.

Signed..... on this day 28th of.....November...2025

DEDICATION

A special dedication to Lehlogonolo and Hlogonolofatso

Topsie 

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First and foremost, to Lord JK – all the glory and all the honour for giving me strength against all odds to finish this thesis. Without You, I am nothing.

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ABSTRACT

Access to safe water, adequate sanitation and hygiene (WASH) services is fundamental to promoting public health and well-being. The provision of WASH remains a central strategy for mitigating public health risks, psychosocial challenges and socioeconomic inequalities, particularly in rural communities. Despite international commitments, an estimated 2.1 billion people still lack access to basic sanitation; 673 million practice open defecation; 1.3 billion rely on limited or unimproved sanitation facilities; and 1.7 billion remain without basic hygiene services.

This study examined the provision of WASH services in the Capricorn District Municipality (CDM) of Limpopo Province. Specifically, it evaluated the extent to which WASH implementation aligns with the objectives of the 2001 White Paper on Basic Household Sanitation and integrates behavioural frameworks such as the Theory of Planned Behaviour (TPB) and the Risks, Attitudes, Norms, Abilities and Self-regulation model (RANAS) in promoting hygiene education. Particular attention was given to psychosocial well-being and gender-transformative approaches, especially for women and adolescent girls in the CDM, to assess whether sustainable governance strategies are in place to ensure effective WASH service delivery. Consequently, the primary objective of the study was to develop a sustainable governance model to enhance WASH provision in rural informal settlements within the CDM. The study focused on constituencies experiencing WASH disparities in rural informal settlements.

A mixed-methods research design was adopted, incorporating a literature review, questionnaires, semi-structured interviews, document analysis and Participatory Rural Appraisal (PRA) techniques such as Photovoice and Transect Walks. In addition, the Delphi Technique was employed to refine, triangulate and validate the proposed governance model. The findings indicated that governance structures within the municipality are largely ineffective, contributing to grossly inadequate WASH service delivery. The study proposes a sustainable governance model that integrates top-down oversight with bottom-up community engagement, especially facilitated through WASH Community Forums. This approach would address community concerns regarding infrastructure availability, facility conditions, privacy, water treatment practices and handwashing facilities.

The study concludes that inclusive participation, particularly involving women, adolescent girls and men, is essential for the successful implementation of the proposed sustainable WASH governance model at the CDM.

Key terms: Adolescent girls, Capricorn District Municipality (CDM), Sustainable governance model, Hygiene, Rural informal settlements, Water, Sanitation and Hygiene (WASH), Women.

LIST OF ACRONYMS

AHPS	Absorbent Hygiene Products
BaSSREC	Basic and Social Science Research Ethics Committee
BEP	Bucket Eradication Programme
CBOS	Community-Based Organisations
CDM	Capricorn District Municipality
CDW	Community Development Workers
COGHSTA	Cooperative Governance, Human Settlements and Traditional Affairs
CTS	Central Theoretical Statements
DA	Democratic Alliance
DEFF	Department of Environment, Forestry and Fisheries
DHS	Department of Human Settlement
DTM	Delphi Technique Model
DWS	Department of Water and Sanitation
E-Municipality	Electronic Municipality
FA	Factor Analysis
FBSAN	Free Basic Sanitation
FGD	Focus Group Discussion
GEAR	Growth, Employment and Redistribution
GIC	Gender Integration Continuum
HWT	Household Water Treatment
HWWS	Hand Washing With Soap
ICESCR	International Covenant on Economic, Social and Cultural Rights
IDP	Integrated Development Plan
IPAP	Industrial Policy Action Plan

JMP	Joint Monitoring Programme
KIIS	Key Informant Interviews
KMO	Kaiser-Meyer-Olkin
LED	Local Economic Development
LNLM	Lepelle-Nkumpi Local Municipality
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MEC	Member of the Executive Council
MMLM	Modimolle-Mokgopholng Local Municipality
MPAP	Municipal Priority Action Plans
MSF	Multiple Stream Framework
Mussa	Municipal Strategies Self-Assessment
NDP	National Development Plan
NGO	Non-Governmental Organisation
NGT	Nominal Group Technique
NPG	New Public Governance
NPM	New Public Management
NPS	New Public Service
NSSS	Non-Sewered Sanitation System
NWU	North-West University
PA	Public Administration
PAR	Participatory Action Research
PCA	Principal Components Analysis
PGDS	Provincial Growth and Development
PLA	Participatory Learning And Action
PLM	Polokwane Local Municipality

PR	Participatory Research
PRA	Participatory Rural Appraisal
RANAS	Risk, Attitude, Norm, Ability and Self-Regulation
RDP	Reconstruction and Development Plan
SAHRC	South African Human Rights Council
SANS	South African National Standards
SDGs	Sustainable Development Goals
Secs	Socioeconomic Characteristics
SSA	Sub-Saharan Africa
Toc	Theory of Change
TPB	Theory of Planned Behaviour
UISP	The Upgrading Informal Settlement Programme
UN	United Nations
UNICEF	United Nations Children's Fund
VDM	Vhembe District Municipality
VFM	Value For Money
VI	Vulnerability Index
VIP	Ventilated Improved Pit Latrines
WASH	Water, Sanitation and Hygiene
WASHCF	WASH Community Forum
WHO	World Health Organisation
WSA	Water Services Authorities
WSDP	Water Services Development Plan
WSSA	Water and Sanitation Services South Africa
WSSP	Water Supply and Sanitation Policy
WWTPs	Wastewater Treatment Plants

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CHAPTER 1:

BACKGROUND AND PROBLEM STATEMENT

1.1 INTRODUCTION

Water, Sanitation and Hygiene (WASH) is the collective term for the related concepts regarding safe drinking water, basic sanitation and hygiene practices. The United Nations (UN) utilises WASH and the Joint Monitoring Programme (JMP) to track the implementation of global targets outlined in the Sustainable Development Goals (SDGs). These initiatives are targeted at resolving WASH-related challenges and developing action plans for Socioeconomic Characteristics (SECs), the environment and prosperity (World Health Organisation, 2022a:2).

Access to safe, clean water and sanitation facilities is crucial for maintaining good hygiene and health, but informal settlements in rural South Africa are currently experiencing a crisis in accessing these infrastructures. Through declarations such as the 1992 Dublin Principles, 2010 UN Human Rights Council Resolutions 64/292 on the Rights to Water and Target 7.C of the Millennium Development Goals (MDGs) (1990-2015) devoted to safeguarding water for sustainable development, the provision of WASH services was well-positioned to facilitate broader goals in developing countries for the future (Hellberg, 2022:2). Many countries in Sub-Saharan Africa (SSA), notably South Africa, are striving to reach the 2015-2030 SDGs and beyond. Considering the abovementioned, the literature presented in this study argues that the provision of basic services such as WASH is closely linked to public policy and the Theory of Planned Behaviour (TPB) which is the backdrop for the decision-making process and the Risk, Attitude, Norm, Ability and Self-regulation (RANAS) strategies affecting the psychosocial well-being of communities in rural informal settlements. This emphasises the need to explore WASH against the backdrop of the White Paper on Basic Household Sanitation of 2001 which directly applies to the municipal setting in the current study. The participating municipal setting served as the initial catalyst for the researcher's interest in providing WASH services and the public strategy. This study aims to develop a sustainable governance model to empower informal settlements in the rural community in the Capricorn District Municipality (CDM) of the

Limpopo Province by filling a public strategy lacuna in the provision of WASH services for societal well-being. Mutyambizi, Mokhele, Ndinda and Hongoro, (2020:2) asserted that informal settlements in South Africa are a result of apartheid policies that segregated people based on race, impacting housing, jobs and education. It is estimated that around 12.2 million individuals reside in the urban informal settlements of South Africa, which includes rural communities that often construct their homes on unauthorised municipal land (Oskam, Pavlova, Hongoro & Groot, 2021:2). Unfortunately, these areas still frequently lack access to essential municipal services like electricity, safe, clean drinking water, proper sanitation and hygiene promotion. The most appropriate research methodologies were researched to reach the study's objectives. A description of the suggested structure used in this proposal is provided at the end of the section.

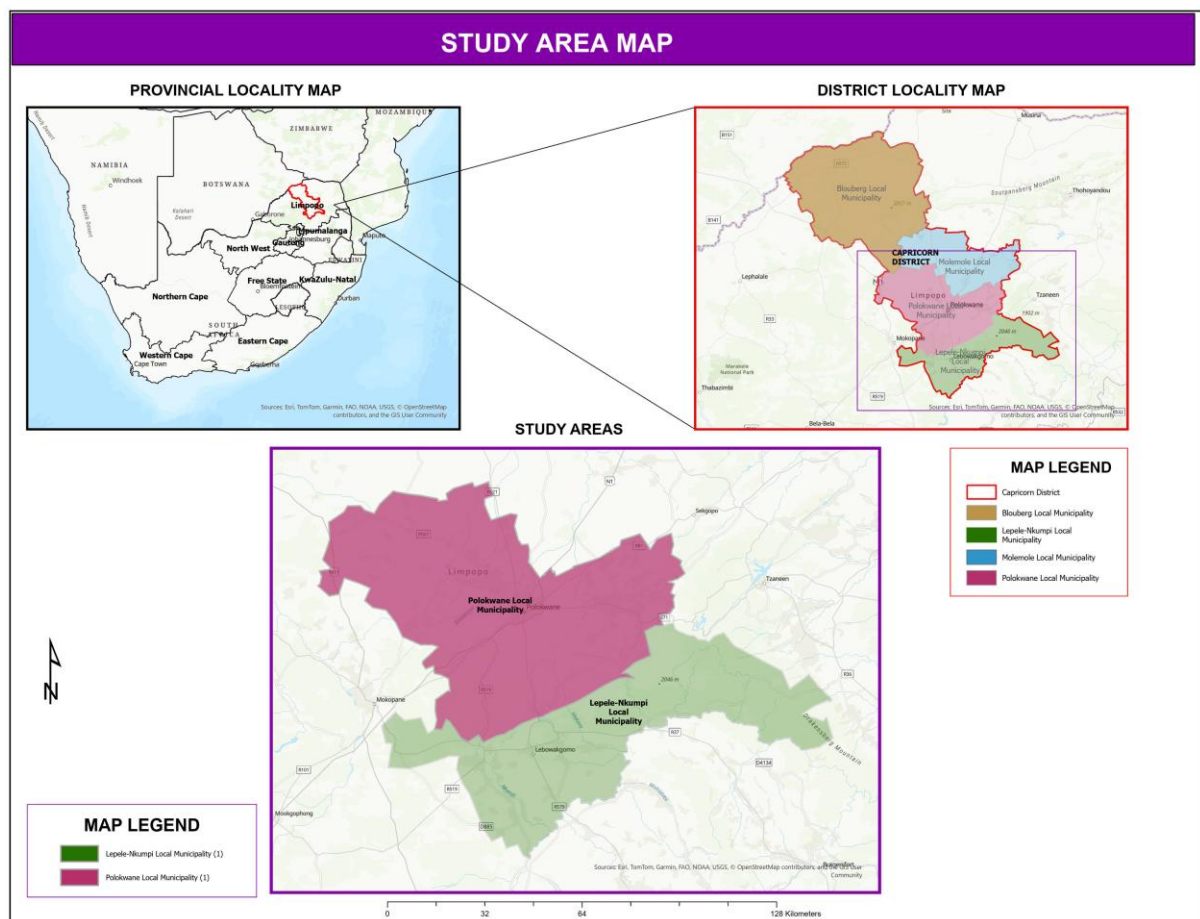


Figure 1.1 Locality map of the Capricorn District municipal area

Source: Author's own compilation

1.2 BACKGROUND TO STUDY

Providing basic services, such as WASH, is the cornerstone strategy for reducing global infections, psychosocial dysfunction and socioeconomic challenges in households of rural communities. The day-to-day priority of many informal households in rural locations is to enjoy safety-oriented societal care. To date, the provision of WASH services to all constituencies in South Africa has never been possible across the three spheres of government, namely national, provincial and, most crucially, local government. A survey by Statistics South Africa (StatsSA) reported from May 2025, nearly one in five South African households, or approximately 22.9% of families, lack access to safe drinking water, 13.4% rely on pit latrines without ventilation, 1.6% still practice open defecation and 0.8% do not wash their hands with soap after using the toilet, even though the report did not give precise data on rural areas of the country, especially informal settlements. As Mutyambizi *et al.* (2020:18) note, the provision of basic services such as WASH in informal settlements is outpaced by rural-to-urban migration, leading to a shortage in supply.

Globally, 2.3 billion people still lack access to basic sanitation facilities, 673 million people still defecate in the open and 1.3 billion make use of limited or unimproved sanitation facilities, while only 68% of the global population has access to basic sanitation facilities (Bhatt, Budhathoki, Lucero-Prisno, Shrestha, Bhattachan, Thapa, Sunny, Upadhyaya, Ghimire & Pokharel, 2019:2; Dickin, Bayoumi, Giné Andersson & Jiménez, 2020:1; Valcourt, Javernick-Will, Walters & Linden, 2020:17; Hu, Xiao, Fan, Sun & Zhu, 2021:1; Sun & Han, 2021:788). Nevertheless, to date, WASH services interventions are envisioned to minimise the spread of communicable diseases such as diarrhoea caused by open defecation, as well as water-related mortalities and/or psychosocial hardships, as women face the brunt of collecting water, which typically takes a long time, particularly in Sub-Saharan African (SSA) nations (Ejelonu, Feng & McKeon, 2020:18).

Fetching water is physically painstaking for women. It also exposes women to multiple health risks, such as musculoskeletal injuries, fatigue, physical pain and never-ending disability. Adams, Byrns, Kumwenda, Quilliam, Mkandawire and Price (2022:2) asserted that fetching water after dark increases the risks of rape, sexual harassment, gender-based violence and other physical attacks and recurring injuries from water

collection. WASH has mainly focused on household communicable disease prevention, neglecting the well-being of women during the water collection journeys. Women in rural informal settlements of South Africa face significant psychosocial challenges in terms of access to basic WASH services compared to those in urban areas, thereby exposing a disproportionate investment in community socioeconomic development along the lines of regional locations and infection reduction. Access to WASH services is critical because it reduces vulnerability to infection and diseases related to the outbreak of the COVID-19 pandemic. Hygiene promotion also reduces WASH-related sickness among communities facing public health issues, as well as the psychosocial challenges facing communities residing in rural informal settlements (VallyMcMichael, Doherty, Li, Guevarra & Tobias, 2019:2). Nonetheless, the assessment of how local municipalities provide basic services related to WASH services is limited in the context of rural informal settlements in South Africa.

In rural informal settlements women, especially in South Africa, were historically disadvantaged from 1948 to 1994 because of the governing party's racial segregation policy, where marginalised people frequently had to relocate to surrounding townships (Oskam *et al.*, 2021:2). When segregation policies ended in 1994, significant guidelines and legislation limiting activities were implemented to correct the injustices, notably the provision of WASH services. In 1994, the South African Government developed the Presidential Leadership Project as part of the Reconstruction and Development Plan (RDP) (Francis & Webster, 2019:796).

The RDP envisioned an overarching socioeconomic developmental right that would provide all constituencies with basic requirements such as water, sanitation, housing and education to reduce inequities and poverty caused by the apartheid government (Ndinga-Kanga, Van der Merwe & Hartford, 2020:29). Nonetheless, the RDP minimal standards were adopted as a cornerstone strategy to monitor disputatiousness arising from socioeconomic inequality and to demonstrate the legitimacy of the new government, even though several constituencies, especially informal settlements in rural communities, do not have access to adequate WASH services in their households.

Furthermore, with the new dawn of democracy in 1994, Water Supply and Sanitation Policy (WSSP) was implemented as a comprehensive declaration of a government policy which aimed to be separated from the apartheid government, and opening

broader opportunities for societal members partaking in the provision of safe drinking water and basic sanitation (Asoba, Fiko, Makiwane & Mefi, 2020:2). Yet, for the WSSP to be effective, monitoring and evaluation measures are vital to gauge its performance in the reduction of the backlog inherited from the apartheid government, especially in the provision of basic services tailored to safe clean drinking water and basic sanitation.

The Growth, Employment and Redistribution (GEAR) programme was implemented after the RDP, aimed at increasing economic growth and restructuring income in the country, while also prioritising the provision of potable water and basic sanitation to all households (Tendengu, Kapingura & Tsegaye, 2022:2). Water insecurity in South Africa has had a deleterious influence on socioeconomic growth and the attainment of the SDGs; many rural households in informal settlements have been affected as communities are expected to maintain and access the provision of WASH services as a corrective action to the COVID-19 pandemic. Access to safe drinking water, sanitation facilities and basic hygiene are the foundations of human health, socioeconomic development and dignity (Banks, White, Biran, Wilbur, Neupane, Neupane, Sharma & Kuper, 2019:2). However, previous research has reported that several communicable diseases afflicting people are partially attributable to insufficient access to WASH services globally (Anthonj, Setty, Ferrero, Yaya, Poague, Marsh & Augustijn, 2022:2).

Several years following independence in South Africa, a series of policies and strategies were implemented; some were tailored to address and monitor the promotion of equitable access to the provision of basic services proposed for public participation within local municipalities, such as the Water Services Act 108 of 1997 and the National Water Act 36 of 1998 (Hove, D'Ambruoso, Mabetha, Van Der Merwe, Byass, Kahn, Khosa, Witter & Twine, 2019:2). The Water Services Act 108 of 1997 was legislated to provide the right of access to basic water supply and sanitation facilities without harming people's well-being, while the National Water Act 36 of 1998 was aimed at protecting the national water and develop a water resource that is not harmful to the environment, which enshrined the legitimacy of societal needs in the provision of basic services (Ndeketeya & Dundu, 2019:166).

The White Paper on Basic Household Sanitation of 2001 focuses on providing basic household sanitation to rural areas and informal settlements. The policy stated that

basically "toilets are only one of several things that contribute to proper sanitation" (Norvixoxo, Schroeder & Spiegel, 2023:4). It has been reported that in the Limpopo Province, 7% of rural households have no access to appropriate sanitation, notably safe, clean drinking water and proper hygiene (Motsoeneng, 2022:187). Water is regarded by many experts as the engine of human survival, the foundation of sustainable development and essential for socio-economic development and a healthy environment.

In 2011, the National Development Plan (NDP) was gazetted and the year 2022 marked 10 years of its adoption as a blueprint indicating the development made since the rebirth of a new democratic government, the slogan of which, 'charting our future – make it work' is aimed at eliminating poverty and reducing inequality now and beyond 2030, by uniting the community (Chigova, 2021:1069). The most prominent social and economic development in the NDP is the access to safe WASH services, which is aligned with the SDGs for South Africa's priorities, and to monitor the progress of strategies to meet its societal needs and vice versa (Haywood, Funke, Audouin, Musvoto & Nahman, 2019:557). Yet, the issue of insufficient sustainable accessibility in the provision of service delivery in developing countries is shared by other countries that struggle to obtain WASH services, although it is a challenge in South Africa.

During the MDGs era, 2000-2015, the JMP used two concepts, the 'improved and unimproved' sources of drinking water and the 'improved and unimproved' sanitation, as the tool for attaining MDG 7c, aimed at halving the global population living without sustainable access to safe drinking water and basic sanitation before 2015 (Weststrate, Dijkstra, Eshuis, Gianoli & Rusca, 2019:796). The intention of the 'services ladders' is to attain vision 2030 of the SDGs target 6, by ensuring access to water and sanitation for everyone, focusing on two out of eight targets – 6.1 and 6.2. Whereas 6.1 intends to achieve global access to acceptable safe and affordable drinking water for everyone, 6.2 was designed to 'end open defecation by providing access to sanitation and hygiene, focusing more especially on woman and girls living in vulnerable conditions (Mulligan, van Soesbergen, Hole, Brooks, Burke & Hutton, 2020:2).

Since the adoption of the SDGs in 2015, the South African government has pledged to continue with its global responsibilities and commitments toward the provision of WASH to its communities. The SDGs established the new global indicator for human

development, focusing on sustainable water and sanitation service provisioning, and presented the 'service ladders' aimed at monitoring drinking water and sanitation progress. These are classified into four concepts: drinking water service, sanitation services, hygiene services and menstrual health (Wagari, Girma & Geremew, 2022:1). This is because the initial service ladders for drinking water and sanitation were implemented globally in 2008 to differentiate between the importance of the provision of water and sanitation practices (Trepanier, Orare, Nyagwencha & Grady, 2021:639). The implementation of service ladders drove WASH aspects for the effectiveness of public policy and bridged the gap for socio-economic growth possibilities, such as basic service provision, infection reduction, health education and the rising disparity between the haves and have-nots.

According to the 2001 White Paper on Basic Household Sanitation, ensuring the implementation of WASH services in rural informal settlements would have a positive impact and ensure the rural household's programme gets appropriate funding and monitoring of its implementation, aligned with the WASH 'service ladder'. Assessing water at the household level, the water service ladder, time and cost are significant issues to consider (Dharod, Nounkeu, Paynter, Labban & Sastre, 2021:1036). The persistent lack of chronic water scarcity holds society hostage, frequently affecting food insecurity strategies and requiring women to prepare less food for their households – with water scarcity affecting the lack of WASH infrastructures and climate-induced scarcity degrading water quality, potentially increasing health-related infections (Apatinga, Schuster-Wallace & Dickson-Anderson, 2022:10). The interventions to improve water quality in households have been linked with psychosocial strategies for reduction of diarrhoea and were aimed at averting contagious infections and preventing individuals without piped water from being measured as 'no service' and consequently deprived, according to the water ladder.

The sanitation ladder takes into consideration households that do not have access to a flush toilet. To decrease the health risks associated with poor sanitation it is critical for rural communities to replace unimproved sanitation facilities with improved ones, and to encourage hand-washing behaviours in the household to reduce infection (Alemu Adugna, Likasa, Mekonnen, Alemu & Girmay, 2023:9). The advantages of availability of improved sanitation and drinking water cannot be comprehended without basic hygiene. Psychosocial habits such as hand washing with soap is regarded as

the key element for good hygiene as it serves as a main barrier so as to eliminate faecal substance from stools and a subordinate barrier for the prevention of pathogens from getting into food and fluids consumed by humans, thus precipitating the spread of diseases (Kotzé & Coetzee, 2019:196).

The lack of hand washing with soap is often related to poor personal hygiene behaviour and it contributes to diarrhoea, intestinal nematode infections, lymphatic filariasis, trachoma, malaria, schistosomiasis, fungal skin infections like ringworm and scabies and related to respiratory infections, often nested within psychosocial factors (Sharma & Adhikari, 2022:2). Access to water can impact household hygiene practices as the majority have limited hand-washing facilities but no access to potable water, or notably, hand soap or sanitizer for infection reduction. The WASH services programme is viewed as a cornerstone for the White Paper on Basic Household Sanitation of 2001, the TPB and RANAS in the provision of hygiene education as a crucial public benefit of WASH services to rural informal settlements. The local government is the custodian of the provision of basic services to communities and accepts relevant agencies and stakeholders to participate in the provision of WASH services in its constituents. Yet within the CDM, public policy related to WASH in the rural informal settlements remains stagnant which often results in the rural informal settlements embarking on service delivery protests.

1.3 PROBLEM STATEMENT

Analysis of how local municipalities provide basic services related to WASH is limited to the context of rural informal settlements (Mutymbizi *et al.*, 2020:2; Bazaanah & Mothapo, 2023:4). Lack of WASH facilities is crucial to society in many developing nations; for example, Punjab in Pakistan, especially when it comes to the importance of psychosocial factors and societal norms in improved sanitation (Adil, Nadeem & Malik, 2021:970). Tanzania has one of the poorest sanitation systems in the world, with growing open defecation, which leads to diarrhoea as the third highest cause of death (González-Rodrigo, Esteban-Zazo, Vela-Plaza, Chaggu & Mancebo, 2022:3). Zimbabwe has been stagnant, reaching only 68% of the SDGs since 2014, owing to limited access to safe drinking water at the point of use with households using public sources of drinking water such as communal boreholes, protected wells, solar-

powered piped water projects and natural springs (Makokove, Macherera, Kativhu & Gudo, 2022:250).

In Botswana, floods have ruined some communities and caused substantial damage to WASH services infrastructure, leaving individuals and households in informal settlements vulnerable to WASH-related infectious illnesses and poor sanitation facilities (Tshuma, Belle & Ncube, 2023:1). Numerous rural communities in the Lepelle Nkumpi Local Municipality at the Limpopo Province still rely on boreholes and shallow wells for drinking water sources and utilise pit-latrines sanitation facilities for their households, without washing their hands with soap after using the toilet (Bazaanah & Mothapo, 2023:3). Notably, the persistence of accessing unreliable unhygienic water sources and unprotected sanitation facilities in our communities significantly deter the achievement of the SDGs in South Africa.

The inadequate provision of WASH services in rural South Africa is significant as the country has been experiencing it for decades and this continues to be challenging for rural communities, also faced with water scarcity. In South Africa, inadequate access to the provisions of safe water is associated with socioeconomic characteristics such as lower school attendance, particularly among female youth who are menstruating (Oskam *et al.*, 2021:3). Living in rural informal settlements such as the CDM, where there are high population densities and inadequate sanitation facilities, makes it challenging for inhabitants to avoid psychosocial problems such as encountering human waste, thus making the issue of poor sanitation particularly significant. Rural informal settlements in South Africa suffer from a lack of improved infrastructure for WASH services in comparison to urban communities and are thereby prevented from achieving the SDGs due to risk barriers such as their locality, climate change, insufficient knowledge of infection reduction measures and proper sanitation facilities. A local municipality is perceived to be attaining universal access to improved WASH services infrastructures amongst the rural informal settlements and households and moving up the sanitation ladder when open defecation changes to an unimproved basic latrine, to the use of more safely managed latrine choices. South Africa has made significant progress towards developing a rights-based sanitation policy over the progression of its first 29 years of independence, but it is still a work in progress. As universal access to WASH is acknowledged as a constitutional responsibility of the

national government, the local government is responsible for providing basic WASH under the constitution and required to take reasonable steps to protect this right.

The minimal quantity of drinking water consumption and domestic water demands, as defined by the United Nations (UN) through SDG 6 on global access, is around 25 litres per person per day, corresponding to the minimum standards prescribed in the RDP, which states that 25 litres (ℓ) of water must be accessible daily to constituencies within 200 meters (m) distance, at a flow ratio of 10 litres (ℓ) per minute (Martínez-García, Oller, Vincent, Rubiolo, Asiimwe, Muyanja, McGuigan, Fernández-Ibáñez & Polo-López, 2022:9). The ventilated improved pit latrines (VIPs) and pit latrines have been identified as the sanitation standards that have been supported since democracy and demonstrated to have huge impact on health outcomes in terms of the provision of sanitation services in South Africa, particularly in rural informal settlements (Madikizela, Hoossein, Laubscher, Whittington-Jones, Ahmed, Mutingwende, Ristvej & Tandlich, 2022:4).

The recommended minimum acceptable basic level of sanitation for the communities is described as having access to facilities for the safe disposal of human waste – faeces and urine – as well as the ability to maintain sanitary conditions through services such as garbage collection, industrial and hazardous waste management and wastewater treatment and disposal (Muanda, Goldin & Haldenwang, 2020:239). The poor provision of sanitation service in South Africa is often worse than poor access to water and electricity in rural informal settlements, let alone hand washing using soap (Kekana, Ruhiiga, Ndou & Palamuleni, 2023:12). Psychosocial factors, approaches, strategies and activities to improve the provision of WASH services and hand-hygiene practices in rural informal settlements appear to be blurred. Targeting interventions and resilience mitigating the effects of unreliable provision of WASH services in the rural informal settlements is difficult without a clear signal of the extent of the problem, where it persists and who is affected. In this research, basic WASH services flexibility is assumed as an adjustment to respond to a variety of situations and build proficiency in the face of adversity. Scholars and policymakers often interpret WASH flexibility as ensuring service access, rather than addressing the system itself (Yasmin, Dhesi, Kuznetsova, Cooper, Krause & Lynch, 2022:20).

Based on the researcher's observations over a period of nearly 20 years during her Master's data collection, the situation regarding the provision of WASH services in

rural informal settlements is hazardous and linked to the psychosocial challenges. Therefore, a prompt intervention is required to mitigate the backlog faced by the communities, especially those in rural areas. Considering the facts and orientation provided, this study sought to develop a sustainable governance model within the strategy of rural communities regarding the provision of WASH services in accordance with the SDGs and UN targets. Thus, this study aimed at reflecting on, *"What might be the most beneficial sustainable governance model to promote the provision of WASH services for rural informal settlements in the Capricorn District Municipality in Limpopo Province of South Africa"*.

1.4 RESEARCH QUESTIONS

1.4.1 Main research question

"What might be the most beneficial sustainable governance model to promote the provision of WASH services for rural informal settlements in the Capricorn District Municipality in Limpopo Province of South Africa?".

1.4.2 Specific Research Questions (RQ)

The study proposes to answer the following questions based on the research topic and problem statement:

RQ1: What are the principles, dimensions and approaches that would underpin a sustainable governance model of WASH within a municipality?

RQ2: What are the theoretical fundamentals of developing a sustainable governance model for WASH with specific reference to existing global models and sustainable governance measuring tools?

RQ3: What are the socioeconomic and psychosocial behaviours related to the provision of WASH in the Capricorn District Municipality?

RQ4: What are the perceptions and challenges encountered by residents at rural informal settlements in the execution of sustainable governance principles of WASH?

RQ5: How could an analysis regarding the feasibility of the implementation of WASH in the Capricorn District Municipality be utilised to the communities?

RQ6: What constitutes a sustainable governance model that can be proposed for the Capricorn District Municipality to improve the provisioning of WASH?

1.5 RESEARCH OBJECTIVES

1.5.1 Main research objective

To develop a sustainable governance model to promote WASH for rural informal settlements in the Capricorn District Municipality.

1.5.2 Research Objectives (RO)

This study is designed to achieve the following objectives:

RO1: To explore the principles, dimensions and approaches that underpin the sustainable governance of WASH.

RO2: To investigate the theoretical fundamentals of developing a sustainable governance model for WASH with specific reference to existing global models and sustainable governance measuring tools.

RO3: To examine the socioeconomic and psychosocial behaviours related to the provision of WASH in the Capricorn District Municipality.

RO4: To empirically determine the perceptions and challenges in the execution of sustainable governance principles of WASH by residents at rural informal settlements in the Capricorn District Municipality.

RO5: To analyse the feasibility of the implementation of WASH in the Capricorn District Municipality.

RO6: To propose a sustainable governance model for the provision of WASH at the Capricorn District Municipality.

1.6 CENTRAL THEORETICAL STATEMENTS (CTS)

All relevant theories and illustrations were analysed to provide a central theoretical foundation for the research study. The second chapter of this proposed study provides a detailed theoretical background for the research. Specifically, the following central theoretical statements are proposed:

CTS1: The COVID-19 pandemic added to the already complicated socioeconomic position of those living in informal settlements (Gil *et al.*, 2021:7).

CTS2: The scarcity of safe drinking water in rural areas is well accepted as a sign of the high occurrence of communicable diseases such as diarrhoea, schistosomiasis, trachoma and intestinal helminths, which can evidently be attributed to unsafe water, poor sanitation and hygiene (Simelane *et al.*, 2020:6).

CTS3: Community participation and knowledge co-production in the creation of novel technologies linked with WASH principles can lead to more sustainable and socially acceptable hand hygiene systems (Sutherland *et al.*, 2021:1).

CTS4: Informal settlements are unplanned residential areas with insufficient improved WASH facilities and crucial services, an insecure land-tenure system, poor housing quality and high dwelling density (Dakyaga *et al.*, 2021:15).

CTS5: Disparities in access to water services exist between countries, within country boundaries and in communities, making the SDG universal access to safe water unachievable by 2030 unless appropriately addressed (Tumwebaze *et al.*, 2022:17).

CTS6: The availability of WASH is influenced by the interdependence of economic, social, institutional, psychosocial and political concerns influencing the provision of WASH services in Sub-Saharan African countries (Ocholla *et al.*, 2022:8684).

CTS7: Migration, settlement in hazard-prone areas, age, gender features, educational level, psychosocial factors, marital and work status are all socioeconomic factors that often play a role in a community's vulnerability and resilience when faced with hazards and disasters associated with WASH inadequacies (Hambati, 2022:342).

Thus, from the aforementioned, the central theoretical statement of this study would be that informal settlements in SA are currently experiencing a crisis in accessing WASH infrastructure and facilities. The provision of WASH services is important to facilitate broader goals in developing countries for the future (Hellberg, 2022:2).

1.7 THEORETICAL OVERVIEW OF THE STUDY

In the context of this study, the conceptual framework is understood to be an depiction that defines the primary objects to be examined, key factors and concepts and recognised interactions among them, either visually or in story form (Van der Waltd, 2020:2). Theories exploit reasonable principles, ideas and assertions to anticipate or explain events, circumstances, or phenomena (Mensah, 2020a:4). A theoretical framework reflects the effort made by the researcher to develop a theory for use in a study.

Theoretical frameworks are required to guide and coordinate the components of a study, such as an issue description, research questions, data analysis and findings conceptualisation (Larsen & Adu, 2021:102). The theoretical framework is understood to be intended to convey the researcher's assumptions and perspectives regarding the topic of the study by enlightening the phenomenon of the study and related assumptions adopted by the researcher. The theoretical framework defines and introduces the theory that underpins the research problem under review. Theoretical frameworks provide a theory or a series of related ideas, while conceptual frameworks proffer detailed concepts or constructions (Larsen & Adu, 2021:127). The researcher has used the Theory of Planned Behaviour (TPB) and Risk, Attitude, Norm, Ability and Self-regulation (RANAS) strategies as the conceptual framework to assess the triangulation on the public policy in this study, since they fit situations where an individual does not perceive themselves as having complete control over their behaviour as might occur in individual households without access to the provision of basic WASH services in rural communities.

The focus is on WASH services in terms of the people, components and functions that are needed to deliver sustainable WASH services in rural communities. This research anticipates assessing the work that other researchers have done locally and globally to provide an analytical context for this field of study. This study is aligned within the broad framework of the SDGs and the UN targets. Aspects such as socioeconomic characteristics (SECs) and the attitudes of rural informal settlements are critical for adopting a psychosocial factor linked with WASH intervention strategies to provide acceptable determinants of diverse WASH practices; thus the TPB and RANAS were utilised in the conceptual framework. Ajzen created a complete integrated behaviour

modification model for WASH in 1985. The TPB is widely regarded as one of the most well-established social psychology theories for predicting human behaviour and it has been studied in several countries and circumstances (Issrani & Alam, 2021:12). The TPB is often related to the prediction of an individual's intention to exhibit a behaviour at a certain time and location. Within the framework of the study's major issue of WASH, other's attitudes towards the women in informal rural areas accessing WASH are significant.

Subjective norms are a type of social pressure that includes both the perceived expectations of others and how the person views those expectations. Women, community members and people with disabilities all have expectations about obtaining basic services such as WASH, since there are relevant subjective standards for these groups. Perceived behavioural capability is defined as how capable an individual believes they are to do a certain activity in their specific situation and circumstances. Thus, it is apt to examine external elements such as the household environment, time and resources. Having explained the relevance of the TPB, it is necessary to clarify the appropriateness of RANAS to the context of this study.

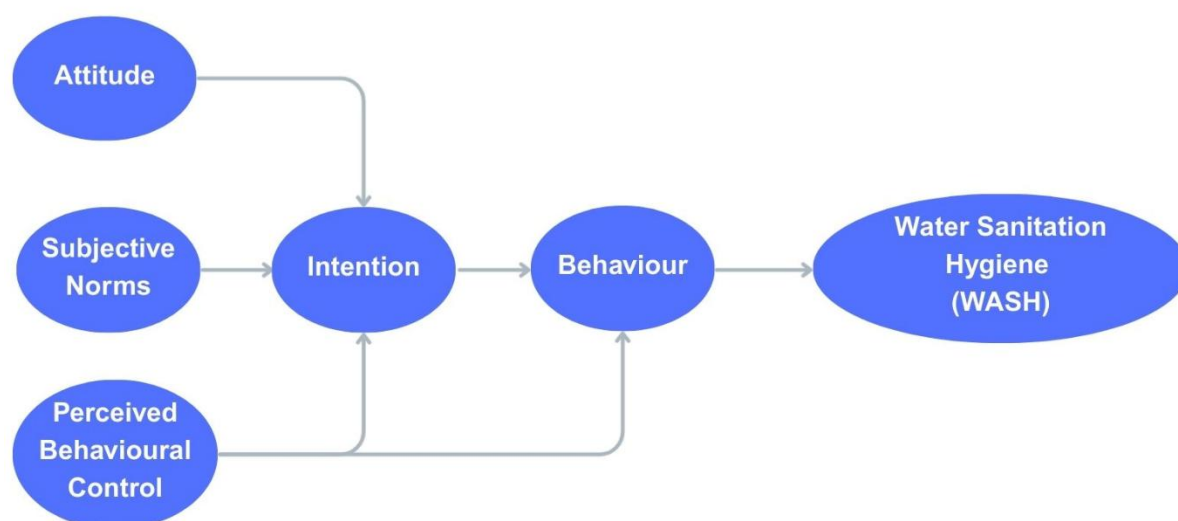


Figure 1.2 Conceptual framework of WASH based on TPB strategy

Source: Author's own compilation

The RANAS model is a mix of psychosocial aspects organised by theories of behavioural components such as societies' ideas, perceptions, feelings and thoughts that influence their conduct. This study uses RANAS to explore psychological variables that may influence the behavioural interventions of rural informal settlements

using WASH services in the Capricorn District Municipality (Mulopo, Kalinda, and Chimbari, 2020:4).

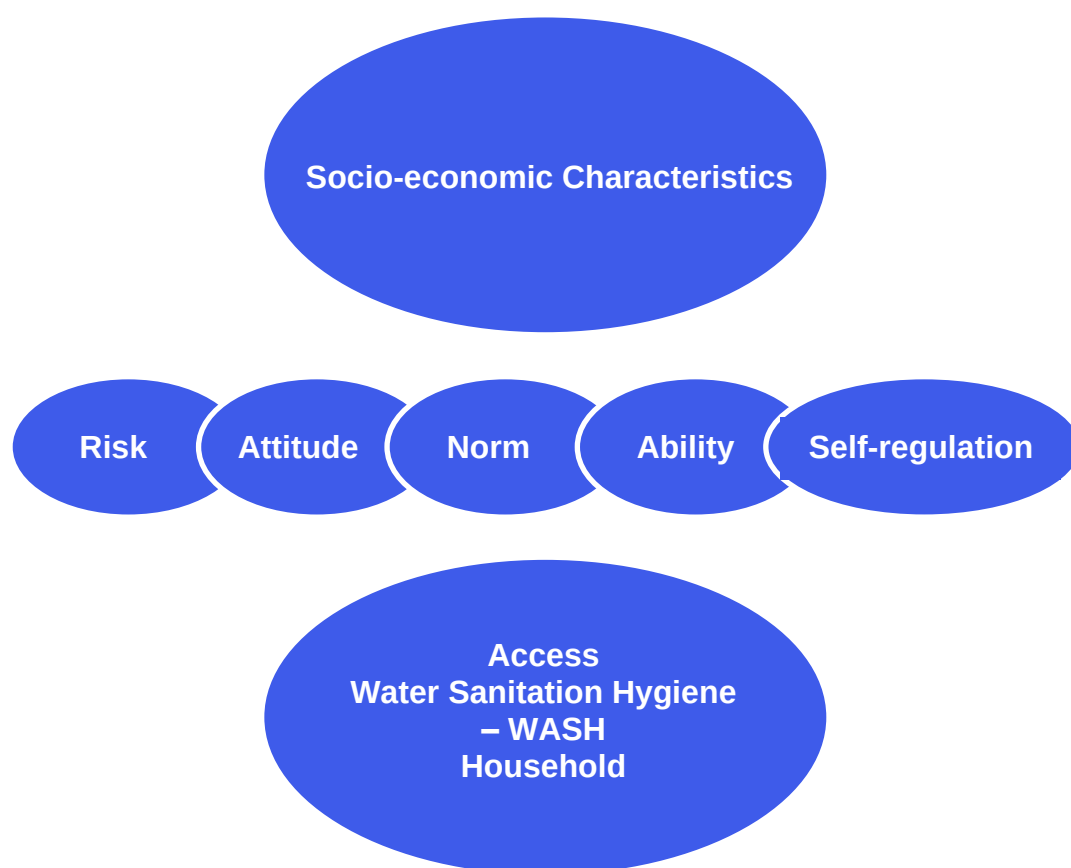


Figure 1.3 Conceptual framework of WASH based on RANAS strategy

Source: Author's own compilation

Individual women's conception and perception of health-related concerns in rural homes are indicated by risk variables. Women living in rural informal settlements face unique vulnerabilities due to limited access to WASH services, as they must manage menstrual periods within a small-sized household which may contribute to risk, either individually or collectively within the household (Calderón-Villarreal, Schweitzer & Kayser, 2022:2). Attitude is a person's overall positive and negative evaluation of an attitude object. WASH initiatives are critical for considering alternative transmission pathways beyond standard WASH advancements for global infection reductions (Williams, Thomas, Kuhl, Bisimwa, Coglianese, Bauler, Francois, Saxton, Sanvura & Bisimwa, 2021:2). The norm factors reflect normal and abnormal actions. Ability factors impact the perception each woman has of their capacity to execute the behaviour. As countries endeavour globally to achieve the SDGs, the ability to provide

basic WASH services lies in the intervention of gender equality and changes in patriarchal culture, as the interconnection of gender and WASH rises from both the role of women, which is often preserved at the household level, such as collecting water and performing other household chores. (Carrard, MacArthur, Leahy, Soeters & Willetts, 2022:2). Ability considerations impact an individual's perception of their capacity to carry out an action.

By learning more about the significance of psychological elements in intervention, WASH beliefs and practices should be distinct, like politics. Political leaders, who have significant power in municipalities, might be involved in WASH promotion initiatives. Commitment and other self-regulation factors are responsible for the continuation and maintenance of certain behaviours. In this study, the RANAS strategies were used to understand how socioeconomic characteristics might affect women in the provision of WASH and to support household creative ability and self-regulation in operating WASH services. The quality of the services desired could be influenced by time constraints and demand of household chores, as well as lowering the structural barriers that prevent society from adopting positive practices and becoming more equitable.

1.8 RESEARCH METHODOLOGY

Research methodology describes the process used to carry out a study. A research design can be thought of as a plan for the study developed to address the research problem. Whereas a research design is the overarching strategy for tying conceptual research issues to relevant and practical empirical study, the research methodology focuses on the steps that a researcher takes to conduct her study (Asenahabi, 2019:77; Sileyew, 2019:1). Research methodology is a structured approach for acquiring and analysing data in a study (Jubaer, Hogue, Oyes, Chowdhury & Miah, 2021:211). In layman's words, a study's methodology describes in-depth concepts like the research design, data gathering methods, sampling procedures and data analysis approaches. This study employed a descriptive technique within a qualitative research design to analyse societal outcomes and draw practical conclusions and recommendations regarding the provision of WASH in South African rural communities. Hendren, Newcomer, Pandey, Smith and Sumner (2023:477) asserted that descriptive technique provides an increased transferability by explaining the characteristics of the study environment that are likely to influence the study findings

on how rural informal settlements perceived WASH in their communities. A participatory rural appraisal design was used to generate and analyse data that would allow for a more restricted and perhaps more refined perception of WASH services.

A descriptive study depicts a precise profile of a specific phenomenon based on events, situations or persons (Sileyew, 2019:3). The study made use of a mixed methods design including qualitative and quantitative methods as well as a combination of primary and secondary sources to triangulate the outcomes of the research (Agarwal, Glenton, Henschke, Tamrat, Bergman, Fønhus, Mehl & Lewin, 2020:2). The goal of qualitative research is to better understand aspects of human social life based on their lived experiences, using the phenomenological paradigm.

Qualitative research employs a variety of interpretive methods, including intensive interviews, to provide a comprehensive account of specific events (Aspers & Corte, 2019:146). The qualitative approach has been chosen for more flexibility and allows the researcher to use a variety of data collection methods such as focus groups, key informant interviews, semi-structured interviews and document analysis. The research study used interviews to collect primary data which will enable the researcher to describe the behaviours, beliefs, perceptions, opinions and emotions of the research participants towards the provision of WASH in rural informal settlements. The researcher collected primary data with questionnaires modified from the World Health Organisation (WHO)/United Nations Children's Fund (UNICEF)/Joint Monitoring Programme (JMP) core questions on water, sanitation and hygiene for household surveys.

Given the aforementioned, the qualitative approach enabled the researcher to collect useful data towards the proposed governance model in the provision of WASH at the Capricorn District Municipality. Stockemer, Stockemer, and Glaeser, (2019:9) asserted that quantitative research is the opposite of qualitative research, as it includes statistics or numbers to quantify phenomena under study to provide evidence of facts or assumptions. According to Mattar and Ramos (2022:252), one of the post-positivism contributions is to emphasis the reality that no observation is without theory. Post-positivism promotes quantitative research as its primary role, allowing the researcher to stay detached from the respondents while gathering trustworthy and legitimate information via questionnaires, semi-structured interviews, social surveys and official statistics. Multilevel linear regression analysis will be used to examine the effects of community variables and household-related variables on WASH. A chi-square test was

used to survey the relationship between total income and households' main source of drinking water, type of household toilet and their hand washing facilities. Thus, the research design helped to collect and analyse data on the proposed governance model in the provision of WASH at the Capricorn District Municipality. Figure 0.4 depicts the research flow chart on how the technique was approached to achieve the objectives.

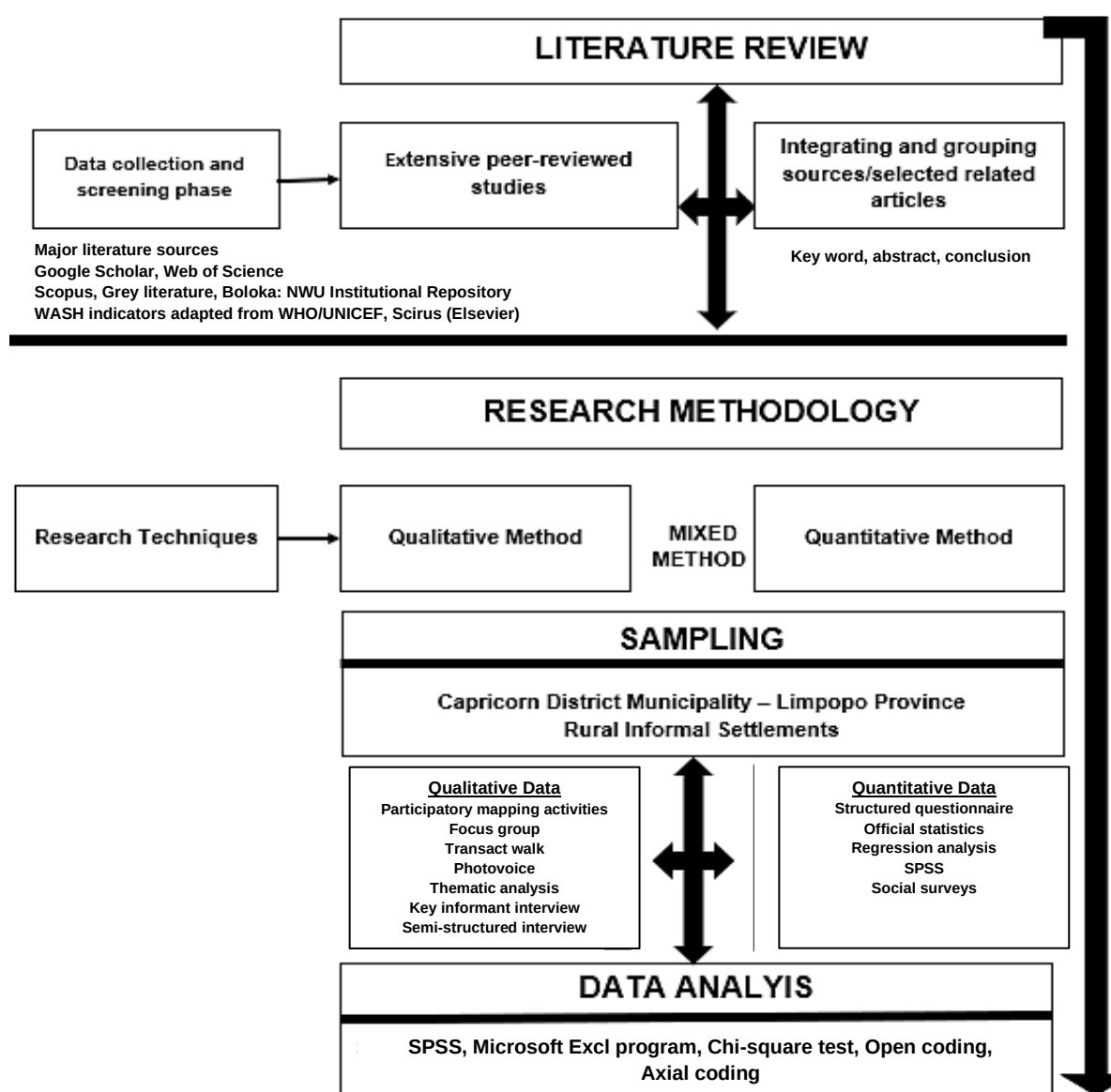


Figure 0-4 Overview of the research design adopted

Source: Author's own compilation

1.8.1 Literature study

A comprehensive review of the current WASH literature was conducted to assess compliance and experiences in accessing the provision of WASH in rural communities.

The literature review perspective across the broader field of social sciences serves as a merger for an iterative process in which data, concepts and evidence are linked to one another (Aspers & Corte, 2019:140). This research has investigated various philosophical approaches and management strategies related to reliable WASH and questions their applicability in assessing the provision of WASH and pertinent rural communities' responses. A solid theoretical foundation is essential for assessing a sustainable provision of WASH for rural women. To determine the availability of literature on the provision of WASH, the following databases were consulted as secondary data:

- i. Google Scholar
- ii. SA ePublications
- iii. Boloka: NWU Institutional Repository (NWU-IR)
- iv. Catalogue of books: Ferdinand Postma Library
- v. EBSCO Academic Search Elite
- vi. Catalogue of theses and dissertations of South African Universities (NEXUS)
- vii Academic journals such as journals of social sciences, public administration and local government
- viii. WASH indicators adapted from WHO/UNICEF
- ix. Scopus
- x. ProQuest dissertation and theses
- xi. Scirus (Elsevier)
- xii. Web of Knowledge

1.8.2 Participatory rural appraisal

Participatory Rural Appraisal (PRA) arose in the late 1970s from community development and global development literature, with the goal of including communities in evaluating, examining and making informed decisions, as well as supporting community development programmes (Roque, Wutich, Quimby, Porter, Zheng, Hossain, & Brewis, 2022:7). In PRA, research participants are involved in the development plans, activities, analysis and plans following research findings, in this case, WASH related issues. PRA contributes to the SDGs by enabling the establishment of transformational frameworks such as WASH interactions. Researchers in sustainability studies form PRA collaborations to combine scientific and grassroots knowledge, helping underprivileged groups to propose practical

solutions to WASH sustainability matters. Data from qualitative research was combined within the PRA activities for a robust assessment of the provision of sustainable WASH services.

1.8.3 Data analysis methods

Data analysis is basically the act of transforming raw data into useful information. Data analysis is the process of evaluating, classifying, tabulating, or otherwise recombining evidence to answer the study's basic allegations (Ebneyamini & Sadeghi Moghadam, 2018:6). As part of the qualitative data analysis methodologies, this study has employed content and thematic analysis.

1.8.4 Qualitative content analysis

Data analysis is basically the act of transforming raw data into useful information. Data analysis is the process of evaluating, classifying, tabulating, or otherwise recombining evidence to answer the study's basic allegations (Ebneyamini & Sadeghi Moghadam, 2018:6). As part of the qualitative data analysis methodologies, this study has employed content and thematic analysis.

Qualitative content analysis is considered as one of the various research methodologies used to analyse text or words. Beyond counting words or extracting factual material from texts, qualitative content analysis examines meanings, themes and patterns that may be evident or hidden in a given text (Shava, Muringa & Oladejo, 2021:553). This method enables students to comprehend social reality in a subjective yet scientific manner. Content analysis can be defined as a research technique that uses systematic classification, coding and theme or pattern identification to recognise subjective interpretations of the textual content of data (Cho & Lee, 2014:6). It can be referred to as a method for systematically describing the meaning of qualitative material (Bhattacharjee, 2012:115). The four phases of qualitative content analysis as recommended by Bhattacharjee were used to analyse data from several texts, such as focus group transcripts, online reviews, newspaper articles, etc. Specifically, qualitative content analysis involves the following phases:

Phase (1) sampling. The researcher will begin by sampling selected set of texts from the larger population. Phase (2) unitising. In this phase, the researcher will identify and apply rules to divide each text into segments or chunks that can be treated as separate units of analysis using specific rules. Phase (3) coding. The researcher applied more

than one code to the segments. The purpose of a coding scheme is to identify the themes the researcher is searching for as she will be classifying the text. Phase (4) analysis. This final phase can be both quantitative and qualitative and requires the researcher to determine appropriate themes which occur most frequently, in what contexts and how they are related to each other.

1.8.5 Thematic analysis

The researcher used thematic analysis to analyse and display data gathered from key informant interviews. Thematic analysis is a method for methodically defining and understanding qualitative data by assigning 'codes' to the 'data' and reducing the code's to themes (Wæraas, 2022:154). The researcher used a transcript of semi-structured interviews, field notes, policy papers, photovoice photographs and video footage as types of data that were analysed during this study. Thematic analysis is a qualitative method for identifying, analysing and reporting patterns (themes) within data and minimally organises and describes a data set in (rich) detail (Braun & Clarke, 2006:79). The six phases of thematic analysis as recommended by Braun and Clarke (2006) were used to analyse data from the semi structured interviews (Chawla, Eijdenberg & Wood, 2021:165).

Phase (1) Familiarising oneself with the data. This phase involves translating the data by reading and re-reading the data and noting initial ideas. Phase (2) Generating initial codes. The researcher develops an initial list of observations regarding the data's substance and what makes it distinctive. This phase entails creating preliminary codes from the data. Phase (3) Searching for themes. During this phase, different codes are sorted into potential themes and all relevant coded data extracts within the identified themes will be compiled. Phase (4) Reviewing themes. This phase involves checking to see if the themes function in relation to the coded extracts and the complete data set and creating a thematic 'map' of the analysis. Phase (5) Defining and naming themes. In this phase, constant analysis to refine the specifics of each theme is done and a brief informative name for each theme is generated. Phase (6) Producing the report. This phase begins when a researcher has a collection of topics that have been completely formulated, which includes the final analysis and report writing. The objective of writing up a thematic analysis for publication, research project or dissertation is to explain the complex outcome of the data in a way that convinces the reader of the merit and validity of the analysis.

1.8.6 Empirical investigation

As previously stated, this study employed a PRA research tool within the parameters of a qualitative research method as an interpretive study. Qualitative data collection methods such as transect walk with photovoice, focus groups, key informant interviews, semi-structured interviews and document analysis were used to collect information from the case-based study.

1.8.7 Transect walk

Transect walks are a well-established participatory research approach for gathering more detailed geographical context about a region through an interactive discussion between an interviewer and a participant (Caperon, McEachan, Endacott & Ahern, 2022:4). A transect walk is a walk through a specified area of interest with community members and experts. Transect walks in this study were intended to capture various physical and socioeconomic characteristics that obstruct the provision of WASH services at the rural informal settlements. The walk included actions such as observation, taking pictures and videos while asking questions and looking for problems and possibly identifying solutions (see Annexure B attached to this study).

1.8.8 Photovoice

Wang and Burris created photovoice in 1997 and defined it as participatory action research (Seitz & Orsini, 2022:281). Photovoice allows research participants to interact with photographs and words while collectively producing a portfolio reflecting on and discussions about WASH related issues during a participatory rural appraisal reflection. The researcher utilised the photovoice tool as a qualitative research method to develop critical debate and knowledge about significant topics via the discussion of photos. Aside from documenting these encounters, the photovoice aims to empower community members and aid in the facilitation of positive social transformation toward the provision of WASH in rural informal settlements.

1.8.9 Focus Group discussion

A focus group is an important technique in the researcher's toolbox (Annexure A). In scientific study, a focus group is a 'technique' formed from a 'method' as a mechanism leading the researcher to explain reality (Acocella & Cataldi, 2020:4). In the qualitative research method, focus group interviews are clustered to generate information about a specific topic through a group of participants collectively, rather than through one-

on-one interviews (Hall, 2020:2). The main popularity of focus group interviews is a quick turnaround from implementation to findings and are best used when conducting investigational research, such as those involving Municipal Managers, Community Development Workers (CDW) per rural informal settlements, Environmental Health Practitioners, Senior Officials at municipalities responsible for WASH in the Traditional Leaders, Church Leaders, Gender Forum, Ward Committee, Non-governmental organisation (NGO), Charity Organisations.

Due to the large number of participants used in the study, as well as the nature of the evidence they provided, the use of a focus group data collection tool was justified. However, the researcher made use of a consent form as a central ethical procedure for human participants. The researcher also used the performative consent model during the focus group interview because it is a public act focusing on communication rather than the mental consent model, which focuses on a person's mental state (Sim & Waterfield, 2019:3004). The researcher took safety, privacy, accessibility and comfort into account as part of precautions during the focus group interview at the location in which the interview was conducted as identified by the research participants. This was based on a pre-established cognitive purpose that would take place among selected participants with specific criteria, as the phenomenological foundation of the focus group interviews.

1.8.10 Key informative interviews

The provision of WASH in the rural informal settlements is vital when addressed by relevant key informants for prevention and health promotion because it allows them to reach their target population in their natural setting. Key informant interviews (KIIs) are a pillar of the qualitative research method, rich in information and frequently supplemented by focus group discussions (Lokot, 2021:1). Key informants are individuals with relevant knowledge about the development, history and establishment of an organisation's mission and vision which can add value to the researcher's perception of a research phenomenon (Cossham & Johanson, 2019:2).

As a result, because this study is naturally interpretative, it sought to identify the uniqueness of social reality and assess the dependability or otherwise, of responses regarding WASH provisions in rural South African communities. The researcher selected key informants who could provide relevant and robust information to address

the research question, guided by semi-structured interviews with selected research participants and pre-tested using a small sample in a pilot study to ensure reliability. Figure 1.5 depicts data collection methods that were used at rural communities using an interview guide which was designed with the central research question and objectives of the study as its foundation.

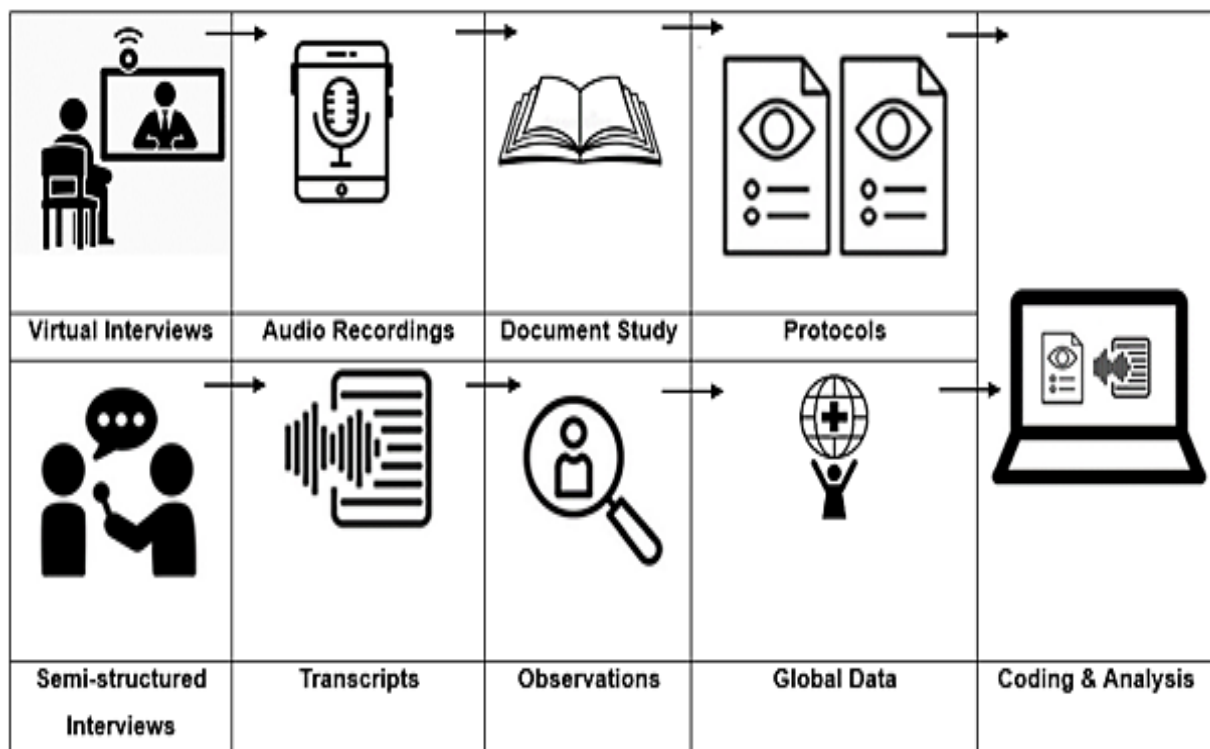


Figure 0.5 Data collection method for rural communities

Source: Author's own compilation

1.8.11 Semi-structured interviews

Semi-structured interviews are intended to gather relevant information from key informants who have lived experiences, perceptions and opinions about the topic of study. Semi-structured interviews are commonly used in qualitative research and can be conducted in a variety of ways, including face-to-face, via telephone, or in individual or group gatherings (DeJonckheere & Vaughn, 2019:1). The advantage of semi-structured interviews is gathering information from key informants who are knowledgeable about the study topic; they allow participants to provide open-ended responses for more in-depth information, promote two-way communication and allow participants to be frank about sensitive issues (Ahlin, 2019:4). Semi-structured

interviews are beneficial in an empirical study because they focus on individuals as unique beings, they strive to get closer to people being studied, their thoughts, feelings, experiences and beliefs about a particular topic and to delve deeply into confidential and sensitive issues (Mahat-Shamir, Neimeyer, & Pitcho-Prelorentzos, 2021:86). This interview technique allowed the researcher to conduct face-to-face interviews with identified participants in this study, as well as provided the researcher with more opportunities to ask follow-up questions to obtain more robust data (Annexure D).

1.8.12 Document analysis

The goal of document analysis is to investigate various types of documents using the qualitative research method for producing knowledge through a structured examination and interpretation of the text and other included information sources, such as records, minutes of meetings and policy documents (Morgan, 2022:64). Document analysis is a systematic procedure for reviewing documents both printed and electronic material and can be used as a stand-alone research tool or as part of a triangulation strategy. In this study, document analysis involved an in-depth study of relevant documents as part of the literature review used to provide valid information for assessing WASH provision.

1.9 POPULATION AND SAMPLING

The target population is defined as a conceptually bounded group of prospective participants about whom the study wishes to learn more (Casteel & Bridier, 2021:344). The population consists of a group of societies, objects and items that share common characteristics to achieve the study's objectives (Etikan & Babatope, 2019:050). Also, the target population must include a supplementary set of restrictions such as time and space, to host and identify the group of individuals who will be asked to participate in the study. The 2011 Census results show that Limpopo has a total population of about 5.4 million, of which approximately 56,945 households (5%) live in informal settlements and have challenges with accessing WASH services. The study sampled women, NGOs, charities, environmental health practitioners and affected groups. This diverse group of respondents were included in the target population because the researcher believes they would provide robust information critical to achieving the study's objectives.

1.9.1 Sampling procedure

Sampling is defined as the selection of individuals or large groups from a target population for research purposes (Etikan & Babatope, 2019:051). It is being claimed that the objective of sampling methods is mainly practical and allows data to be analysed smarter rather than attempting to reach every participant in the study (Turner, 2020:8). As such, the researcher believes it is necessary and appropriate to include all relevant participants in the study's sample to convey information that will contribute to meeting the study's objectives. The researcher used the convenience sampling method, which is widespread in population research and notably in disaster studies, to address social and behavioural elements of rapid onset collective stress events, sometimes known as mass crises or disasters similar to the rural informal settlement in the proposed study (Stratton, 2021:373). People who live in rural informal settlements have resided there for their entire lives and could provide reliable information. The researcher is well known to the community as she had previously visited the settlements for collecting research data for her master's study. The accessible research participants were selected using a non-probability convenience sampling method. This technique is less expensive, faster and easier to implement as the participants are readily available, compared to other types of sampling methods. It also facilitates the achievement of the study's objectives (Krupnikov, Nam, Style, Druckman, & Green, 2021:166).

Due to the lack of an address list containing the names of all people living in the rural informal settlements, the researcher employed a convenience sampling approach to select key informants ($n = 7$) residing in the rural settlement who were interviewed during the data collection process. This study relied on convenience sampling as it could only generalise the population that was conveniently accessible at the time the sample was gathered (Andrade, 2021:87). Slightly, more than eight-tenths (84%) of South Africa households lived in informal settlements and the population of Limpopo Province is approximately 5.4 million, of which 2.8% of households live in the rural informal settlements; based on the estimates from the Limpopo Department of Cooperative Governance, Human Settlement and Traditional Affairs (COGHSTA) (Statistics South Africa [StatsSA], 2020:19). To analyse the supply of WASH in rural informal communities, the Capricorn District municipality and its four (4) local municipalities were chosen. Table 1.1 summarises the proposed sample of the study.

Table 1.1 Proposed sample of the research study

STUDY POPULATION		SAMPLING METHOD	PROJECTED NUMBER	PARTICIPANT GROUP
RURAL INFORMAL SETTLEMENTS	(i)	(iii)  CONVENIENCE SAMPLING	2	1 x 2 Municipal Managers
	(iv)		14	2 x 7 Community Development Workers (CDW) per rural informal settlement
	(v)		2	1 x 2 Environmental Health Practitioners
	(vi)		2	1 x 2 Senior Officials at municipalities responsible for WASH in the Dept of Water and Sanitation
	(vii)		2	1x 2 Department of Cooperative, Human Settlement and Traditional Affairs (COGHSTA)
	(viii)		2	1x 2 Traditional Leaders
	(ix)		2	1x 2 Church Leaders
	(x)		2	1x 2 Gender Forum
	(xi)		14	2 x 2 Ward Committee
	(xii)		14	2x 7 Key Informants
	(xiii)		2	1 x 2 Non-Governmental Organisation (NGO)
	(xiv)		2	1x 2 Local Business Owners
	(xv)		2	1 x 2 Charity Organisations
	(xvi)		2	1x 2 Disaster Management Forum
TOTAL	(xvii)		64	

Source: Author's own compilation

The rural informal settlements in the Capricorn District Municipality includes Lepelle Nkumpi Local Municipality, which has two (2) rural communities, Polokwane Local Municipality, which has five (5) rural communities, comprising a total of seven (7) rural communities with $N=151200$ households; there is no reliable data on the actual number of informal settlements in the Blouberg Local Municipality and Molemole Local Municipality, according to the municipal Integrated Development Program (IDP) 2022/2023. Three hundred and eighty-five (385) households, considering a confidence level of 95% with a projected margin of error of 5% and distribution of 50% were targeted at the rural informal settlements (Raosoft, 2022).

The researcher selected the following samples, two (2) Municipal Managers, fourteen (14) Community Development Workers (CDW) per rural informal settlement; two (2) Environmental Health Practitioners; two (2) Senior Officials at municipalities responsible for WASH in the Department of Water and Sanitation and two (2) COGHSTA staff. Other participants included two (2) members and representatives of each of the following categories of respondents: traditional leaders, church leaders, gender forum, ward committee, key informants, Non-Governmental Organisations (NGOs), local business owners and charity organisations. Furthermore, two (2) disaster management forum members and stratified random sampling were used for every second household to provide information for the study. The researcher developed an interview guide to collect information from selected research participants.

1.9.2 Method, source and data triangulation

The use of triangulation in data collection and analysis boosts the credibility of interpretivism research, particularly in terms of validity and reliability (Liu, Kulturel-Konak, & Konak, 2021:1; Noble & Heale, 2019:67; Santos, Ribeiro, Queiroga, Silva, & Ferreira, 2020:656). Triangulation is a research approach that allows for the use of several data sources to ensure that the data, analysis and conclusions of the research are complete, accurate and corroborated (Moon, 2019:103). The questionnaire (Annexures C1 and C2) and interview guides that were used for data collection were validated and the Cronbach's alpha coefficients were calculated to examine the internal consistency of the questionnaire. Since the researcher is a native speaker of the local language (Sepedi) predominantly spoken in the communities, no language

barrier was envisaged as the researcher also undertook a back translation of the questionnaire from English (Annexure C1) to Sepedi (Annexure C2) which were carried out by a Language Practitioner. In this study Triangulation was used to corroborate data collected from three sources, i.e., questionnaire, interview and document analysis, regarding the provision of basic WASH services as well as appropriate sustainable governance model rural communities at informal settlements.

1.10 ETHICAL CONSIDERATIONS

The fundamental ethical obligation is to safeguard participants and foresee any potential maleficence that may develop because of the study endeavour, by emphasising new difficulties associated with the provision of WASH services in rural informal settlements. Prior to commencing data collection, the researcher had the study authorised and registered for ethical clearance. The procedure for getting ethical approval then commenced. This required the researcher submitting her proposal and completing the required ethics application form and any other essential paperwork to the Basic and Social Science Research Ethics Committee (BaSSREC). Following ethical approval, the researcher wrote to the gatekeepers of the sampled community to request permission to collect data. The researcher's involvement was to protect the participants' rights, improve study validity and preserve scientific integrity. This study followed ethical guidelines for voluntary participation, informed consent, anonymity, confidentiality, risk of harm and communicative outcomes (Newman, Guta & Black, 2021:3).

To ensure confidentiality, the researcher ascertained that the collected information would not be shared with individuals who are not entitled to have access to it. In addition, the researcher strived to conduct interviews in secure locations where outsiders were not able to overhear the questions and answers during the interview. Furthermore, the researcher ensured that the devices used for storing audio recordings were password protected. The researcher also made sure that hardcopy data were stored in a secure location which can only be accessed by her. Anonymity was assured by not recording the names and addresses of the participants. Pseudonyms were used to identify participants rather than their actual names. The researcher also did not reveal any information that might have allowed others to infer the identities of the participants in the research study.

The researcher got written informed consent from all participants. To ensure that participants freely consent to being interviewed, the researcher described the study's aim and purpose. She also urged them to ask as many questions as possible to seek clarifications as necessary. Furthermore, the researcher informed the participants that they were free to withdraw from the study at any stage of the study without repercussion. Participants were also informed that they would not be financially rewarded for providing information for the study. Furthermore, interviews were scheduled as convenient for the participants.

The researcher believes she is ethically committed to communicate the findings of the study to the participants. Ethical clearance and permission to conduct the study were sought from the Department of Water and Sanitation. North-West University requires researchers to get ethical approval before commencing a field study to guarantee that investigations comply to the ethics of conducting a scientific study. This standard procedure was complied with in carrying out the study. The NWU ethics form is attached as Annexure G.

1.11 LIMITATIONS AND DELIMITATIONS OF THE STUDY

The limitations of a study concern the potential constraints that are beyond the researcher's control, whereas the delimitations of research are those qualities that restrict the scope and define the borders of the study (Malakar, 2022:54). This study, like any other survey in social science research, was severely limited in various respects. These limitations included but were not restricted to human failing and shortcomings arising from the research design which could not be accomplished due to the scope of the project, and limitations of time and resources. In assumptions that the target population would represent many populations, replies were most likely slanted towards their interests. As regards WASH, the responsiveness might be deceptive as it is a life-threatening subject for respondents that could lead to biased responses. The researcher backed up the biased responses by triangulating data from other sources and experiences of other district municipalities and global countries. Therefore, this study was restricted to developing a sustainable governance model for the Capricorn District Municipality and focuses on aspects that would assist in developing a WASH model from the global best practices. WASH has been selected because of its human rights components. Furthermore, in the rural informal settlement

of the Limpopo Province, WASH is relegated and needs to be prioritised towards the well-being of everyone in the community.

1.12 SIGNIFICANT CONTRIBUTION OF THE STUDY

This research aimed to add to the existing body of knowledge by facilitating a better understanding of the concept of WASH in terms of public policy, analysing the TPB and RANAS strategies in the literature as well as rural communities' preferences. Since the concept of WASH are globally recognised, its foundation in the local government sphere is still being explored not only in the developed world but also Sub-Saharan African countries. The study presented persuasive information on how best to develop a sustainable governance model in the provision of WASH at the Capricorn District Municipality.

Against this backdrop, the study aimed to contribute to the development of strategies to improve the understanding of WASH in developing countries, particularly in South African rural communities. This research further seeks to contribute to a better understanding of the provision of WASH and its challenges in the Capricorn District Municipality, as well as exploring appropriate management strategies for sustainable provision of WASH in rural communities of South Africa. In addition to promoting a better understanding of the provision of WASH in rural environments, the study also contributed to the theory on best practices for accessing WASH facilities to attain the SDGs now and beyond 2030 in the Capricorn District Municipality. Above all, the findings of the study provide the basis for implementing a sustainable governance model for WASH provision in the Capricorn District. Therefore, these concepts and strategies related to WASH directly align with the discipline of Public Administration.

1.13 DISSEMINATION OF THE RESEARCH

This study would be available as an unpublished thesis in the library of the NWU. However, once the study is completed, several academic articles would be published for it to share the results findings.

1.14 STRUCTURE AND CHAPTERS OF THIS THESIS

The thesis consists of nine chapters. The structure of the study is graphically displayed in Figure 1.6 below and explained afterwards.

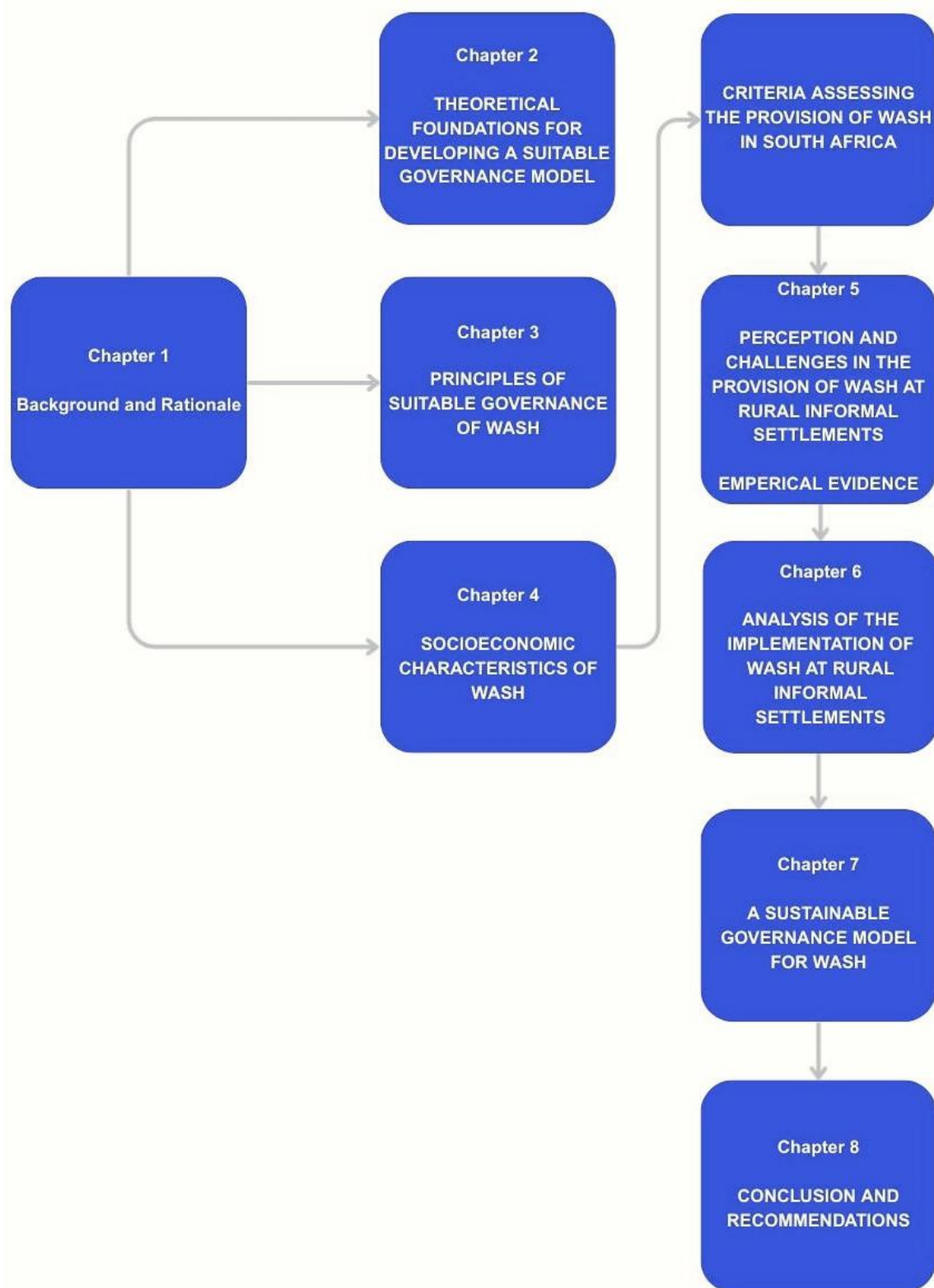


Figure 1.6 Structure of the thesis

Source: Adapted from Diedericks (2013:19)

1.15 CHAPTER LAYOUT OF THE THESIS

CHAPTER 1: BACKGROUND AND PROBLEM STATEMENT

This chapter presents information relating to the background of the study, research questions and objectives. The leading hypothetical statements, methodology and significance of the study are also discussed.

CHAPTER 2: THEORETICAL ANALYSIS OF WASH IN SOUTH AFRICA

The discipline of Public Administration, according to convention, operates within a specific governmental and regulatory framework. This chapter outlines the history of WASH provision in rural South Africa and provides a brief background on the existing public policy, legislation and framework affecting WASH provision in the country. The chapter serves as a policy reference point for the study's empirical work and concludes with an overview of the state of water and sanitation provisions in the area. The chapter also discusses in detail what constitutes a model and how and why it is developed by the scientific community. The relevance, use and application of modelling would form part of the discussion.

CHAPTER 3: PRINCIPLES OF SUSTAINABLE GOVERNANCE OF WASH

This chapter presents the principles, dimensions and approaches that underpin the sustainable governance of WASH. The research is guided by the Batho Pele Principles with an overview of linkages, approaches and dimensions of the 2030 agenda.

CHAPTER 4: SOCIOECONOMIC CHARACTERISTICS OF WASH

This chapter explores the socioeconomic characteristics and disparities in rural informal settlements related to obtaining WASH, with considerations for employment, marital status, age and gender, and to monitor the use of drinking water sources, sanitation facilities, hygiene promotion and provide evidence for future policy interventions.

CHAPTER 5: PERCEPTIONS AND CHALLENGES IN THE PROVISION OF WASH AT RURAL INFORMAL SETTLEMENTS: EMPIRICAL EVIDENCE

This chapter investigates the perceptions of rural informal settlements about WASH in the Capricorn District Municipality's proposed sustainable WASH governance model.

The research methodology is discussed, including details of the research instruments, study population, sample and sampling, data collecting and analysis procedure, among other techniques.

CHAPTER 6: ANALYSIS OF CHALLENGES RELATED TO THE PROVISION OF WASH IN RURAL INFORMAL SETTLEMENTS

This chapter examines the feasibility of implementing WASH in the Capricorn District Municipality from a Public Administration perspective, as well as to highlight the widespread challenges by reviewing definitions of WASH used in existing literature, as well as several procedures in which WASH is assessed in Sub-Saharan African countries.

CHAPTER 7: A PROPOSED SUSTAINABLE GOVERNANCE MODEL FOR WASH

The last chapter proposes a strategy and sustainable governance model for WASH provision in the Capricorn District Municipality. The model is constructed by considering the SDGs/UN WASH best practices and the submissions from the rural informal settlements, as well as the relevant theory investigated to achieve the objectives of this study.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

The last chapter summarises the findings and draws conclusions. The chapter also gives recommendations for future WASH policy development and implementation of the sustainable governance model. Finally, the chapter proffers recommendations for future research

1.16 CONCLUSION

Chapter One outlined the foundation of this study, which is anchored on its overarching objective – to develop a sustainable governance model for promoting Water, Sanitation and Hygiene (WASH) services in rural informal settlements within the Capricorn District Municipality (CDM) of Limpopo Province, South Africa. The chapter established the contextual and conceptual bases of the research by presenting the study background, problem statement, research questions and objectives, methodological overview, limitations and ethical considerations. In particular, the chapter emphasised the central research question: “What might be the most beneficial sustainable governance model to promote the provision of WASH services for rural

informal settlements in the Capricorn District Municipality of Limpopo Province, South Africa?” The main research objective designed to develop a sustainable governance model to enhance WASH service delivery in rural informal settlements within the CDM, was also clearly articulated. Six specific research questions and corresponding objectives were formulated to guide the study. These focused on exploring the key principles, dimensions and approaches underpinning a sustainable governance model for WASH; identifying relevant theoretical underpinnings; analysing socioeconomic and psychosocial behaviours; understanding residents’ perceptions and challenges; and assessing the feasibility of implementing a sustainable governance framework for WASH. Furthermore, the theoretical and conceptual frameworks informing the study were discussed, particularly the Theory of Planned Behaviour (TPB) and the RANAS model (Risk, Attitude, Norm, Ability and Self-regulation), which collectively provided the analytical foundation for interpreting behavioural and contextual factors influencing WASH practices at the CDM. The chapter also outlined the research methodology, summarising the mixed methods approach that integrates both qualitative and quantitative designs. These include Participatory Research (PR), Participatory Action Research (PAR) and Participatory Learning and Action (PLA), complemented by data collection techniques such as semi-structured interviews, focus group discussions (FGDs), questionnaire administration and thematic analysis. Finally, the chapter concludes with a description of the overall thesis structure, linking subsequent chapters to the objectives and methodological considerations introduced in Chapter One.

CHAPTER 2:

THEORETICAL FOUNDATIONS FOR DEVELOPING A SUSTAINABLE GOVERNANCE MODEL

2.1 INTRODUCTION

Water, sanitation and hygiene (WASH) can be perceived as a crucial necessity, recognised as a sustainable development tool globally and locally within social determinants of health, human rights and the water-energy-food nexus. Its success globally has led to scholars extending its relevance to the public and private sectors of the economy. Typically, the public and private sectors have been seeking sustainable substitutes to improve challenges encountered within the WASH services.

Accordingly, the evolution of WASH as a development tool has created the need to explore how it can be implemented in local government administration. This study analysed WASH as a practical tool to improve access to basic services for rural informal settlements in the Capricorn District Municipality (CDM). In line with the research objective RO2, namely, to investigate the theoretical fundamentals of developing a sustainable governance model for WASH with specific reference to existing global models and sustainable governance measuring tools within the CDM, the study sought to assess the regulatory framework to clarify existing public policy, legislation and framework affecting WASH provision in South Africa. The application of WASH in local government is embedded within the public strategy lacuna in providing basic services for societal well-being, as a policy reference point and within the knowledge domain of public administration as a scholarly discipline.

The purpose of this chapter is therefore to present a theoretical framework for achieving WASH services within the South African public sector, including analysing the role of relevant external stakeholders in the provision of basic services. To operationalise the research objective, this chapter is divided into five major sections. Firstly, to provide an inclusive theoretical overview of the framework of WASH services within the municipal sphere to ensure that basic services are provided to communities sustainably. Secondly, the historical background of WASH provision within the existing public policy in South Africa was traced. Thirdly, an overview of the state of water and

sanitation provisions in the rural informal settlements in the Limpopo Province is presented. Fourthly, this section explains what constitutes a sustainable governance model, such as brainstorming, predicting, using the Delphi Technique model and others to develop a sustainable development model and explain why the scientific community has adopted the model.

Lastly, the chapter assesses the relevance, usage and application of modelling, which is important when developing a sustainable governance model for the CDM. This determines the criteria for assessing government and external stakeholders, especially WASH-related development. Hence, this was done to examine the status quo of fundamental service provision and the authorities and functions conferred on local government as the domain of government closest to the people in SA which includes the Limpopo province.

2.2 CONCEPTUALISING WATER, SANITATION AND HYGIENE (WASH)

A theory is an 'isomorphic' representation of a social phenomenon, thus highlighting certain structures and agreeing to the empirical observations they engender in a logical system (Lasswell 1956; Basheka & Uwizeyimana, 2021; Banha, Flores & Coelho, 2022; Basheka & Uwizeyimana, 2021; Fuhse, 2022; Qawasmeh, 2022). Theorising the provision of drinking water within a public policy framework contributes to a comprehensive understanding of the multifaceted interactive factors that impact the availability, accessibility and quality of drinking water in local municipalities. In discussing public policy theory in this section, specific attention was given to the general conceptualisation of WASH and understanding the process by which policies are structured within public administration.

2.2.1 Conceptualising water

Water is crucial for sustaining life and its satisfactory, safe and adequate provision ought to be accessible to everyone, including women and children for the improvement of perceptible health benefits in societies (Muanda, Goldin & Haldenwang, 2020; Organization, 2022:1; Yang, Tan, Shi & Deng 2023). Safe drinking water appears to have a direct influence on social lifestyle expectancy. Safe and quality drinking water is essential for human rights and its availability to societies has been embedded in the UN-SDG Goal 6 which states that reducing the proportion of people without

sustainable access to safe drinking water and sanitation is a prime goal to be attained by the United Nations (Luvhimbi, Tshitangano, Mabunda, Olaniyi & Edokpayi, 2022:2).

According to Grönwall and Danert (2020:3), access to safe drinking water is a human right. In 1966, the International Covenant on Economic, Social and Cultural Rights (ICESCR) endorsed the right to water as an adequate standard of living and inseparably related to the highest physical and mental health standard, the right to life and human dignity. Malima, Kilonzo, and Zuwarimwe (2022:148) stated that numerous countries, including South Africa, are protected by international and national legislation for human rights relating to providing safe drinking water to their communities.

However, many communities and groups have gradually begun to depend on a diverse range of strategies to retaliate against lack of provision and claim their right to water, using service delivery protests or litigations as a means of political participation and expression of disagreement. Kryeziu, Abdushi, Kryeziu, Mazreku, Bytyqi, and Gashi (2023:195) specified that society's gaining access to reliable safe drinking water is vital for the reduction of infections globally, especially waterborne and water-washed diseases. Thus, from the local to the provincial and national levels, ensuring access to safe drinking water is essential as the quality of water is critical in determining a country's health and development.

Catherine, Ayesiga, Rukundo, Lejju, Byarugaba, and Tamwesigire (2023:2) asserted that the provision of safe drinking water that is potable, accessible and available is required for daily household general purposes, including personal hygiene, laundry and food preparation and is an absolute necessity for health and productive life. Despite substantial advances in extending access to safe drinking water, billions of people around the world still have limited access to water as its safety is uncertain, particularly in rural informal settlements where many are victims of unequal and unjust distribution of water resources.

The demand for reliable water sources for household usage is escalating within rural communities in informal settlements, particularly in the majority of poor developing countries, including South Africa. Baleni, Obioha and Mugari (2022:5) stated that rural communities, townships and informal settlements in South Africa are undergoing a crisis regarding the adequate provision of safe drinking water in their communities.

Global sustainability cannot be accomplished unless everyone has access to safe drinking water in their respective households.

According to Asoba, Fiko, Makiwane, and Mefi (2020:3), since 1994, it is estimated that 14 million South Africans, especially in rural communities, lack access to safe drinking water, with many depending on surface water from rivers, springs and unimproved boreholes and wells as their water sources, often far from their households, thus making safe drinking water inaccessible and unaffordable by the people to sustain their livelihoods.

Gondo and Kolawole (2022:2) measured water affordability using the water affordability index, a statistical measure developed by comparing a household's monthly revenue to a percentage of its yearly income spent on buying safe drinking water for all members of their households at any given time. For the unemployed in households located in rural informal settlements, clean water is unaffordable in the era of water scarcity, despite access to affordable safe drinking water now being an official public policy. Affordability is notably a barometer of measuring progress towards attaining the UN-SDGs now and beyond 2030.

Mabotha and Chauke (2023:310) linked water with 'scarcity' as South Africa is regarded as a water-scarce country. Water scarcity impacts the provision of water quality standards at the point of supply to users in numerous rural informal settlements which depend on surface water such as rivers, natural fountains, unreliable boreholes and communal municipal taps as their source of water used for drinking and other household purposes. Water is a source of life and a means of survival for humanity but when in excess or scarce, it can bring about despair or even bereavement in extreme cases.

According to Adom, Simatele, and Reid (2023:1), water scarcity directly impacts food security which limits the provision of agricultural products, further contributing to poverty and a static economy and leading to stresses on livelihoods such as food insecurity, migration, unemployment, poor health conditions and household violence.

The availability of safe drinking water is quantified based on the availability of water resources per unit and time Chathuranika, Sachinthanie, Zam, Gunathilake, Denkar, Muttill, Abeynayaka, Kantamaneni, and Rathnayake, (2023:4), Mpongwana, Shumba, and Bracking (2022:218), stated that regarding the provision of safe drinking water,

water can be stored in various containers such as buckets, drums, vertical water storage tanks, corrugated iron tanks, pail enamel buckets and plastic bottles which is a regular standard practice for households in rural informal settlements. Falk, Globisch, Angelmahr, Schade, and Schenk-Mathes (2022:5) also highlighted the need for adequate provision of quality water in households as contaminated water is often linked to high mortality rates amongst young children, especially in rural communities. Regardless of the significant efforts made by the South African Government, external stakeholders, agencies and private sectors, impeded access to the provision of safe drinking water in households in rural informal settlements and equitable water distribution remains a serious challenge, as is the quality and standard of drinking water.

The UN recommended the quantity of the provision of safe regulated drinking water from piped sources up to 50-100 litres per person per day for household usage and other personal necessities in July 2010 (Panhwar, Abro, Kandhro, Khaskheli, Jalbani, Gishkori, Mahar & Qaisar, 2022:1). Numerous countries, especially those in Sub-Saharan Africa, have enacted policies to ensure that households have access to adequate provision of safe drinking water. For instance, in Uganda the provision of safe drinking water is sanctioned at 15 L/ day per person (Nanteza, Thomas, Kitembe, Nakabugo, Mukwaya & Rodell, 2022:10); and in Zambia, household drinking water is prescribed as 20 L/ day per person of water per day for drinking, cooking, cleaning and bathing (Hubbard, Meltzer, Kim, Malambo, Thornton, Shankar, Adhikari, Jeon, Bampoe & Cunningham, 2020:3). As for South Africa, the quantity regulated for local governments in the provision of safe drinking water is 25 L/day per person, while in Mozambique it is 10 L/day per person. These values are much lower when compared to those of European countries which are prescribed at 200-300 L/day per person and 575 L/ per person in the United States (Verlicchi & Grillini, 2020:3).

Njoku, Durowoju, Uhunamure and Makungo, (2022:8), in their article 'Investigating the attitude of domestic water use in urban and rural households in South Africa', reported that the quality of drinking water is related to poor water management where societies have innumerable water-coping behaviours such as walking long distances to fetch water, treating and storing drinking water, constructing private wells, accessing borehole water and purchasing water from vendors and neighbours for their households. As the provision of basic services, including water and sanitation, is within the jurisdiction of local municipalities, such services are paramount to sustaining

people's daily livelihood. To ensure efficiency in service delivery, local municipalities should implement a robust monitoring and surveillance system to track water quality and assess compliance with regulatory measures. For purposes of this research, use of water is therefore defined as having access to safe, reliable and affordable water sources for drinking, cooking, cleaning and other household purposes. It involves not only the availability of water but also its quality and accessibility. Water is a valuable resource, and it is essential to maximise the benefit of every drop within the water system, ensuring it is free from contamination and readily available when needed by the communities. Safe drinking water can be consumed directly in liquid form or indirectly through food preparation.

2.2.2 Conceptualising sanitation

Sanitation is an essential aspect of maintaining hygiene and cleanliness, particularly regarding human defecation and urination. It involves the use of tissue paper, toilets or latrines, both within the confines of one's household and in public restrooms (Mensah, 2020b:1). This practice ensures that waste is properly disposed of and does not pose a risk to households, public health or the environment. The UN has recognised the classification and a new perception of global monitoring of sanitation progress, which is driven by four service ladders, with safely managed sanitation being the most desired as opposed to basic, limited, unimproved and open defecation sanitation for households' usage and monitoring purposes (Tumwebaze, Sseviiri, Bateganya, Twesige, Scott, Kayaga, Kulabako & Howard, 2023:1). Safely managed sanitation facilities need to be equipped to ensure equal access and considered safe for women, girls and vulnerable individuals as they are crucial for maintaining hygienic households, promoting dignity and ensuring safety.

Muanda *et al.* (2020:238) when discussing safe sanitation, said that it was a challenge when quantifying the actual types of household toilet facilities. The provision of safe and managed sanitation is challenging due to the types of toilet facilities normally available in urban informal settlements, such as communal flush toilets, MobiSan, Kayaloo and porta-potties. These types of communal toilet facilities are frequently found blocked, while some households often lack access to sufficient water for toilet use, all of which could lead to unsafe conditions especially for women and children.

Mutyambizi, Mokhele, Ndinda and Hongoro 2020:18) stated that, to date, numerous rural informal settlements in Sub-Saharan African countries depend on pit latrines as their most common toilet facilities for their households. This absence of satisfactory sanitation facilities is potentially life-threatening. Furthermore, the provision of safe sanitation in underprivileged communities such as rural informal settlements poses a huge challenge due to the burgeoning population growth. Children in these communities in particular, are in jeopardy when using back-pit latrines due to the risk of them falling inside, with the depth of the construction of most latrines being far too great for their size and age group to escape (Kekana, Ruhiiga, Ndou & Palamuleni, 2023:11).

Despite the lack of accurate official statistics on children drowning in pit latrines, there have been several accounts in the local media over the years. Furthermore, during the rainy season, stacked human waste from the back-pit latrines washes downstream and flows onto roads and alongside households in informal settlements, infringing on their environmental rights and leading to health risks. Alemu, Adugna, Likasa, Mekonnen, Alemu, and Girmay (2023:2) defines basic sanitation as a crucial to the overall well-being of women and children in society since it supports good health, economy and mitigates poverty. Promoting basic sanitation is essential for improving human health and driving economic growth. Hence, improving access to basic sanitation requires the government to bridge the gap through the provision of ample financial resources and sustainable technological solutions that align with the municipal Integrated Development Plan (IDP), political determination and the rapid population growth of the informal rural settlements.

Migrants and refugees living in camps also form part of the vulnerable populations residing in informal settlements. Due to overcrowding, they often lack access to basic sanitation amenities and infrastructure like water, soap and adequate toilet facilities. Access to medical facilities, health information and proper sanitation is often limited and insufficient in informal settlements. While household sanitation facilities provide numerous benefits, including the reduction of diarrheal diseases and the improvement of societal psychological well-being, Afework, Beyene, Ermias and Tamene (2022:1) described household sanitation facilities as being limited, which influences their adoption and implies regular shared use. There is clearly a need for these societies to

achieve universal access and to better understand the factors that influence the adoption and practice of limited sanitation.

Muanda *et al.* (2020:239) describe unimproved sanitation as a common contributing factor to the high incidence of morbidity and mortality in the rural informal settlement households. Numerous households are exposed to the high risk of disease outbreak when using unimproved sanitation facilities, which include emptying buckets, flying toilets (plastic bags are filled with human waste and simply tossed as far away as possible, often onto rooftops or into bushes) or open defecation, as they are deprived of basic toilet facilities. Addressing social, cultural and normative barriers to end open defecation is often associated with poverty, wealth, disparities, malnutrition, low education levels and poor latrine conditions (Immurana, Kisseih, Yusif & Yakubu, 2022:2).

Furthermore, it has been reported that numerous Sub-Saharan African countries, including but not limited to Ghana (Immurana *et al.*, 2022:1), South Africa (Muanda *et al.*, 2020:239), Uganda (Tumwebaze *et al.*, 2023:2), Benin, Burkina Faso, Chad (Rahut, Singh & Sonobe, 2022:7) and Zimbabwe (Matsa, Dzawanda, Mupepi & Hove, 2023:11) still practice open defecation. From the literature review above, it indicates that there is a lack of public policy intervention in rural informal settlement communities, as open defecation is often informed by factors including lack of household safety, poor conditions of facilities and lack of privacy and choice, which hampers the achievement of the provisions of the UN's vision 2030.

2.2.3 Conceptualising hygiene

Hygiene refers to a set of practices involving, inter alia, rubbing hands together vigorously for at least 10-15 seconds, using soap and clean running water, to preserve healthy households (Tamene, Habte, Tagesse, Endale, Melis, Wale Sewalem & Afework, 2023:2). Access to soap and clean running water is essential for maintaining basic hygiene in every household. Handwashing with appropriate resources is crucial for practising good hygiene. Johnstone, Page, Groome, Madhi, Mutevedzi, and Thomas (2022:1) asserted that practising good hygiene, including regular Hand Washing with Soap (HWWS) and wearing masks, are necessary to reduce the spread of communicable diseases during and beyond the COVID-19 pandemic. However, compared to urban settings, people in rural informal settlements have struggled to

access HWWWS facilities during and after the COVID-19 pandemic due to communal use of outside tap water and toilets. The COVID-19 pandemic has highlighted the issue of limited access to water for basic hygiene practices, such as HWWWS, which is a significant strategy to reduce disease transmission. Sutherland, Reynaert, Sindall, Riechmann, Magwaza, Lienert, Buthelezi, Khumalo, Dhlamini, and Morgenroth (2021:2) linked hygiene with societal behaviour, particularly in rural informal settlements as they have been deleteriously affected by limited or no access to soap and clean running water in their households to protect their household members from contamination.

An effective hygienic way to limit the spread of diseases through food, drinking water and person-to-person contact within households is through handwashing as the first line of defence against contamination. This hygienic practice can be achieved through essential agents as described by the World Health Organisation (WHO). Tamene *et al.* (2023:3) and Jiwani and Antiporta (2020:1) stated that the WHO recommends essential agents that include, but are not limited to, liquid soap, powder detergent, soapy water and disinfectant wipes after using the bathroom or before and after eating food, as a global indicator of hygiene in a household or public environment. Nannan, Neethling, Cois, Laubscher, Turawa, Pacella, Bradshaw, and Pillay-Van Wyk (2022:735) reported that certain countries, particularly South Africa, lack handwashing facilities in households according to the hygiene service ladder. Many households in rural informal settlements do not have access to handwashing facilities with soap, which can hurt their hygiene practices and increase vulnerability to infection. Mitigating disparities linked with the evolution of WASH is therefore critical to addressing challenges in rural informal settlements.

For the purposes of this research, hygiene is defined as the practices and conditions that promote health and prevent the transmission of diseases. This definition specifically focuses on behaviours that maintain cleanliness and minimise the spread of communicable diseases. It encompasses personal hygiene, food hygiene and environmental hygiene within the public services. Public services such as WASH in South Africa are managed by public administration, the system responsible for implementing government policies. This system plays a crucial role in the country's development by ensuring efficient resource allocation, transparency and governance that prioritises the needs of its constituents. Public administration operates at national,

provincial and local levels, with each sphere having specific responsibilities. Following the end of apartheid, reforms were introduced to democratise public administration, address historical injustices and promote inclusivity. A central aspect of public administration in South Africa is the implementation of policies and the provision of basic services. The next section will provide a succinct overview of public administration, highlighting the role of public administrators in implementing government policies and providing essential services like WASH.

2.3 EVOLUTION OF PUBLIC ADMINISTRATION

The Online Dictionary of the Social Sciences (Robert & Parkinson, 2025) conceptualises a paradigm as the framework used in thinking about and organising an understanding of natural or social phenomena. All societies and the individuals within them, tend to have relatively fixed assumptions about how to understand and interpret the world, but there is great variation in these assumptions from place to place and from time to time. Turin, Raihan, and Chowdhury (2024:1) asserted that a paradigm is a set of beliefs, theories, or assumptions that form the basis of concepts, such as identity, or institutions, such as a religion. In simpler terms, the study views a paradigm as a theoretical framework that encompasses the body of knowledge based on factual beliefs. The paradigm orientation of Public Administration (PA) serves as the body of knowledge that has been or is used to study and understand the discipline of PA in Africa specifically for purposes of this study. Several schools of thought have emerged to discuss the importance of paradigms in PA.

Public administration is essentially government in action, concentrating on the management of public affairs and the implementation of public policies. Public administration is what the government does and includes the provision of basic services – such as WASH – to everyone. Terrance and Uwizeyimana (2023:327) asserted that PA is often viewed as both static and dynamic, particularly in recent paradigm shifts in advanced economies, including those in African countries. These changes have introduced both benefits and challenges to the socio-economic and political landscapes, creating new dilemmas for public administration within academia. Basheka and Auriacombe (2019:34) and Basheka (2019:34) specified that public administration is philosophical and is not as ancient as its practices, it has evolved through several academic disciplines and stages known as paradigms. Although

numerous authors have proposed various classifications, there is a consistent alignment in their scholarship. Martinus (2022:104) quoted Basheka and Auriacombe (2019:34) and Basheka (2019:34) as authors who developed eight paradigms of public administration:

Period 1: The Politics–administration dichotomy (1887–1926)

The Politics–Administration Dichotomy was dominant from 1887 to 1926 and proposed a clear separation between policymaking (politics) and its implementation (administration). Woodrow Wilson advanced the politics-administration dichotomy. They viewed this separation as essential for promoting administrative neutrality, preventing political interference and enhancing efficiency and professionalism in public administration. This theory suggests that while politicians determine policy, administrators should carry out these policies without political interference. The key assumption and strategy during this epistemological period was the idea to separate politics and the administrative function of government, thereby promoting efficiency and effectiveness. This period was one in which the extension of administrative practices was believed to be a necessary step in improving government (Basheka & Auriacombe, 2019:35; Basheka, 2019:35).

Period 2: Principles of Public Administration (1927–1937)

During this period, public administration achieved a reputational zenith as a discipline and practice, it commanded a high degree of respect and its products were in great demand both in government and business (Basheka & Auriacombe, 2019:41). This era sought to establish public administration as a science by identifying and applying universal practices to enhance efficiency and effectiveness in government.

Period 3: Era of challenge (1938–1947)

The era of challenge was marked by a critical examination of the established management principles that had been developed previously. Scholars began to question the universality and applicability of these principles, which prompted a re-evaluation of administrative theories and practices. This period marks a significant phase in the development of public administration and by 1940, it acquired remarkable prestige and self-confidence within political science and the practices of government (Basheka & Auriacombe, 2019:44).

Period 4: Identity crisis (1948–1970)

This period was marked by a struggle to define the field of public administration's scope, nature and boundaries, including its methods of study and teaching. After the end of the Second World War, public administration's place within political science declined precipitously. Public Administration was accused of being concerned with mundane or low-level activities of government, unlike political science, which was concerned with higher-level strategic activities. During this period, public administration lacked a natural home as the discipline was no longer welcome in the house of its youth – political science (Basheka & Auriacombe, 2019:49; Basheka, 2019:49).

Period 5: From Public Administration to Public Management (1970–1990)

This period witnessed a significant shift in public administration, moving towards a focus on public management. Allen Schick, Hugh Heclo, Stephen Skowronek and James Wilson influenced the shift by analysing public bureaucracy, policy and the political context of public administration. A general trend advocating for a more “client-” or “customer”-oriented approach, decentralisation of authority and being more “business oriented”, gained high momentum. There emerged what was labelled the New Public Management (NPM) movement (Basheka & Auriacombe, 2019:53; Basheka, 2019:53).

Period 6: From Public Management to governance (From the late 1990s–2008).

This period marks a significant shift in public administration from a focus on public management to governance. The belief that a lack of ‘good governance’ might be the main hindrance of economic growth in Africa was firmly set in the minds of the international community following a World Bank report published in 1978, which categorically declared that “Underlying the litany of Africa’s development problems was a crisis of governance” (Busieka, 2018:47). ‘Governance’, referred to the exercise of power to manage a nation’s affairs. Since then, the phrase ‘governance’ has become a mantra in the development business. It is presented as the ‘discovery of new truths’ that must be hammered into the benighted minds of African policy makers. The Africans themselves often consider it as one more item on the list of aid conditionality (Basheka & Auriacombe, 2019:58; Basheka, 2019:58).

Period 7: From governance to global crisis (2008–2010)

This period occurred during the global financial crisis, revealing weaknesses in global governance structures and promoting substantial policy responses. For the period 2008 to 2010, no serious academic theory was advanced. This period could be described as a crisis of identity for the public administration discipline, but also as a crisis of ideology to guide governments (Basheka & Auriacombe, 2019:61; Basheka, 2019:61).

Period 8: From governance to New Public Governance (2010 to date)

This period is characterised by a focus on collaboration, networks and citizen participation in addressing complex public problems. To support the role of the state and ensure that its goals are fulfilled, public administration continues to evolve, incorporating new methods and adapting practices in response to social and technological advancements. Within the changing context, another new public service model has emerged, dubbed 'New Public Governance – NPG' as an approach which includes a centralisation of power, an increased number, role and influence of partisan-political staff: personal-politicisation of appointments to the senior public service; and the assumption that the public service is promiscuously partisan for the government of the day (Basheka & Auriacombe, 2019:62; Basheka, 2019:62). The Old Public Administration is discussed to understand its historical context, foundational principles and how it contrasts with modern approaches such as the New Public Administration, helping current and future administrators to navigate the complex, evolving challenges of governance and public services provision such as WASH.

2.3.1 Old Public Administration

Many significant events in our society were likely achieved through contributions from what we now refer to as public administration. The Old Public Administration model was developed within the context of liberal constitutions and was influenced by the works of Max Weber, Woodrow Wilson and Frederick Taylor. Woodrow Wilson is considered the father of public administration. The field of Public Administration dates to 1887 with the publication of Woodrow Wilson's "The study of administration" in the Political Science Quarterly, (Wilson, 1887:197-222). There's no single theory of Public Administration. Public administration consists of a body of knowledge to which theories have contributed throughout the decades. The Old Public Administration in the 21st

century has inherited the 20th-century bureaucratic model based on Max Weber's ideas, which emphasised hierarchy and meritocracy (Terrance & Uwizeyimana, 2023:329). For an organisation to act, it must exercise power within a framework of rules and procedures, thereby neutralising the power of legal and rational authority.

The bureaucratic system was established globally as a legacy of colonial rule which persisted for centuries. Bureaucracy is the most prominent branch of executive government, responsible for implementing government policies and programs, as well as providing goods and services to the public (Igbokwe-Ibeto, 2019:2). In South Africa, the legacy of the past still looms large, resulting in ongoing issues such as corruption, bureaucratic inefficiencies, resource limitations and service delivery issues (Shava, Muringa & Oladejo, 2025:2). The Old Public Administration's key objective was to oversee the provision of services through a hierarchical model and bureaucratic supervision by the managers to ensure compliance with established rules and procedures. Although Old Public Administration originates from different countries globally, numerous scholars, such as Dunleavy and Hood (1994), Osborne (2006) and Pollitt, Van Thiel and Homburg (2007), have investigated its main features, as summarised in the table below.

Table 0.1 Essential elements of the Old Public Administration

The key elements of Old Public Administration (Osborne, 2006)	✓ the dominance of the 'rule of law'. ✓ a focus on administering set rules and GUIDELINES. ✓ a central role for the bureaucracy in policy making and IMPLEMENTATION. ✓ the "politics-administration" split within public ORGANISATION. ✓ a commitment to incremental BUDGETING. ✓ The hegemony of the professional in the service delivery system
Principles of Old Public Administration (Pollitt <i>et al.</i>, 2007)	✓ hierarchy and RULES. ✓ permanence and STABILITY. ✓ an institutionalised civil SERVICE. ✓ internal REGULATION. ✓ equality

Source: Selepe and Shopola 2023:223

The lowercase term “public administration” refers to the broader field of activities within the public sector, while the uppercase term “Public Administration” refers to specifically to the academic discipline or study of that field. The concept of Public Administration consists of two terms: “public”, which relates to government activities and “administration,” derived from the Latin *administrare*, meaning to serve or manage. In essence, it refers to the management of public or private affairs (Thapa, 2020:1). The notion of administration is as old as civilisation. Public administration in South Africa encompasses governmental activities within a specific sphere of government (Mathebula, 2023:68); it is a tool used for implementing government policy (Basheka & Auriacombe, 2019:123; Basheka, 2019:123; Sithomola, 2022:28). Public administration focuses on how a country's administration is organised and how it should operate. Mdhluli and Jili (2023:77) asserted that public administration encompasses the activities carried out by public officials, focusing on the management and implementation of government activities. This includes enforcing laws, regulations and government decisions, as well as overseeing the provision of public services in areas such as WASH, finance, health, housing and social security. Public administration can be understood as both the implementation of government policy (Mdhluli & Jili, 2023:78) and an academic discipline (Mathebula, 2023:59).

It emphasises action by involving administrative and political participants to assess the implementation of constitutional values and government decisions, while also training and nurturing public servants. In the context of WASH, effective management and implementation of services by local government are essential. This involves planning, resource allocation, infrastructure development and ensuring that all residents have equitable access to WASH, since municipalities are legally required to provide WASH services. Given this background, Public Administration has passed through three dominant modes (Terrance & Uwizeyimana, 2023:330), see figure 2.1.

- ✓ a longer, pre-eminent mode of Public Administration, from the early 1900 to 1980s
- ✓ a second mode of the New Public Management, from the late 1980 to 2000s
- ✓ and recently an emergent third mode of the Public Governance

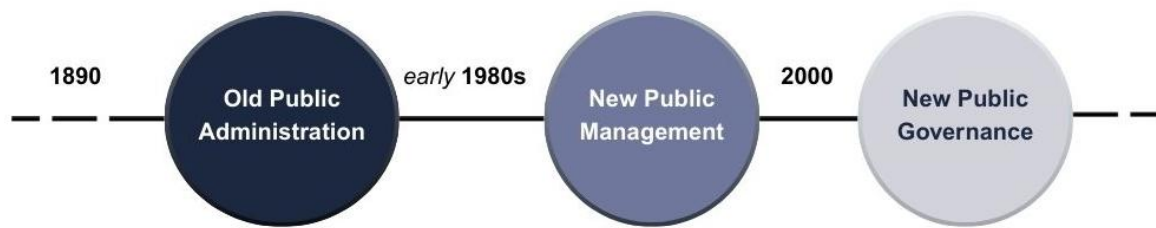


Figure 2.1 Three management modes of Public Service Organisations

Source: Terrance & Uwizeyimana, 2023:329

2.3.2 New Public Management

New Public Management concerns “different types of values”, “different types of policy-making processes” and “different types of organisations and stakeholders” (Bovaird, 2005:218). In the early 1980s, a new set of ideas began to supplant the traditional approach to Public Administration. This shift promoted a different approach to a new model of Public Administration that emerged. Growing public expectations demanded alternative forms of service provision, which contributed to a new wave of reforms. This marked another period of change in both the constituent and ideological framework of Public Administration. Christopher Hood is recognised as the foremost scholar who coined the term ‘New Public Management’ and greatly influenced its development (Dewi, Sahputra & Zulfikar, 2023:4905; Indahsari & Raharja, 2020:74).

New Public Management (NPM) emerged as a response to the increasing complexity and fiscal crises faced by governments globally (Lapiente & Van de Walle, 2020:467). NPM has become a label for reforms in the public sector across Western countries, such as the United Kingdom and New Zealand. Dewi *et al.* (2023:4904) indicated that NPM focuses on controlling government policy outputs, decentralising management authority, introducing market and quasi-market mechanisms and providing customer-oriented services. The New Public Management (NPM) aligns with participatory governance and democratic decision-making theory, making public participation in municipal affairs essential for the NPM approach (Mamokhere & Meyer, 2023:4). The intention of NPM as a theory can be viewed as an efficiency-driven and an alternative paradigm of government to the traditional state service provision or public administration (Selepe & Shopola, 2023:223). As a result, the NPM often opposes

democratic approaches that advocate for management without traditional hierarchies, rigidly rule-based administration and the self-governance of public-service professionals such as teachers and doctors.

Although the NPM was adopted due to increasing complexity and the fiscal crises that many African countries faced since the 1980s (Vignieri, 2020:7), it is also argued it was due to the application of a more business-like style for the management of their public affairs (Basheka, 2023:33). Also, many governments and international organisations have embraced the NPM as the framework for modernising government and re-engineering the public sector to strengthen the connections between government and its mechanisms (Basheka, 2023:43). However, the expectation of a strong regulatory function has not been fully realised on the African continent. Countries like South Africa struggle with corruption, inadequate WASH services, lack of accountability, bureaucracy and nepotism, though the NPM. Mamokhere (2022b:279) asserted that the NPM theory depends on the constitution and democratic decision-making and promotes participatory governance. Selepe and Shopola (2023:222) indicated that the NPM has been an umbrella concept covering various emerging structures, such as the provision of WASH services in government structures and various other legislative policies.

Indeed, the NPM encourages the participation of multiple stakeholders, including private entities, non-governmental organisations (NGOs) and community-based initiatives, in service delivery, reducing sole reliance on centralised government structures. In the context of (WASH) services, various legislative policies support decentralised governance, enabling the development of diverse institutional and organisational frameworks. These policies actively promote public-private partnerships and performance-based management, ultimately enhancing service efficiency and accountability. The New Public Governance (NPG) emerged as a response to the limitations and unintended consequences of the New Public Management (NPM) due to the increasing complexity of modern societal challenges.

2.3.3 New Public Governance

This research adopted the New Public Governance (NPG) theory, which emphasises institutional relationships within society and views governance as a central component of interaction between government and the non-profit sectors (Indahsari & Raharja,

2020:79). The NPG emerged in the 21st century, acknowledging the interrelatedness of policymaking and service delivery (Casady, Eriksson, Levitt & Scott, 2020:162). In this paradigm, WASH can be viewed as a partnership involving joint services, collaborative governance and shared responsibilities, making the provision of WASH essential. Basheka, (2023:61) viewed the concept of NPG as an approach that involves centralising power, increasing numbers, the roles and influence of partisan political staff, personalising the appointment within the senior public service and assuming that the public service is excessively partisan in favour of the government. Krogh and Triantafillou (2024:3042) conceptualise the NPG as a cohesive set of policies, measures and tools that are based on ideas, values and assumptions about collaboration as a way to create public value. This can be viewed through various approaches, such as network governance, stakeholder involvement, negotiated decision-making, shared power arrangements, devolved and decentralised authority, resource mobilisation and managing inter-organisational interdependencies.

The primary focus of the paradigm of the NPG is on partnerships, networks, joint services and innovative collaborative methods between the public and private sectors in government services, such as the provision of WASH in local municipalities. Popęda and Hadasik (2024:28) indicated that numerous scholars have developed a subframe consisting of six concepts of the NPG paradigm, referring to it as the “6-CO” coherent conceptual framework, such as collectively, collaboration, coordination, co-creation, co-production and common goods. This is subsequently described as follows:

- 1) CO-llectively: The existence of communities composed of various stakeholders and actors, indicating public and private ones, with different interests and goals, functioning “side by side” in an unorganised way (Ansell & Torfing, 2021; Anttiroiko, A Bailey & Valkama, 2011).

In contrast, various stakeholders in the NPG paradigm can be consulted on their perceptions of water challenges and knowledge gaps in research relevance and responsiveness, availability and nature/source of funding and addressing the implementation challenges in water (Jacobs-Mata, Mukuyu & Dini, 2021:19).

- 2) CO-llaboration: The community, including individual members, can work together, thanks to which there is an initial exchange of thoughts and resources and the willingness to cooperate on a common goal. Self-organisation takes place. This process is initiatory and needs to be more coordinated, requiring

additional efforts to move on (Ansell & Torfing, 2021; McMullin, 2021; Wiesel & Modell, 2014).

Under the NPG paradigm, collaborative governance, co-governance and co-policy design have replaced enforcement-driven mechanisms in the production and provision of WASH services. Working together with schools, health facilities and community organisations reduces the incoordination and adopts a culture of caring and responsibility. The effectiveness of these initiatives can be evaluated using key indicators such as improvements in hygienic practices, a decrease in waterborne diseases and the dependability of clean WASH facilities (Muchaku & Zhou, 2025:8).

- 3) CO-ordination: The community, seeing the assumptions of similar goals and appropriate resources using the scale effect, undertakes coordination activities to achieve the effects of assumed activities, which proves the efficiency of the community. Activities at this stage are more reliable and structured and stakeholders are fully involved. “Working teams” are formed (Anttiroiko *et al.*, 2011:3).

The NPS paradigm shifts the focus to a coordinated government in the provision of WASH. The government serves as a facilitator of collaboration across all WASH sectors rather than focusing as a central policymaker or service provider. In the NPG context, “publicity” emphasises the involvement of WASH sectors, promoting transparency, equality and consensus through inclusive dialogue among stakeholders. Muchaku and Zhou (2025:08) emphasised that coordinated effort between government agencies, NGO, stakeholders and local leaders will ensure that solutions are driven by the community and address specific challenges faced in South African local communities.

- 4) CO-creation: The community enters the creative stage to create new solutions or solve problems. There is an intensive exchange of ideas, tools, means and resources, which is the foundation of the social, creative process (Ansell & Torfing, 2021).

The NPG focuses on effective local community engagement in WASH interventions as the primary facilitators of WASH practices (Tseole, Mindu, Kalinda & Chimbari, 2022:13). Community-based programs are essential for educating residents on water

conservation and hygiene practices, intending to develop long-term resilience and sustainable access to WASH services (Muchaku & Zhou, 2025:2).

- 5) CO-production: At this stage, the community proceeds to finalise conceptual and creative solutions, realising the “production” of everyday goods and services created as a result of a transparent and participatory process that meets the assumptions of the entire community (Brinkmann & Heine, 2019:339; McMullin, 2021; Wiesel & Modell, 2014).

Co-production refers to active participation of citizens or groups in the operations of water utilities, aiming to achieve environmental, social and economic benefits through collaboration (Landriani, Agrifoglio, Metallo & Lepore, 2022:2). Co-production of WASH services often implies the introduction of small-scale solutions – devices and alternatives to the large-scale infrastructures in the rural informal settlement communities.

- 6) CO-mmon goods: Due to all the previous stages and cooperation within the community, everyday goods and services are created. These are solutions and decisions addressed to all stakeholders of a given case and created by all stakeholders. The commons are a creation of the community and at the same time, the recipient of the commons is the community, which is the sub-foundation of 1 CO-Collectivity (Liddle, 2021).

In contrast to the NPG, common goods refer to essential services, resources and practices vital for public health, economic activity and environmental sustainability. Landriani *et al.*, (2022:9) emphasised that the users of the service who can be broadly considered as agents of the “common good” are the ones best suited to govern the service. This ensures that the principles of democracy, equity and sustainability are maintained. Popęda and Hadasik (2024:29) highlighted that the process outlined in the 6-CO coherent conceptual framework operates continuously with no definitive endpoint and each part is interconnected. Thus, ensuring consistency in the model effectively applies the ideologies of the NPG concept by aligning with the provision of WASH in rural informal settlement communities.

The public policy process is discussed to understand how government identifies and addresses societal problems, allocates resources effectively and shapes society for the public good. Analysing this process provides insight into governance, promotes

accountability and prepares constituencies and policymaker to drive positive change in the provision of WASH.

2.4 PUBLIC POLICY PROCESS

The public policy process addresses societal challenges, upholds the Constitution, promotes human rights and ensures inclusive, developmental governance (Fobosi, 2024:5). The provision of basic services, such as WASH, presents a challenge in rural informal settlement communities within local municipalities. Uwizeyimana (2024:628) provides a lead on what the public connotes by arguing that public policy is conceived when policy emanates from government, and/or political parties, including businesses or individuals, to guide practices such as WASH public-private partnerships, focusing on government decisions to address public interests or concerns.

Walters and Pisa (2023:1) define public policy as ‘a statement of intent’ tracked by the government to achieve specific goals and later presented as a formal policy with the publication of a White Paper in South Africa. Hill and Varone (2021:6), define policy as a course of action based on declarations and principles, emanating from both the government and global institutions such as the UN and the WHO, overseeing WASH.

The notion of policy is captured in the works of Hoeyi and Makgari (2021:2) as a principled guide of action created by the government to provide strategic solutions to existing public problems and complex challenges faced by the government, public institutions and communities. Public policy thus encompasses official policy concepts framed by the executive branch of government and executed by the public and private sectors, policy actors' actions and their actual behaviour. The implementation of public policies involves disciplines such as politics, law, economy, sociology and public administration. According to Parlak, Sarihan, DÜlgar, Örselli, Küçüktığı, Yildirim, Soner, DÖnmez, Furat and Abdullah (2022:103), the etymology of the word “policy” emerges from the Greek word, *polis* (city-state), the ancient Sanskrit *pur* (city) and the Latin *politia* (state), which ultimately evolved into the ancient English word *policie* meaning “administration of government” alongside “everything that government chooses to do or not do” as a well-known description of public policy, according to Dye (1972:101).

The evolution of public policy in South Africa began at the dawn of democracy and expanded within the public services department, subsequently impacting service

delivery provision. One of the primary objectives of public policy is to enhance the capacity to address the art of creating and solving societal problems worth solving. Aiyede and Muganda (2023:89) asserted that public policy is developed in response to various social issues that require attention. Since 1993, achieving democracy in South Africa has kick-started a long journey to transform the poor socioeconomic conditions rampant in rural areas through implementing various public policies. Mlambo and Maserumule (2024b:211) argue that since 1994, South African local governments have adopted bad governance, which has affected the provision of service delivery, such as WASH, to its constituents, especially in rural informal settlements. Umoh (2022:21) also argues that in South Africa, a petition is a valuable approach for influencing public policy, especially when policy is poorly implemented. Carbonell, Hofmann, Srikissoon, Campos, Mbatha, Lakhanpaul, Mabeer, Steenmans and Parikh (2023:4) argued that a public policy guiding government officials at the national level differs from a newspaper article as the authors deal with matters of inequality and follows a reflexive process collectively deciding what to include and why identified evidence is classified. According to Plagerson (2023:205), the panoramic view of documents across various tiers of government policy provides strategic examples that can be considered components of an efficient approach to mainstreaming how poverty, inequality and social exclusion is dealt with in public policy.

Mlambo and Maserumule (2024a:5) affirmed that a complete transformation of a newly adopted service delivery model, such as WASH, is critical for the distribution of basic services in the South African local government to meet the objectives of implemented public policies. The philosophy of public policy in Africa has been identified to take into consideration the historical concerns of the global influences on South African policy and evolving African contributions to poverty alleviation, social justice, socioeconomic and infection reduction nexus that lie at the core of the SDGs policy tribunals in the 21st century (Onyango, 2022: xvii). Therefore, the purpose of public policy is to influence decisions that address public issues, as it is imperative in the WASH environment, where policies seek to provide strategic solutions to existing societal problems and complex challenges faced by the government and public institutions.

South Africa's democratic government cannot turn a blind eye to public policy as a course of action, especially regarding the plight of the constituents it represents.

Decisions on actions and inactions are often linked with relevant role players, executive statements, policy papers, written plans or administrative orders.

Knill and Tosun (2020:4) referred to public policy as the actions taken by public actors, such as governments and societies, aimed at participating in public decision-making and ensuring governance that responds to the basic needs of communities. Public policy has a significant impact on the development of societies, their ability to deal with numerous societal issues and the need to strengthen links between practitioners and authors to focus on multifaceted and interrelated topics such as WASH. Moreover, in democratic structures, various public policies are debated, focusing on how problems are framed and require public attention (Head, 2022:9). Hill and Varone (2021:168) state that elite community members can shape public policy through knowledge, interests and the development of service delivery provisions to prevent skewed policymaking, such as in WASH and other basic service delivery provisions.

Although numerous community members are forbidden to participate in the policy-making process, public policy is often developed to enhance the lives of all constituents, including those within rural local municipalities. Consequently, public policy involves decision-making and activity, policy-oriented towards a goal or desired state to solve a problem, or a series of decisions taken over an extended period including an exercise of power and understood and implemented by public and private actors who have different understandings of problems, solutions and their motivations (Aiyede & Muganda, 2023:90).

Public policy is a tool of resource provision channelled through meeting governmental goals and objectives influenced by decision-making processes to reflect people's will. Thus, Umoh (2022) submits that public policy is persuaded by the partnership between the state and interested groups that bargain over a wide variety of problems, like the WASH in policymaking processes. However, is it not only the decisions of the government that constitute public policy context. In this sense, Uwizeyimana (2024:632) asserted that public policies are implemented within the ecological context shaped by socioeconomic realities, categorised by 'policies with public' as coalitions of interest groups and 'policies without publics' as weak policy communities. It is important to bear in mind that inaction is also an action; thus, commitment to public policy implementation is crucial for determining the failure of a policy.

Another critical point is that whatever government policy is implemented for the provision of basic services, such as WASH, with the public or without the public, it should not negate a critical analysis of the issue concerning the objective and goals of the government. Therefore, it is important to underscore the power dynamics of public administration to avoid unnecessary conflicts in public policy design and implementation. Basheka and Uwizeyimana (2021:68) opined that the study of 'Public Administration' is rooted naturally in an academic discipline and 'public administration' by preserving government activities such as public policies effectively and effectively. Miller, and Rabin (2021:136) indicated that public administration theories have shifted focus from the dominant rational actor model to influencing multiple actors on public policy and management outcomes over the past 30 years. The notion of public administration is appropriately captured in Qawasmeh (2022:22), who saw public policy as being naturally embedded in the scholarly field of public administration from the epistemological and chronological perspectives, such as the Classical Public Administration, New Public Administration and New Public Management and New Public Governance. The interrelation of public administration and public policy both claimed the value of democratic governance and the use of scientific assessment in resolving social problems. Public policy has pointed out the need to strengthen links between various consultants and researchers to promote joint networks focusing on complex interconnected issues and responding to the messy reality of policymaking in the provision of WASH, which is often challenging to categorise but resonates with Lowi's foundational ideologies (Lowi, 1996; Petek, 2024:416).

Policy typologies are classification systems that help us to understand and analyse different types of public policies based on their characteristics, functions and effectiveness on society. Similarly, policies are categorised to help policymakers, scholars and citizens better understand how various government intervention work and what outcomes they're likely to produce.

2.4.1 Typologies of public policy

The public is affected by public policy and others seek to transform benefits and foster equality for certain groups in society or intend to regulate behaviour and establish executive agencies. For example, the Water and Sanitation Services South Africa (WSSA), an ISO-certified water service provider in South Africa, aims to offer solutions

as a water services institution. Qawasmeh (2022:27) highlights the substantial role of various actors in public policymaking, as a robust network involved in its implementation, such as governmental actors, non-governmental actors and the private sector at all levels of government.

The notion of adopting Theodore Lewis' four policy typologies into the WASH policy and public administration background has been predominantly cited for over half a century, even in political discourse, as the distributive, regulatory, redistributive and constitutive policy in Table 2.2 (Kuhlmann & Blum, 2021:278; Petek, 2024:416).

a) Distributive policies

These are public policies that provide benefits to individuals, groups, communities or companies with distributive policies aiming to share public resources for the general welfare of citizens, such as clean water, basic sanitation and hygiene practices (Petek, 2024:416; Uwizeyimana, 2024:631).

b) Regulatory policies

A regulatory policy defines conditions and restrictions for individuals' activities, debated as costs and concentrated by larger communities framed within the economic policy. The SDGs' targets 6.1 and 6.2 serve as the foundation for a robust regulatory framework in the WASH for rural informal settlements (Kuhlmann & Blum, 2021:279; Petek, 2024:419).

c) Redistributive policies

Redistributive policies portray a powerful policy instrument for improving equality of income and enhancing equality of opportunity, such as human capital and wealth across individuals as well as between the private and public sectors. Goals within redistributive policies are set to enhance public interests, such as the rural informal settlements and fall within social policies and social security policy (Petek, 2024:421). Costs and benefits of socioeconomic responses as well as their allocation to diverse groups in the community become much more noticeable (Kuhlmann & Blum, 2021:293).

d) Constitutive policies

Constitutive policy is meant to shape the government and rural communities by defining their constitutional arrangements and human rights, characterised by a lack of non-government actors and constituencies. According to Petek (2024:434), gender

equality policy displays a robust participation of NGOs within rural informal settlements in the provision of basic services such as WASH.

Table 2.2 Typologies of public policies

CHARACTERISTICS	DISTRIBUTIVE	REGULATORY	REDISTRIBUTIVE	CONSTITUTIVE
Content of government function	Allocation of government material resources	Arranging business behaviour	Reallocation of resources among social groups	Government and society building
Pattern of politics	Clientelism	Pluralism	Elitism/ Corporatism	Statism Policy networks
Primary non-governmental actors	Small, well-organised interested groups	Economic actors	Peak associations, unions, political parties	Non-government actors NGOs Citizens
Political relations	Mutual non-interference logrolling Pork-barrel	Bargaining (secret) negotiations	Ideological disputes	Based on identity and moral issues
Goals	Gains and promotion of important special interests	Favouring special economic interests (to enhance economy)	Public interests (economic and social safety of all citizens)	Public interests (social inclusion)
Policy instruments	Public finances	Regulations	Public finances Public services	Regulations, Information and persuasion
Stability/change	Temporary and periodical	Unstable structure	Stable and institutionalised	Procedural or reform
Conflict	Almost no conflicts	Often and direct	Partisan	Non-economic issues and conflicts
Visibility	Low visibility	Quite hidden from public	Public debates	Public deliberation

Adjectival policies Classical examples	Local policies Agricultural grants	Economic policies: Trade policy	Social policies	Classical (electoral, national security) Newer (protection regulation, social regulation in moral policies, identity policies)

Source: Petek (2024:422)

The public policy cycle provides a systematic, heuristic framework for segmenting and analysing the complex, dynamic processes of how public problems are identified, addressed and evaluated in a structured manner. Its value for this study lies in offering a clear administrative guide by separating the various stages of policymaking, from agenda setting to evaluation, thereby enabling a more comprehensive and ordered assessment of WASH policies, their strengths, weakness and overall effectiveness.

2.4.2 Public policy cycle

Numerous scholars such as Lasswell (1956), Wilson (1887), Jenkins (1978), Brewer and DeLeon (1983), Jones (1984), Hogwood and Gunn (1984), Parsons (1995), Dye (1972), Marks and Gerrits (2017), Basheka and Uwizeyimana (2021), Banha *et al.* (2022), Qawasmeh (2022) and Lourenço (2023) have contributed to documenting the process of public policy. Lasswell's theory of '*who gets what*' '*when*' and '*how*' became the major concern in the study and field of public administration and administrative policy-making in modern democracies (Farazmand, 2023:10630). Harold Lasswell's (1956) public policy cycle was used to acknowledge the challenges and problems similar to WASH. Lasswell categorised policymaking as consisting of five sequential stages -i) agenda setting, ii) policy formulation, iii) decision making, iv) implementation and v) evaluation Figure 2.2 below, depicts the interaction connecting deciding issues and problems associated with the cycle and stages of public policy (Banha *et al.*, 2022:539).

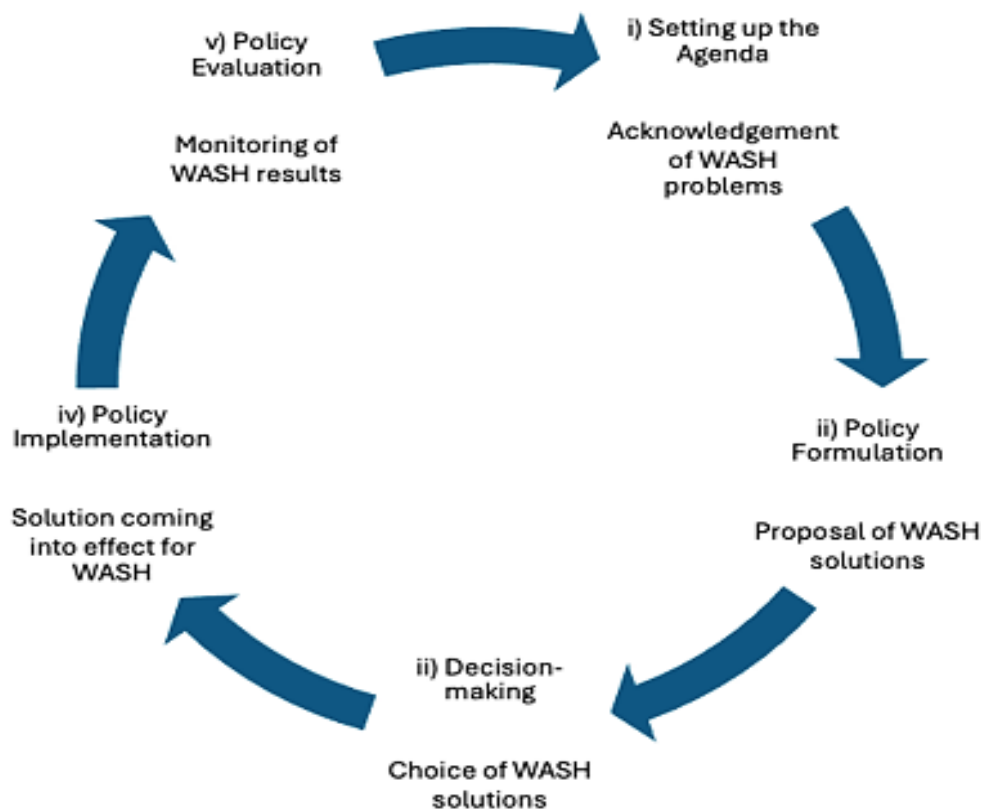


Figure 2.2 Public policy cycle

Source: Banha *et al.* (2022:539)

The concept of public policy presented in Lasswell's stages is embedded in the South African Government's structure and processes (White Paper on Basic Household Sanitation of 2001), which tend to attribute policy failure to implementers (Taing, 2019:537). Even though Lasswell's stages provide a clear sequence for the policy process, some argue that it is too streamlined. Shafi and Raheeq (2023:13) reveal that even though the public policy cycle is streamlined, it individually possesses unique complications and demands. Brasil and Jones (2020:1487) indicate the significance of admiring earlier authors such as Lippman (1922), Lazarsfeld, Berelson, and Gaudet (1944), Lasswell (1956), Bachrach and Baratz (1962), Cohen (1963) and McCombs and Shaw (1972), who have contributed to our understanding of public policy and enlightened scholars on how problems are constructed, understood in political communities and defined as societal issues in a democratic theory.

2.4.2.1 Agenda-setting stage

The concept of the agenda-setting stage is rooted in political science (Tosun & Scherer, 2020:1). Arguing against the concept of public policy, Onyango (2022:2) argues that subsidy on African public policy seems to lag in setting the agenda for public policy as a field and as a practice. Arfan, Ansari, Ullah, Hassan, Siyal and Jia, (2020:2) asserted that in social sciences, agenda-setting studies how mass-media agendas influence public policy.

Agenda setting concerns issues that enter public debate and are taken into consideration by policymakers to propose a public policy (Tosun & Scherer, 2020:2). At this stage, public policy was considered as one of the activities within the government's process. In this study, the author's perception is formed to connect agenda setting to WASH as a Socioeconomic Characteristic (SECs) in rural informal settlements at the local government level in the Limpopo Province. The agenda setting is aimed at tracing the problems of WASH in South Africa, despite its depleted capacity for economic growth, social development and environmental quality. Lourenço (2023:3) notes that at this stage, the government is obliged to state how the process will be developed, but not all societal problems can be addressed simultaneously to satisfy societal needs.

Arguing against the notion of agenda setting, Qawasmeh (2022:36a) states that political parties, administrative institutions, interest groups, public opinions and media are the primary sources of problems introduced in setting the agenda for a public policy process. The researcher hopes to integrate John Kingdon's multiple-stream framework (MSF) adopted in 1984 as a simpler conceptual canvas which could be more easily stretched to accommodate the requirements of competing policy processes amongst the academic community's public policy analysis. In his revolutionary study. For example, John Kingdon comments:

The agenda, as I conceive of it, is the list of subjects or problems to which government officials and people outside of government closely associated with those officials, are paying some serious attention at any given time.... Out of the set of all conceivable subjects or problems to which officials could be paying attention, they do in fact seriously attend to some rather than others. So, the agenda-setting process narrows

this set of conceivable subjects to the set that becomes the focus attention. (Kingdon, 1984:3-4).

Kindgon's MSF is an instrumental key towards the study of public policy connecting three independent streams, such as problem, policy and politics (Agide, Garmaroudi, Sadeghi, Shakibazadeh, Yaseri, Koricha & Tefese, 2019:278; Brasil & Jones, 2020:1488; Jacobsen Bygvraa, Baygi & Charalambous, 2023:246). The fluidity and unpredictability of agenda setting in a public policy, which highlight the fundamental interaction between the timing of problems, availability of policy solutions and the approachability of political actors, are captured in Kindgon's MSF (Fowler, 2019:1; Shafi & Raheeq, 2023:15). In this study, Kingdon's MSF theory is described as the development and impact of public policy modelling WASH in Figure 2.3.



Figure 2.3 Multiple stream framework

Source: Author's own compilation

This research sought to discover relevant dynamics for agenda 'status' of WASH on Kingdon's MSF approaches and does not suggest where attention should be targeted; rather, adding to the literature, which enlightens actors in sustainable governance, thereby contributing to building a sustainable governance model to empower informal

settlements in rural communities regarding WASH. Agide *et al.* (2019:281) asserted that mainstreaming problems within government and public-private partnerships, such as WASH, denotes an ongoing agenda. Kingdon's MSF as a comparative foundation is therefore needed to understand why certain issues emerge on the following three independent streams:

a) Problem stream

Attention motions to a policy problem. Problems are policy issues which are assumed to require attention based on how they are framed. Hoefer (2022:2) states that in addressing societal problems through political action, objectives must first define the conditions. Policymakers need to see a situation as a problem before creating a policy response as it is important to consider their observations (Ruvalcaba-Gomez, Criado & Gil-Garcia, 2023:241a).

Kingdon's MF aimed to assess how problems are identified and how they are included in the governmental agenda, as not all problems can be debated simultaneously (Banha *et al.*, 2022:543). The authors linked the adoption of the White Paper on Basic Household Sanitation of 2001 and the COVID-19 pandemic attitude, which highlights the need for long-term solutions for WASH in rural informal settlements, along with essential legal measures to avert contagious infections, as one actor may see it as a social problem.

According to Yuanyuan (2023:154), policymakers are biased against some societal challenges defining the problems through three methods: (a) alteration in project costs – access to clean drinking water, basic sanitation and handwashing soap etc, (b) focal events – post-matric Rage Festival event in Ballito (South Africa) sparked societal concern and become influential drivers of an agenda in WASH policy, (c) feedback from existing programmes –medical reports on how many people were contaminated, the hospitals in which they were admitted, as well as visitation and mortality rates. This means that some real-life issues can only be identified as problems when certain things are tangible, i.e., wearing masks, social distancing and hand sanitising in the absence of soap and water. Shafi and Raheeq (2023:15) concurred with Kingdon's MSF on how the effectiveness of problems, availability of policy solutions and political actor approachability are interconnected in the agenda-setting stage. Concerning the focus of this study, the researcher compared Kingdon's MSF problem stream as the

first stage of the framework, which involves identifying social issues or problems in the case related to the provision of WASH.

b) Policy stream

The policy stream aspect suggests that *a solution to that problem is available*. This stream concerns how policy ideas are distributed in a public policy process. Shafi and Raheeq (2023:16) as well as Johannesson and Qvist (2020:8) depict Kingdon's MSF policy stream as a conceptual framework combining problem recognition, policy proposal and politics to address critical issues in policy agenda setting. Policy stream in Kingdon's terminology is regarded as the 'policy primaeval soup' or 'soup' (Santosh & Kane, 2025:252) in which numerous ideas, such as the WASH, float and bump into one another, encountering new ideas and forming mushroom groupings.

Ruvalcaba-Gomez *et al.* (2023:241b) viewed the 'primaeval soup' as solutions to problems that emerged from the background and then converted to government policy. Jacobsen *et al.* (2023:250) asserted that Kingdon's MSF policy stream is related to the evaluation and analysis of problems and their proposed solutions. At this stage, an acceptable basic level of sanitation, clean drinking water and hand hygiene practices in rural informal settlements are needed.

The policy stream in this research focused on recognising the novelty of public policy, such as the White Paper on Basic Household Sanitation 2001. Norvixoxo, Schroeder, and Spiegel (2023a:1747) describe the reiteration of the 1997 policy within the White Paper on Basic Household Sanitation 2001, as a concern to address the indigent, as opposed to 1996 that communities in low-density rural areas and the informal settlements households should bear the responsibility for sanitation.

The White Paper recognised the concept of a 'toilet' as merely an element that makes good sanitation in a household, but without water and good hygiene practices, it remains a white elephant aimed at improving conditions of WASH in South Africa and providing basic sanitation 'toilets' for the poor. To fully understand the recognition of the toilet as an element in the household, Norvixoxo *et al.* (2023a:148) outlined in Table 2.3, the evolution of toilets in the South African sanitation policy from 1994 to 2016. The focus during this period highlights both the efforts and challenges in achieving universal sanitation access since 1994, a goal increasingly affected by

issues such as rapid population growth and poor policy implementation. The aforementioned is captured in Table 2.3 below.

Table 2.3 The evolution of toilets in South African Sanitation Policy – 1994 to 2016

Year	Document	Sanitation Goal Declaration
1994	Reconstruction and Development Program (RDP)	Aimed: provide clean water and sanitation for all Proposed: establishing a national water and sanitation programme
1994	Dept of Water and Forestry (DWAF) White Paper – Water Supply and Sanitation Policy	Proposed: One Ventilated Improved Pit (VIP) latrine per rural household
1996	DWAF White Paper: National Sanitation Policy	Recommended: Households bear the main responsibility for sanitation provision
1996 & 1997	Constitution of the Republic of South Africa & Water Services Act	Legislated: Water and sanitation provision are a municipal (local government) responsibility
1997	Water Services Act	Defined basic sanitation: Services necessary for the safe, hygienic and adequate collection, removal, disposal or purification of human excreta, domestic wastewater and sewage from households, including informal households
2001	DWAF White Paper: Basic Household Sanitation	Proposed the minimum acceptable basic level of sanitation. (a) appropriate health and hygiene awareness and behaviour. (b) a system for disposing of human excreta, household wastewater and refuse, which is acceptable and affordable to the users, safe, hygienic and easily accessible. (c) a toilet facility for each household

		Proposed providing free basic services, including basic sanitation, for users unable to afford higher service levels Recognised: 'Toilets are just one element in a range of factors that make up good sanitation' which included '[c]ommunity participation in decision-making, safer living environments, greater knowledge of sanitation-related health practices and improved hygiene'; but failed to provide implementation guidelines
2003	DWAF Strategic Framework for Water Services	Set target: 'All people in South Africa [to] have access to a functioning basic sanitation facility by 2010.' Introduced: Notion of 'services ladder'
2005	DWAF National Sanitation Strategy	Recognised: Challenges to meeting universal sanitation by 2010 Explicitly: Emphasised sanitation technology
2009	DWAF Free Basic Sanitation Implementation Strategy	Formalised: Free basic sanitation principles Catalogued: Technology options for different settlement types Reset: 2010 target for universal sanitation to 2014
2016	DWS National Sanitation Policy 2016	Reiterated: Earlier policy Introduced: Focus on sustainability of sanitation services Commit: To SDG 6c

Source: Norvixoxo, Schroeder and Spiegel (2023:1746).

c) Political stream

The main theme of the political stream is that *policymakers are motivated to choose a solution*. Hoefer (2022:3) states that political information originates from interactions among politicians, the national mood, elected government officials and societal groups. Allen (2020:120), Banha *et al.* (2022:543) and Hoefer (2022:3) emphasise that the political stream involves ongoing political events from various aspects such as political parties, electoral processes, civil society, media, interests and public

perceptions. Ruvalcaba-Gomez *et al.* (2023:242) concur with previous authors by suggesting that Kingdon's MSF is the most noticeable powerful guide to politics such as government transformations and public administrators, participation of pressure groups and the political environment. There is little in published literature about the public administration context of WASH policy in rural informal settlements in the Limpopo Province. South Africa became one of the few countries in Sub-Saharan Africa to partake in embracing the SDGs – targets 6.1 and 6.2 (Table 2.4) in the provision of the WASH framework to comply with and merge universal standards, thereby enhancing their legitimate human rights that grant its constituents access to WASH.

Table 2.4 SDG Goal 6 – Ensure availability and sustainability management of water and sanitation

Target		Indicator	Agencies
6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all.	6.1.1 Proportion of the population using safely managed drinking water services	WHO UNICEF JMP
6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.	6.2.1.a Proportion of population using safely managed sanitation services 6.2.1.b Proportion of population using a handwashing facility with soap and water available	WHO UNICEF JMP

Source: SDG 6 (UN-WHO 2024:2).

Ruvalcaba-Gomez *et al.* (2023:242) suggested that Kingdon's MSF 'coupling' moment gave rise to the opening of the '*policy window*' formed from the three streams – problem, policy and political. Windows are opened by influential problems or events in the political stream and facilitated and manipulated by policy entrepreneurs who immediately seize the opportunity to initiate the problem. According to Fowler (2019:2), '*policy windows*' are fleeting opportunities for supporters of recommendations to push their attention towards special problems.

The researcher sketched Kingdon's MSF to reveal that the White Paper on Basic Household Sanitation 2001 offered a '*window period*' of opportunity to better address social determinants of WASH, arguing that the social, political and behavioural lessons presented by the White Paper should be drawn on in these fundamental principles based on socioeconomic characteristics.

d) Policy entrepreneurs

This rationale suggests that *a course of action is officially approved*. Kingdon's MSF acknowledges the role of policy 'entrepreneurs' who take advantage of opportunities to move items onto the formal agenda. Mavrikou, Zahariadis, and Karokis-Mavrikos, (2022:295) view them as individuals engaged in policy, while Petridou and Mintrom (2021:4) see them as agents of change. Cavalcante, Pot, Van Oel, Kchouk, Neto, and Dewulf, (2023:950) refer to them as actors, Yuanyuan (2023:154) as activists and Valin and Huitema (2023:21) as experts in policy development and decision-making.

The notion of policy entrepreneurs is meant to help propel political and policy changes by focusing on commitment to policy solutions and protecting legislative action. Petridou and Mintrom (2021:4) stated that policy entrepreneurs often seek to tell a story and work with relevant stakeholders to scale up policy changes from a bottom-up approach strategy, i.e., local, provincial and national governments, similar to the challenges of WASH.

Addressing disparities in access to WASH during the window period and coordinating multisectoral efforts that include both top-down and bottom-up approaches to support policy entrepreneurs and reduce barriers to inclusive WASH policymaking is imperative. The Top-down approaches include government, while the bottom-up approaches involve community mobilisation and advocacy. Kingdon and Stano argue that:

Windows are opened either by the appearance of compelling problems or by happenings in the political stream. Policy entrepreneurs, people who are willing to invest their resources in pushing their pet proposals or problems are responsible not only for promoting important people to pay attention but also for coupling solutions to problems and for coupling both problems and solutions to politics (Kingdon & Stano, 1984:21).

Coupling denotes a consistent tie linking problems and policies concurrently, which reveals a strong political provision to enhance the policy and commitment to adjusting

public policy processes (Wang, Yang & Fang, 2023:3). Similarly, a WASH policy may be formulated when coupling takes place. The policy formulation stage emerges with pioneering proposals intended to solve WASH problems in South Africa, known and unknown, since 1994 in the public policy, based at the local municipalities in rural informal settlements.

2.4.2.2 Policy formulation stage

The second stage of the public policy cycle process is policy formulation. The development of the policy formulation stage of public policy can be traced back to James Anderson's era (1979). Anderson's philosophy cannot be ignored in developing a sustainable model, which recommends public policies by middle managers and not top managers. The actors in the policy formulation stage play a vital role in interacting with administrators and pressure groups, robustly stabilising their policy subsystem in the policy-making process. Firdaus, Fauzi, and Qurtubi (2023:185) asserted that policy formulation is crucial because WASH boundaries are created by policymakers. Setyawan, Muluk, and Amin (2024:12) reported that during the formulation stage, policy proposals are created to address specific problems and are selected from a few competing options. Contrary to defining and identifying the problem, the public is not directly persuasive in the public policy formulation stage. Uzun and Furat (2022:113) identify scientific elements of a good public policy formulation as:

- ✓ simple for everyone to understand and clearly defined;
- ✓ supportive of other public policies in force and at least should not conflict with other policies;
- ✓ the real situation should be considered and the competencies of those who will implement the policies should not be overlooked;
- ✓ open to new situations and should be able to update itself constantly.

In addition to Uzun and Furat's (2022) good policy formulation mentioned above, the researcher proposes that:

- ✓ the policy should be feasible and lend itself to continuous monitoring and evaluation.

Public policy formulation deals with positive and negative problems and depends on the arrangement of a particular WASH policy, even though economic actors hinder

local political decision making and public-policy formulation, monitoring and evaluation are essential, especially in rural informal settlements.

2.4.2.3 Decision-making stage

The decision-making stage is considered the third stage in the development of the public policy process. Since this study involves the way decisions are made in public policy, it is pertinent to incorporate the science of 'Muddling Through Framework' implemented by Lindblom in 1959 with a comparable impact, strengthening the decision-making stage (Setyawan *et al.*, 2024:13; Van Ryzin, 2021:341; Zhang, Hou, Lei & Luo, 2023:364).

Cardinaal, Tjan, Jeurissen, and Berden (2024:2) suggested that the 'Muddling Through' is also known as the theory of 'incrementalism' or the 'patchwork' approach, referring to the decision-making process as a sequence of small and mostly spontaneous transformations. In this sense, the author referred to the socio-technical development of the co-production of the Water and Sanitation Services South Africa (WSSA) as a water service provider acting as an incremental learning process through which rural communities partake in the decision-making process in their local municipality by shaping the organisational restrictions and conditions of their livelihoods (Rosati, Moretto & Teller, 2022:163).

2.4.2.4 Implementation stage

The implementation aspect is considered an interaction stage between actors reaching an understanding of the *in-situ* functioning or failure of a policy in the public policy process. It is imperative to provide a precise definition of the 'implementation' of a public policy, as this term is used widely and selectively in the various scientific disciplines including public administration, organisational theory, policy management and political sciences (Prasetyo, Fauziah & Kesuma, 2023:421).

Sabatier (2005:21) explains policy implementation as the 'carrying out of a basic policy decision, usually incorporated in a statute, but which can also take the form of important executive orders or court decisions' (Nguluwe & Keyter, 2022:111). In the implementation stage, public policies are coiled from intentions into actions based on a top-down perspective (Qawasmeh, 2022:37). Public policy implementation has access to implementation structures in the provision of basic services and to advance

their different interests in WASH, values, perceptions and policy preferences during the implementation process.

According to Nokele (2022:80), public policy delivery actors are proficient influencers in the success of public policy implementation and ensuring accountability through respect of the Constitution and holding those who have breached the rule accountable in South Africa. Implementing policies in the context of the South African Government, characterised by political, economic and cultural issues, has created numerous challenges in rural informal settlements regarding service delivery provision, especially regarding WASH.

The researcher merged Sabatier and Mazmanian's Implementation Analysis Framework of 1983 in the public policy implementation stage to explain the successful implementation of the character of the problem, social and political context and the capacity of the legislature to structure the implementation process (Bollens, 2020:1359). The notion of the White Paper on Basic Household Sanitation of 2001 embraced strategic interventions, developing a common approach focusing on the implementation model and technical options to solve the South African household sanitation problems. Arguing against the notion of implementation, the researcher compared implemented public policies in South Africa such as the Free Basic Sanitation (FBSan) in Cape Town's informal settlements with flawed ideologies about policy objectives, resources, infrastructure support and technical feasibility affecting municipal implementation. This eventually contributes to policy failures and the White Paper on Basic Household Sanitation of 2001 in the Limpopo Province rural informal settlements with similar underlying policy challenges rooted in flawed unplanned principles sustaining national policy (Taing, 2019:540). The execution of political procedures, rules, routines and social processes are put together in the implementation stage. Banha *et al.* (2022:546) asserted that Sabatier and Mazmanian's framework had six conditions that determine the efficiency or failure of the public policy tied with a set of tasks that need to be undertaken such as:

- (i) Clear and consistent WASH policy goals.
- (ii) Adequate casual theory influencing power concerning WASH public institutions and appropriate decision-making powers.
- (iii) Legally framed structures that are permitted to access institutions that support the WASH programme, suitable hierarchical integration, the

possibility of assigning accountabilities to specialised units, adequate financial resources of WASH and appropriate decision-making rules.

- (iv) Devoted and competent people who are committed to the achievement of WASH goals of the policy, training in management and political science.
- (v) Support from lobbying groups and high office holders for the formalisation of decision power.
- (vi) Changes in social and economic decisions about the economic and social conditions of the government.

Nationally, South Africa has a democratic government, and the provision of basic services is central to the role of local governments because it has the potential to address triple problems such as poverty, unemployment and shortage of WASH programmes. Hence, the importance of a competent government managing policy implementation cannot be overemphasised as implementation occurs within a given institutional context and requires specific structure and organisations for its successful conduct.

2.4.2.5 Evaluation stage

The public policy evaluation phase is regarded as the last stage in the process of the public policy cycle, as a *sine qua non* and an unavoidable exercise for any government administration globally. Since the study involves the way policies are administered to constituencies, the debate on public participation in service delivery in the democratic era is fundamental to assess actors involved in the previous policy process (Qawasmeh, 2022:37). The debate focused on whether public participation should be involved in the evaluation stage. The notion of public participation is regarded as an acute factor in the democratisation of the provision of basic service delivery, despite its awkward administrative problems immersed in the South African Government (Kgobe, Bayat & Karriem, 2023:1).

Moreover, competency in public participation in the social sciences is predicated upon two fundamental concepts such as early involvement, engaging individuals in the decision-making process (window period) and the true voice, giving individuals the opportunity to contribute to determining the final decision (Kgobe *et al.*, 2023:2). The debate in the study during this period was mainly to observe and oversee the idea of

public participatory activities engaging rural informal settlement constituencies in the public policy evaluation process.

According to Caruso, Conrad, Patrick, Owens, Kvitén, Zarella, Rogers, and Sinharoy (2022:24), perceived limited knowledge in rural communities often inhibits women and girls partaking in community decision-making bodies such as WASH evaluation requests, as they obtain minimal or rather irrelevant knowledge from other women in a public meeting and close friends about WASH activities, instead of defending gender norms, therefore preventing women's awareness. Policy evaluation assesses the efficiency of implemented public policy in terms of its perceived objectives and applies principles and methods, examining a particular policy as a response to a detected policy problem.

Policy evaluation normally produces diverse sets of knowledge depending on the type of questions that need to be answered, and all components are rarely evaluated at once. According to Grimaldi and Carrasco-Farré (2021:198), public policy evaluation aims to identify and test underlying hypotheses and generate evidence that can be utilised in decision-making. Hence, a general framework guiding policy evaluation such as the theory of change (ToC) adopted by Weiss (1995) is essential, as it explains the main hypotheses contributing to public participation and achieving objectives.

Aslanyan, Sheikh, Feletto, Launois, Vahedi, Brizuela, Thorson, Begg, Crossman, and Bates (2024:1) define a ToC as a visual representation of how a programme plans to achieve goals. Goldsworthy (2021) defines ToC as “an explicit process of thinking through and documenting how a program or intervention is supposed to work, when it will work, who it will benefit (and in what way) and the conditions required for success”. Figure 2.4 explains the ToC analysed from the White paper on Basic Household Sanitation 2001 and the fundamental hypothesis derived from the research questions regarding developing a sustainable governance model for WASH provision in rural informal settlements in the CDM of Limpopo Province.

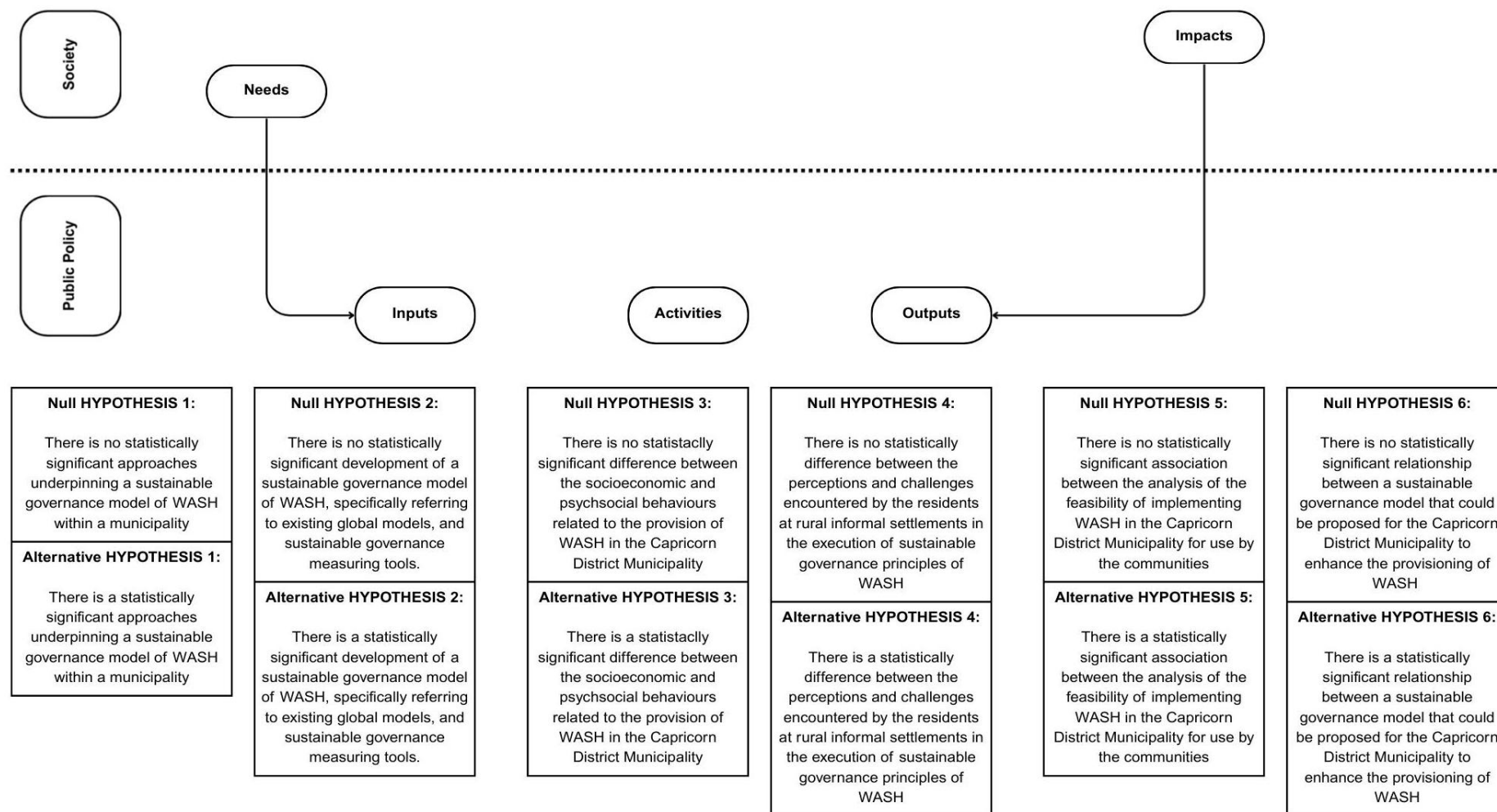


Figure 2.4 Theory of change of public policies and underlying hypothesis

Source: Grimaldi and Carrasco-Farré (2021) (Modified).

2.5 THE EVOLUTION OF WASH POLICY

Before 1652, South Africa's water policy was administered under customary law for indigenous Black Africans, while White settlers and other immigrants were subjected to civil law also referred to as 'racial outsiders' (Kaziboni, 2024:13; Viljoen, 2022:200). Accessing the status of clean drinking water, basic sanitation and hygiene in South Africa is particularly pertinent as water scarcity has not been a modern phenomenon in the country since the pre-colonial era.

The pre-colonial era was characterised by rural communities that survived in a close-knit area, with combined WASH resources and practising communal forms of lifestyles. Bablin (2021:29) stated that since the earliest days of human settlements in South Africa, WASH in the pre-colonial era has been a defining factor in determining where people choose to live, how they manage to survive, what food they consume and why they relocate. The South African Government has a history of communities having inadequate access to water rooted in its legacy of racial segregation, social injustice, environmental degradation and economically inefficient management practices.

During the colonial era, rural communities had to apply for permits for service delivery, such as WASH, which displaced Black South Africans to infertile areas and perpetuated racial wealth disparities which are still prevalent today (Calverley & Walther, 2022:6). The WASH laws relied on Roman-Dutch permit systems. Women in the colonial era, especially indigenous Blacks residing in rural informal settlements, were significantly impaired by the colonial administration as they collaborated with their male counterparts in labour domains such as farming, fetching water and collecting firewood for their household and tediously sustained their livelihood thus during the apartheid era.

During apartheid, public policies concerning WASH did not permit everyone, including the Limpopo Province communities, to have sufficient basic drinking water, which is safe, accessible and affordable for their well-being. Kaziboni (2024:2) posits that the problem of water scarcity in South African Black communities was conceived during the colonial and apartheid era and remains a persistent socioeconomic and political concern. Inadequate provision of basic sanitation in informal settlements has persisted since the fall of apartheid, despite implemented public policies and multiple attempts to eradicate bucket toilet systems that produce foul-smelling and unhygienic effects on constituents' well-being (Mukiga, 2024:2).

Klug (2021:222) reported that drinking water allocated in the post-apartheid era was governed by national and international laws based on human rights and fair distribution principles as established by the South African Government. Subsequently, the post-apartheid South African Government has to address inadequate access to basic services such as WASH, based on racial inequalities. Bablin (2021:33) asserted that the post-apartheid evolution of the WASH provision has been hindered by discriminatory government policies and tainted water reform obstacles. The transition to a democratic South Africa required shared provision of WASH to all citizens, ending segregation policies of colonialism, apartheid and capitalist development governed by the National Water Act 36 of 1998.

Mukiga (2024:8) opined that the 1996 South African Constitution represents an effort to transform the long-term impacts of racial segregation on human development. The Constitution embraces the values of democratic government, such as human dignity and equity; nevertheless, the informal settlement constituencies are still forced to collect water from unprotected wells or springs or store water in containers until use, which results in poor health outcomes. The availability and accessibility of WASH are primarily connected to socioeconomic development, including economic progress, human wellness and lifestyle quality (Tshililo, Mutanga, Sikhwivhilu, Siame, Hongoro, Managa, Mbohwa & Madyira, 2022:1). Hence, disparities comparable to WASH vary across the provinces in all contexts and disadvantaged socio-economic groups in the Limpopo Province face barriers against attaining SDG 6.1 and 6.2. Within the context of this study, the disparities in the provision of WASH are outlined in terms of socioeconomic, socio-demographic, gender-related and psychosocial inequities (see Chapter Three).

2.5.1 Disparities in the provision of WASH

Disparities in the provision of WASH exist throughout Africa and are a major concern, with significant inequalities evident between urban, rural and informal settlement areas and across different wealth quintiles. WASH inequalities have been measured and monitored to date on a global level, particularly concerning the targets of SDG 6. These disparities are deeply rooted in socioeconomic, socio-demographic, gender and psychosocial factors. This is subsequently discussed.

a) Socioeconomic disparities

According to Omotayo, Olagunju, Omotoso, Ogunniyi, Otekunrin, and Daud (2021:63153), population growth in the Limpopo Province is under pressure due to migration as a result of socioeconomic development issues, specifically in the provision

of adequate quality and quantity of safe drinking water. Numerous households and communities in rural informal settlements in the Limpopo Province face challenges regarding their drinking water, basic sanitation and hygiene practices; water sources are contaminated and pose health risks, contributing to hunger, malnutrition, poverty and a poor economy.

Oskam, Pavlova, Hongoro, and Groot (2021:5) asserted that knowledge of socio-economic disparities in accessing WASH in a community is a starting point for formulating public health policies targeting constituents without sustainable access to WASH. Understanding disparities in WASH access within a community is crucial for developing effective public health policies aimed at improving access for vulnerable populations. Mutyambizi *et al.* (2020:5) suggested that consumer experiences and expectancy regarding the provision of basic services are the main elements of constituent satisfaction. Yet, unsafe drinking water, such as foul-smelling water or water with different colours and contaminated groundwater, are associated with constituent dissatisfaction, particularly in poor households. Groundwater, without treatment or awareness of contamination, remains the primary source of drinking water in rural Limpopo Province households (Lalumbe & Kanyerere, 2022:1). In areas such as the North West Province, use of groundwater continues to increase, much the same as what is happening in rural and peri-urban communities, it is the sole provider of household water sources for domestic use and performing other related WASH services (Masindi & Foteinis, 2021:2).

The communities' perception of adequate, potable, accessible and available WASH in the rural informal settlements cannot be addressed only by the Department of Human Settlement (DHS) nor can they be only held accountable, because legitimate operational procedures concerning WASH also fall under the respective municipalities. According to Abrams, Carden, Teta, and Wågsæther (2021:2), the provision of WASH is delayed in local municipalities due to population growth, climate change and limited infrastructure, particularly affecting people with disabilities regarding their access to safe water and basic sanitation, and some depend on groundwater for their livelihoods. The Limpopo Province has yet to find sustainable solutions to the problems of a shortage of potable water and appropriate household toilets for rural informal settlements.

b) Socio-demographic disparities

Due to the interconnections of household hygiene and socio-demographic aspects, sanitation behaviour, hygiene behaviour and waste disposal patterns can pose a risk to

potable water quality in rural informal households. Bazaanah and Mothapo (2024a:26) asserted that poor water quality arising from pollution can reduce life expectancy in rural informal settlements if constituencies consume water from unimproved water sources without proper knowledge of purification. Improved water sources are classified by the WHO as safely managed drinking water sources located on the premises and are available when needed and free from contamination (Tshililo *et al.*, 2022:2).

Despite enormous strides in the socio-demographic aspects, the future looks unclear and daunting due to disparities in access to WASH services amongst various ethnic groups, geographical areas, social classes, religious denominations and gender equity. Previous studies (Nguyen, Fagbayigbo, Cissé, Redi, Fuhrmann, Okedi, Schindler, Rösli, Armitage & Carden, 2021:2; Okoro, Adediran & Umeokafor, 2023:399) reported that constituencies in the informal settlements are characterised by congested livelihoods, dense populations, unhygienic conditions, improper waste disposal and illegal housing constructions associated with a lack of WASH services. Constituencies living in dense populations are generally exposed to diarrhoea due to stagnant water, which poses health risks, spreading pathogens and unhygienic health behaviour, further influenced by gender inequity.

c) Gender disparities

Compared to socioeconomic and socio-demographic disparities, less effort has been put into evaluating WASH disparities related to gender and how gender affects constituencies in rural informal settlements. According to Dickin and Gabrielsson (2023:4), gender-related disparities in WASH are significant as they are deeply rooted in gender norms related to water and sanitation. Gendered aspects of sanitation are subjected to harmful social norms which are prevalent and significant in individual households. Therefore, it is important to study the key factors in women's unequal susceptibility to these norms and the various ways they experience water- and sanitation-related violence. Tsekleves, Fonseca Braga, Abonge, Santana, Pickup, Yongabi Anchang, De Pippo, Semple, and Roy (2022:144) stated that problems connected with WASH are not gender-neutral and practitioners, policymakers and actors have overlooked gender problems in WASH. The failure to include and segregation of women in community project classifications hinder women's participation, and traditional beliefs often cause a high rate of development failures and implementation of public policy solutions in rural informal settlements.

Toivettula, Varis, Vahala, and Juvakoski (2023:2) asserted that insufficient drinking water services can also trigger psychosocial stressors between genders, communities and

socioeconomic groups based on poor quality and quantity due to water-related inequalities. Riskind (2024:10) reported that the provision of basic services in rural communities are gendered-related, which mostly contributes to health risks affecting women and girls having anxiety disorders. Local governments ought to embed gender roles to promote adequate and effective workshops, as individuals in rural informal settlements are challenged psychosocially when unable to access adequate WASH services.

d) Psychosocial disparities

Unsurprisingly, the notion of psychosocial disparities is connected to mental health disorders connected to water inequalities and sanitation problems amongst constituencies struggling to access WASH services. The promotion of human health and the well-being of constituencies are arbitrated by the daily amount of safe drinking water that is accessible (Toivettula *et al.*, 2023:1). Vulnerability when accessing safe drinking water can determine constituencies' perception regarding population density, groundwater depletion and the quality of supplied drinking water. The vulnerability-stress model of safe drinking water is displayed in Figure 2.4 below. Factors such as social vulnerability, cognitive vulnerability and external stress factors are analysed to support the psychosocial disparities.

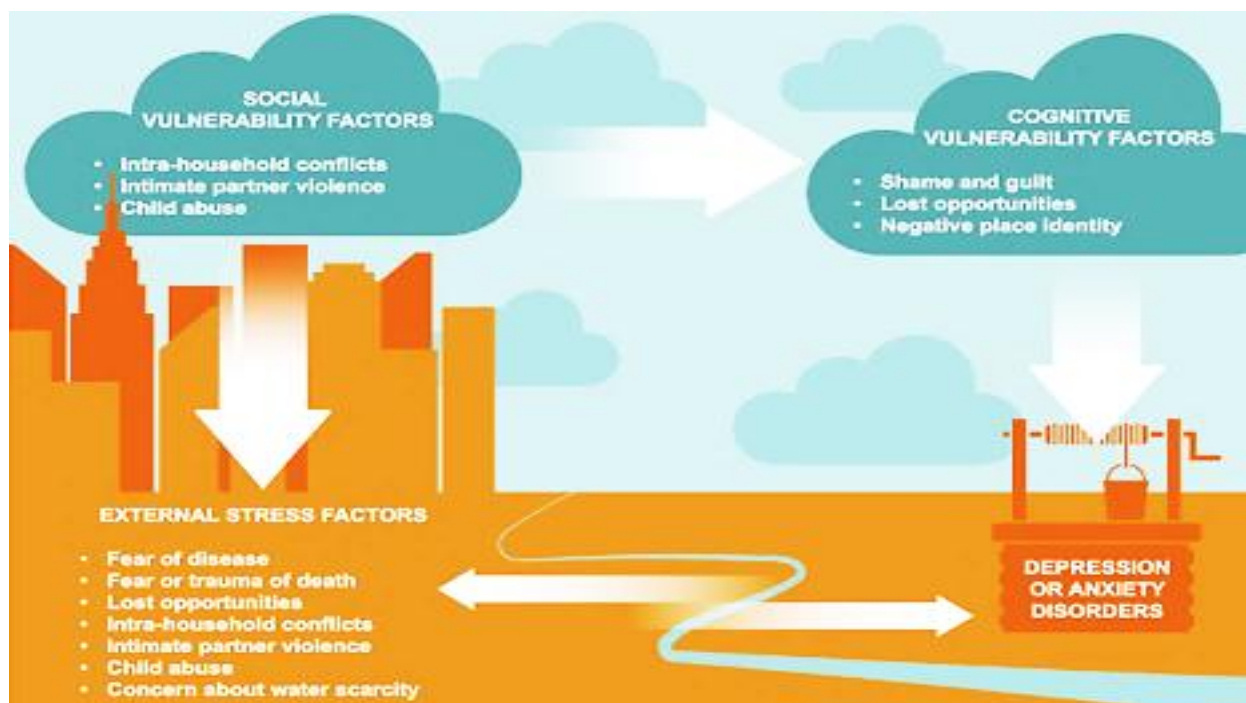


Figure 2.4 The vulnerability-stress model related to safe drinking water

Source: Toivettula *et al.* (2023:4)

d(i) Social vulnerability factors

In discussing the notion of vulnerability, Chumo, Kabaria, Shankland, and Mberu (2023:4) indicated that vulnerability is a relative condition that may range from resilience to total powerlessness and defencelessness, particularly in marginalised societies and vulnerable individuals or groups. Individual vulnerability is a relatively measured permanent factor. According to the view of Mah, Penwarden, Pott, Theou, and Andrew (2023:1), social vulnerability refers to uneven conditions in society, especially among individuals experiencing poor social conditions, which can affect their well-being. Toivettula *et al.* (2023:3) defined a community's social vulnerability as a component comparable to a combination of various factors, such as biological, psychological, social and cognitive problems amongst people. Societies and individuals residing in rural informal settlements are primarily exposed to unfavourable impacts of naturally hazardous lifestyles, including death, injury, loss or disruption of their livelihoods. Turesson, Pettersson, De Herve, Gustavsson, Haas, Koivisto, Karagiorgos, and Nyberg (2023:6) emphasised the notion of social vulnerability based on qualitative research to create a deeper understanding of the phenomena perceived as social vulnerability in the context of risks incurred, such as demographic factors (age, education, gender, marginalised groups and demographic change); economic factors (the financial situation of municipalities, type of employment and unemployment, income and wealth); individual factors (health status and risk perception, knowledge and information); the built environment factors (reliance on vulnerable infrastructure, infrastructure, availability and functionality of infrastructure); and social capital factors (social cohesion on community level and social relations and networks).

The study explores social vulnerability in providing WASH in rural informal settlements and reveals a 'window period' suggested by the White Paper on Basic Household Sanitation 2001 during which people adjust when exposed to hazardous health and mitigate vulnerability depending on the changed climate and water storage as an external factor. Chumo *et al.* (2023:2) highlighted social vulnerability as a fundamental tool for exploring determining factors concerning general vulnerability amongst marginalised societies in informal settlements. Poor access to health and well-being services, child abuse and violence and WASH service provision challenges impact the health and well-being of marginalised and vulnerable populations. According to Ntakirutimana (2021:15), housing structures, especially in rural informal settlements, pose a serious threat to the quality of children's lifestyles as they are exposed to pollution from overflowing sewage,

toxic and contaminated environments, illegal dumping, substance abuse and floods in their households.

Anwana and Owojori (2023:2) described how South Africa is a flood-risk country, especially in Limpopo, North-West, Eastern Cape and KwaZulu-Natal provinces, as the most vulnerable regions exposed to severe floods affect marginalised and poor groups with multifaceted levels of social vulnerabilities. Simply put in summary, social vulnerability covers the overall circumstances that have an effect on an individual's occupation, age and locality, and that impact people's health conditions, potentially leading to chronic disorders, trauma and even death. The provision of safe WASH could mitigate social vulnerability and decrease intra-household conflicts, intimate partner violence and abuse, as well as child abuse in communities residing in rural informal settlements.

d(ii) Cognitive vulnerability factors

Persistent perceptions of looming threats when accessing WASH cause anxiety and depression amongst communities in rural informal settlements. Boateng, Workman, Miller, Onono, Neilands, and Young (2022:1) suggested that depression increases the risk of cognitive impairment in individuals, groups and societies which also includes genetic vulnerability, adverse life events, lack of social support systems and chronic diseases. Turesson *et al.* (2023:7), as well as Anthonj, Poague, Fleming, and Stanglow (2024:2) asserted that individuals with mental disorders or with mental illness-impaired cognitive functions cannot act independently during severe weather conditions, which lead to shame and guilt. Therefore, inadequate access to the provision of WASH services could indirectly increase cognitive vulnerabilities in society.

According to Toivettula *et al.* (2023:4), individual vulnerability comprises combinations of numerous factors such as biological, psychosocial, social and cognitive models associated with genetic inheritance, personality and attachment to relationships, resulting in people feeling negatively towards their area (for example rural dwellers compare to city life). Growing up in a rural environment can create a negative identification with where they live, with individuals trying to fulfil societal needs related to security, identity and lower self-esteem, especially those living in rural informal settlements (Thoma, Rohleder & Rohner, 2021:10). Similarly, unlike in urban areas, the rural informal settlement communities in the Limpopo Province who experience a lack of basic WASH services and a changing environment that impact their livelihood, reflect a morose arrogance and

a transformation of how they see and understand themselves. The study is therefore undertaken to validate the aforementioned assumption. Anthonj *et al.* (2024:4) specify that despite the UN pledge to ensure '*no one will be left behind*' and to '*endeavour to reach the furthest behind first*' regarding SDG 6.1 and 6.2., access to WASH in rural and informal settlements in the Limpopo Province remains inadequate. This has resulted in significant WASH disparities and reported violence and trauma, which are understudied, despite being noted in government statistics. Safe drinking water is a fundamental municipal service expected by all members of society.

d(iii) External stress factors

Chronic environmental conditions increases the burden of non-communicable diseases, including mental disorders, acting as external stress factors in rural informal settlements. Mental disorders burden rural informal settlements by stressing individuals, groups and societies struggling with access to basic WASH and affecting their health (Jailobaeva, Falconer, Loffreda, Arakelyan, Witter & Ager, 2021:2; Sadiki & Steyn, 2021:58). Fear of mental health disorders, death, trauma and prevalent poverty escalating in rural informal settlements and poor households is rife, and child-headed families associated with family disintegration are increasing, yet all this often goes unnoticed, even though it forms an integral part of the local government's rural landscape. Makuyana, Mbulayi, and Kangethe (2020:1) and Toivettula *et al.* (2023:4) highlighted that sustainable growth and development are inversely linked to child-headed households, with some children facing daunting poverty and lack of safe access to basic WASH, which provokes children into adopting external stress-coping mechanisms such as substance abuse and undesirable living environments. Child-headed households, adjusting to parenting roles with no additional guidance from family members, are severely in distress, and even though foster grants are for improving children's access to food, water and education are available, they are insufficient, which creates food insecurity and hunger.

Ngarava (2023:1) indicated that intra-household food system agency (the ability of individuals within a household to make decisions and exert influence over food-related activities, including production, acquisition, preparation and consumption) is an inclusive matter resulting in diverse competencies and functions, which have a behavioural impact on social well-being (with a lack of resources negatively affecting well-being and livelihoods). Agencies of the intrahousehold food system controlled by females often allocate more food than males in bigger household residences, which usually causes

conflicts. Gendered intra-household disparities quantifying water are common in societies, with females being allocated more water than males. These disparities are a cause of inter-gender conflict. Similarly, there is a concern about water scarcity to avoid intimate partner acts of violence (Dickin & Gabrielsson, 2023). Concerns about water scarcity in rural informal settlements in the Limpopo Province highlight the need for evaluating and exploring WASH aspirations. It is essential to understand the principles, dimensions and approaches that support the sustainable governance of WASH to identify what constitutes an effective governance model.

2.5.2 Challenges of evolving a sustainable WASH model

Theory on existing global sustainable governance models for WASH, especially for rural informal settlements, has been vague. As indicated in Chapter 1, the UNICEF and WHO Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) provides criteria for global standardised WASH indicators, such as '*ladders*'. The ladders are designed for various purposes such as benchmarking, research analysis and comparison of service levels to correspond with the achievement of the SDG WASH targets based on improved and unimproved facility classifications (Amankwaa, Abrefa Busia, Agbadi, Duah & Arthur-Holmes, 2024:267; Dickin & Gabrielsson, 2023:2; Pessoa Colombo, Chenal, Orina, Meme, Koffi, Koné & Utzinger, 2023:2). The challenges highlighted in the JMP ladders, as shown in Figure 2.6, particularly regarding unimproved facility and services classification, would provide a basis for grounding the development of a sustainable WASH model for the CDM in the Limpopo Province. The JMP service ladders will be applied in this study for monitoring of household WASH and associated SDG 6 targets to confirm or contrast the findings and contribute to the aim of "what might be the most beneficial sustainable governance model to promote the provision of WASH services for rural informal settlements in the Capricorn District Municipality in Limpopo Province of South Africa".

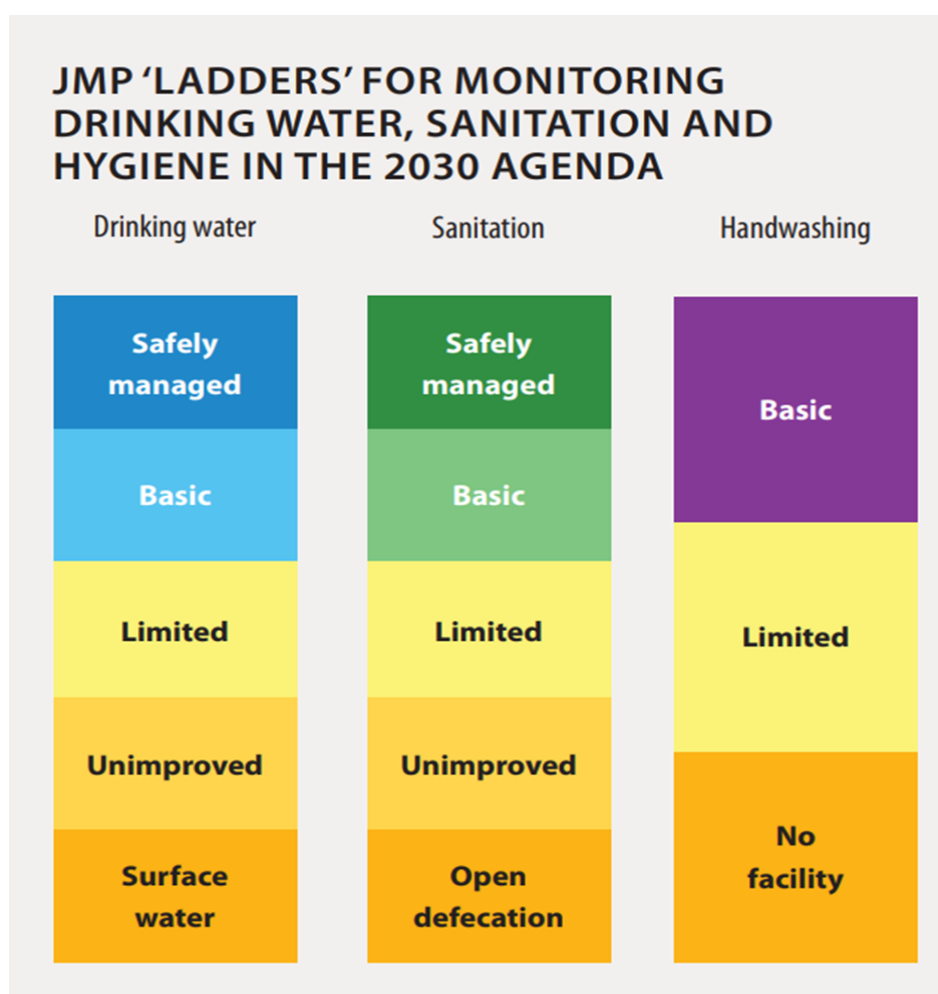


Figure 2.5 JMP service ladders

Source: UNICEF/WHO/JMP (2024)

2.6 SUSTAINABLE WASH MODELS

As outlined in the previous section, WASH seeks to develop a sustainable governance model. This section provides a review of the literature on sustainable governance models, focusing on the concept of sustainability in general and sustainable WASH in particular.

2.6.1 Conceptualising sustainability

The notion of capacity development in the WASH sector is crucial to attain the provision of sustainable services. The term ‘capacity development’ dates back to the 1970s in the United States, related to improving government and local government policies sustainably (Jiménez, Álvarez Prado & Saikia, 2024:578).

Golhasany and Harvey (2023:2) define capacity development as “the process by which individuals, groups and organizations, institutions and countries develop, enhance and

organize their systems, resources and knowledge; all reflected in their abilities, individually and collectively, to perform functions, solve problems and achieve objectives”.

Capacity development has been perceived as part of several United Nations (UN) resolutions and a key factor in implementing the SDGs. In the book titled, *Water, the Environment and the Sustainable Development Goals*, by Dehghani, Karri, Tyagi, and Scholz, (2023:68), the authors included five key factors to accelerate the achievement of SDG 6 by 2030, such as governance, financing, capacity development, data and information, as well as innovation. Dehghani *et al.* (2023:68) asserted that combining all five factors globally can attain the SDG target 6 vision for 2030 and beyond. Despite focusing the research on South African local government, the researcher revealed the significance of capacity development in SDG target 6.a – “*to expand international cooperation and capacity-building support to developing countries in water-and sanitation-related activities and programmes, including water, harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies*” (Dehghani *et al.*, 2023:111). Capacity development averts the spread of waterborne infections and improves societal health in rural informal settlements. According to Dahal, Avellán, Haghighi, and Kløve (2023:598), the concept of sustainability is unclear and oxymoronic, which leads to operational difficulties when implemented. Previous studies by researchers such as Fischer, Foord, Frecè, Hillebrand, Kissling-Näf, Meili, Peskova, Risi, Schmidpeter and Stucki (2023:18), Muniz, Da Costa Júnior, Buratto, Nied, and González (2023:2) and Wu, Yang, Lian, Wang, and Kang (2023:1), describe sustainability as an agreeing act between the interconnection of social (group), environmental (ecosystem) and economic (profitability) dimensions. However, without a collective concern for sustainability, policymakers experienced difficulties in translating scientific research outcomes and expert information into effective policies that integrate environmental, social and economic dimensions of sustainability in WASH management. The notion of sustainability can be applied to the South African Human Settlements Housing Projects by addressing housing backlogs and implementing a sustainable human settlement with effective monitoring and evaluating activities (Mvuyana, 2023:2). The White Paper on Basic Household Sanitation of 2001 designates sustainable human settlements as having to have access to the provision of basic services such as WASH, refuse removal and electricity. The Delphi Technique Model is discussed next due to its structured, iterative process, gathering anonymous expert opinions used to achieve a reliable consensus on complex issues where no empirical data or established agreement exists.

2.6.2 Delphi Technique Model

The Delphi Technique Model (DTM) was mainly developed by Dalkey and Helmer (1963) at the Rand Corporation in the 1950s and is widely used for collecting opinions from a group of experts to get a collective or consensus response (Assubayeva, Xenarios, Li & Fazli, 2022:1; Dahal, Avellán, Haghighi and Kløve, 2023:600; Sablatzky, 2022:1; Scarr & Jagnoor, 2024:146; Schneider, Niederberger, Kurowski & Bade, 2024:38). The Delphi method was designed as a group communication process of gathering qualitative information from a diverse pool of experts through discussion of a specific issue for goal setting, policy investigation or predicting the occurrence of future WASH programmes. Rationalisation of the Delphi technique depends on the theory that collective group responses are superior to individual responses. Sablatzky (2022:2) and Assubayeva *et al.* (2022:4) suggested that the Delphi method has been applied in various fields such as drafting white papers, techniques, models, programme planning, policy determinations and as a communication technique to reach agreement on the environmental sciences, including water resources topics. Dahal *et al.* (2023:603) and Sablatzky (2022:3) declared that Delphi mostly used an average of two or three rounds of collecting data, which includes the initial, core and final stages, often applied when there is insufficient empirical data to make valid hypotheses. Naisola-Ruiter (2022:91) summarised four fundamental objectives of the Delphi method derived from Elnasr, Sobaih, Ritchie and Jones (2012:888):

- 1) Collecting and distilling knowledge from a group of experts.
- 2) Achieving consensus and/or gaining judgment on complex matters where precise information is unavailable to underpin a prediction of the future.
- 3) The reliable and creative exploration of ideas.
- 4) The production of sustainable information for critical decision making.

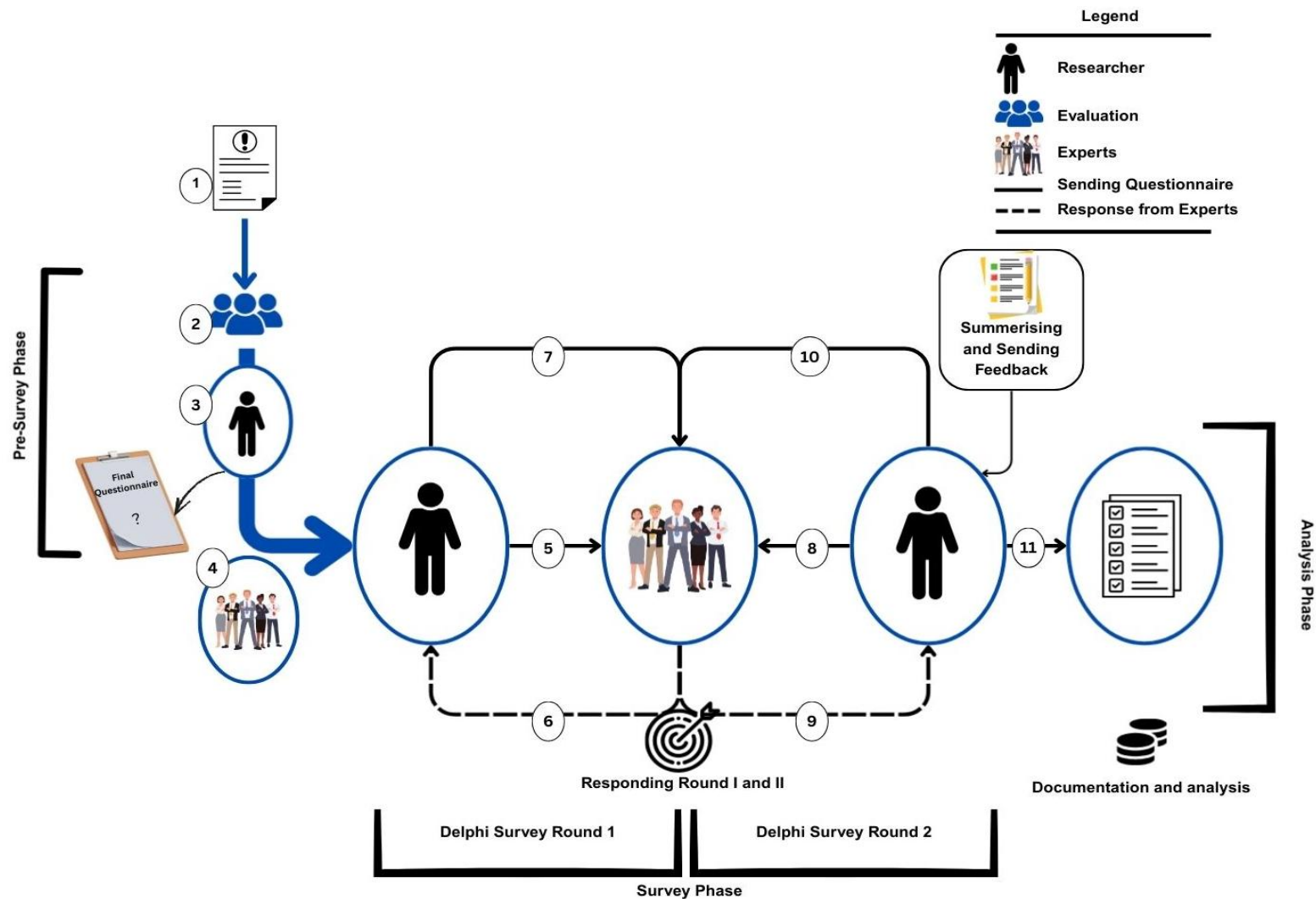


Figure 2.7 The Delphi Method

Source: Dahal *et al.* (2023:602)

2.6.3 Nominal Group Technique

Credible authors, including Afentou, Jackson, Andrade, Elliott, Hull, Shepherd and Frew, (2024:3), Carinanos-Ayala, Zarandona, Durán-Sáenz, and Arrue (2023:1), Ryan, Wenke, Carlini, Weir, Shapiro, Baglot, Tobiano, Sargeant, and Hattingh (2024:4) and Zulkefli, Endut, and Abdullah (2023:351) agreed that Delbecq and Van de Ven (1971) discovered the Nominal Group Technique (NGT) in 1972 as a structured face-to-face group communication. Smith, Cartwright, Dyson, and Aitken (2024:158) and Vahedian-Shahroodi, Mansourzadeh, Shariat Moghani, and Saeidi (2023:838) described NGT as utilising a structured method within groups comprised of selected stakeholders as nominal groups aimed at achieving level of consensus and selecting essential information and solutions for managerial and community problems. The NGT is documented as an effective and efficient method of getting adequate agreement from the groups.

Gladman, Tylee, Gallagher, Mair, Rennie, and Grainger (2020:5) also described how verbal communication between the leader and group participants within the NGT is controlled by the leader to avoid discussion among participants and to ensure all members are considered. During the NGT, participants receive and reflect upon a given question, and the facilitator asks each participant to share ideas with the group. The facilitator generates a group discussion and ranks the discussed ideas amongst the group to reach a consensus. Rationalisation of the NGT decision-making depends on creative solutions from a selected group of participants with varied talents, knowledge and skills aimed at a consensus. The ideal size of an NGT group consists of four to seven participants with two to twenty people per group (Vahedian-Shahroodi *et al.*, 2023:842; Wongprawmas, Sogari, Menozzi & Mora, 2022:2). Carinanos-Ayala *et al.* (2023:2) suggested six stages initiated by Delbecq and Van de Ven (1971) in Figure 2.6, portraying how the NGT model ought to be presented in various groups to prioritise issues and create robust solutions, as voting is anonymous amongst participants; Figure 2.6 clarifies the NGT model.

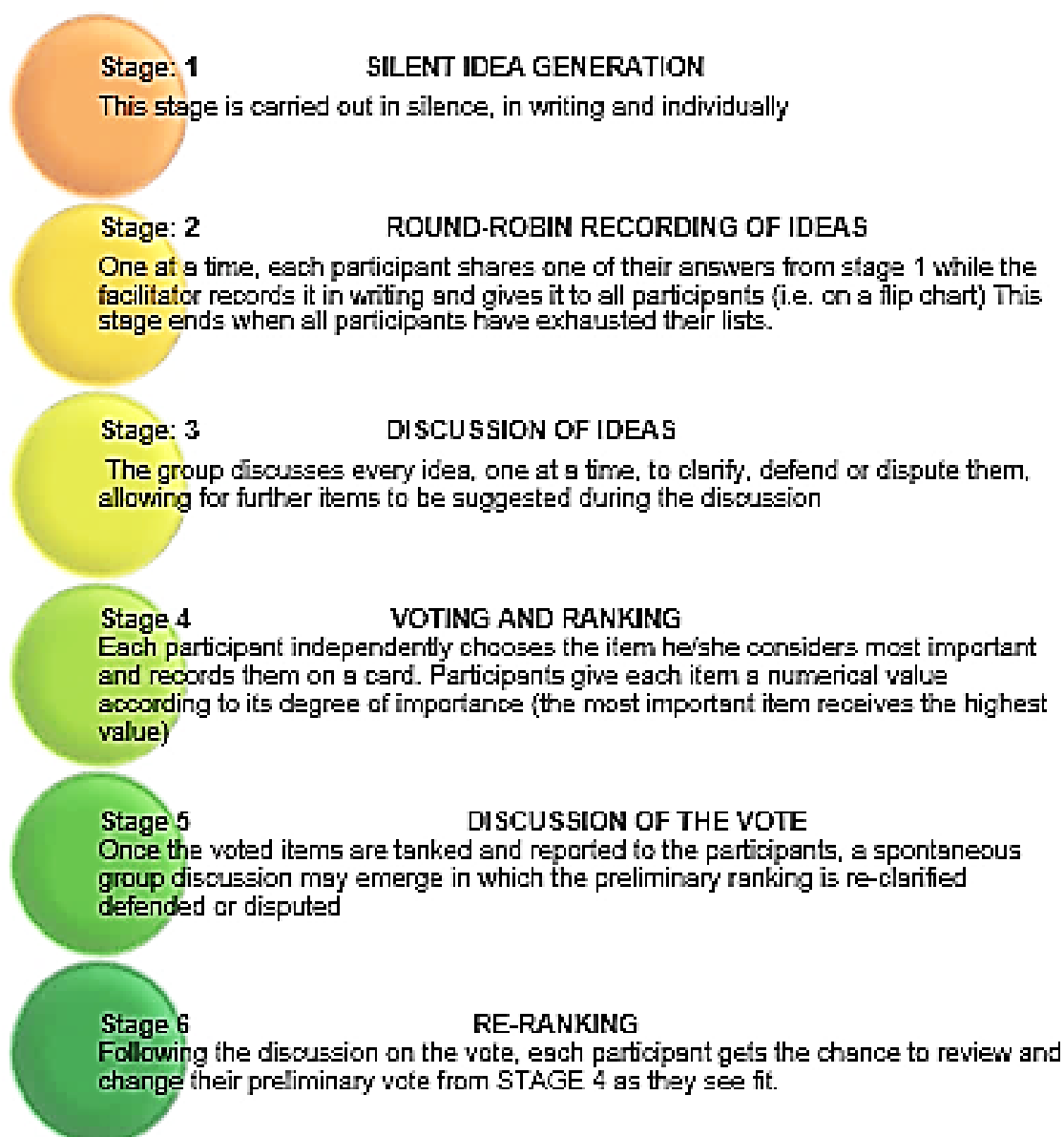


Figure 2.6 Nominal Group Technique stages

Source: Delbecq and Van de Ven (1971)

2.6.4 Discussion of the models

Although diverse models exist, a sustainable governance model should denote community commitment to environmental, social and governance problems by making the right decisions for the community for implementing WASH effectively. The prototypes offer a conceptual approach addressing the sustainable governance model as interconnected group participation aimed at achieving lasting agreement for an

inclusive community comprising children, adolescents, adults and people living with chronic diseases, for capacity development. The knowledge derived from the Delphi and the NGTs are both consensus methods that involve a group of experts or facilitators to generate ideas and determine priorities. Scarr and Jagnoor (2024:145); and Shang (2023:2) asserted that the main difference between the Delphi and the NGT is that the latter is typically used for face-to-face interaction, exploring consumer stakeholders' views, while the former is commonly used to develop guidelines with health professionals and sustainable development initiatives through global formulation strategies.

In the Delphi method, there is no proximity or face-to-face meeting, thus allowing independent experts to provide opinions on the theme of discussion, enabling group communication free from geographical constraints and saving time, money and travel costs. Delphi's method can determine consensus across a global background of individual experts (Sablitzky, 2022:4). The NGT provides more unique and balanced participation between participants, which then increases feelings of accomplishment and greater satisfaction and promotes group effectiveness (Cook, Bailliard, Bent, Bialosky, Carlino, Colloca, Esteves, Newell, Palese & Reed, 2023:2; Vahedian-Shahroodi *et al.*, 2023:842). The Delphi method is categorised as a qualitative research approach. According to Drumm, Bradley, and Moriarty (2022:2235), during the COVID-19 pandemic, Delphi offered a sustainable and practical approach to reaching consensus.

The Delphi technique is a well-established method to answer research questions using the identification of a consensus view across subject experts globally (Cook *et al.*, 2023:8). For the provision of WASH in the rural informal settlements in the Limpopo Province, the nominal method lacks flexibility by being able to deal with only one problem at a time; however, the WASH problems are complex and interconnected. Anonymity and confidentiality are most applied in the research case study and are closely linked while maintaining strict adherence to ethical considerations and the Delphi method allows experts, relevant government officials and external stakeholders, especially for WASH, to provide their opinions anonymously. This eliminates the potential for bias as it is the ideal method for addressing the need to develop a sustainable governance model for rural informal settlements at the CDM in the Limpopo Province.

2.7 CONCLUSION

This chapter focused on RO2 of the study, which was to investigate the theoretical fundamentals of developing a sustainable governance model for WASH with specific reference to existing global models and sustainable governance measuring tools within the CDM. The review of the literature has demonstrated that the theory and practices of public policy have been obstructed with implemented guidelines impacting societal well-being. The challenges have been accompanied by societal participants, whose voices and engagements are inadequately considered for the purpose of human rights and social justice. Similarly, implemented public policies need societal consensus if they are to be efficient and effective.

The Delphi and nominal group models reviewed in this chapter are useful tools but lack evidence for what might be the most beneficial sustainable governance model to promote the provision of wash services for rural informal settlements in the Capricorn District Municipality in Limpopo Province of South Africa. The lack of governance specifically unveils the need for specific actors, including wash public, partnerships and constituencies, to develop their sustainable governance model, which accommodates the communities, especially those in rural informal settlements. The next chapter focuses on the principles, dimensions and approaches that underpin the sustainable governance model of wash in rural informal settlements.

CHAPTER 3:

PRINCIPLES OF SUSTAINABLE GOVERNANCE OF WASH

“Everybody should practice good hygiene.” Nelson Rolihlahla Mandela

3.1 INTRODUCTION

Chapter Two focused on the theoretical fundamentals of developing a sustainable governance model for WASH with specific reference to existing global models and sustainable governance measuring tools. This chapter explores the principles, dimensions, and approaches underpinning the sustainable governance model of WASH as stated in RO1 and outlined in section 1.1. The South African Government implemented numerous legislative provisions on sustainable governance that appear well-suited and adequate on paper. These provisions have shaped the WASH dialogue in the country by embedding democratic principles and dimensions into its framework and discourse. These principles ensure that essential legislation, such as inclusivity and participatory decision-making, are adequately considered in the provision of WASH. Legislative framework encourages inclusivity and participation by legally requiring public consultation, offering a platform for diverse citizen input and creating mechanisms for transparency and accountability in the decision-making process.

Exploring inclusive and participatory WASH legislative principles and dimensions through sustainable governance poses ongoing challenges in postcolonial Africa. While numerous sustainable governance legislative provisions exist, public service transformation and policy implementation remain key challenges for African governments in providing WASH. Scholars across the continent have studied governance and public administration to understand this poor WASH policy implementation and service provision. Okesanya, Eshun, Kuaka, Manirambona, Olabode, Adesola, Okon, Jamil, Singh, Lucero-Prisno III, and Ali (2024:1) and Bose, Bhattacharya, Kaur, Banerjee, Bhatia, Ray, Batra, Mondal, Ghosh, and Mondal (2024:280) have studied how poor governance, such as poverty, malnutrition, climate change, and inadequate financing, interrelatedness, population growth, and ineffective

local community engagement, lead to failure in WASH policy implementation and service delivery. Despite this extensive research on public administration and basic service provision in African nations, sustainable governance remains poorly implemented. In South Africa, research has focused on the role of civil servants and their impact on key governmental priorities related to providing basic services such as WASH. Matloga, Mahole and Nekhavhambe (2024:9) reported that sustainable service delivery in South African municipalities requires the implementation of a structured public participation process and comprehensive consultation with all identified stakeholder groups.

The literature on public administration and provision of service delivery ranges from the apartheid era to the current democratic era, addressing various aspects of public service delivery, particularly the provision of WASH in local municipalities. Chapter 10 of the Constitution and the *Batho Pele* (People First) principles provide fundamental values that govern public administration across various spheres of government. The eight principles are:

- (i) **Consultation:** Involving citizens in decisions about the services they receive.
- (ii) **Service Standards:** Clearly stating the level and quality of service citizens can expect.
- (iii) **Access:** Ensuring all citizens have equal access to public services.
- (iv) **Courtesy:** Treating the public with respect and kindness.
- (v) **Information:** Providing the public with clear and accurate information about services.
- (vi) **Openness and Transparency:** Being open about how services are delivered and how the department operates.
- (vii) **Redress:** Having a clear and accessible system for handling complaints.
- (viii) **Value for Money:** Ensuring services are delivered in the most efficient and cost-effective way.

Moloto and Makalela (2023:174) asserted that the concept of *Batho Pele* can be understood based on these eight principles: consultation, developing service standards, access to information, courtesy, information, openness and transparency, redress and value for money. These principles form a crucial part of the legislative framework that underpins the functioning of public services and approaches towards sustainable governance. *Batho Pele* principles sought to transform public service

provisions, putting the interests of the people of South Africa first and improve the overall functioning of government services, including providing WASH amongst constituencies residing in rural informal settlements. Sustainable WASH governance is essential for public health, human rights and resilient communities. This requires collaboration among stakeholders to ensure equitable access to resources and effective water management, especially under the *Batho Pele* principles. Building lasting infrastructure and capacity is important for addressing future challenges and achieving the SDGs.

3.2 EXPLORING BATHO PELE PRINCIPLES IN THE PROVISION OF WASH

The evolution of the New Public Governance (NPG) is essential but faces challenges due to fragmented state structures in South Africa as the country navigates and explores its post-apartheid democratic journey. Municipalities experience challenges related to poor governance, characterised by corruption, mismanagement and lack of accountability (Mamokhere, 2022a:7). This fragmentation increases the risk of racially motivated abuses in providing basic services (Mofuoa, 2024:4). The foundation for this democratic shift is established in Section 195 of the Constitution. In 1997, the South African Government endorsed the White Paper on the Transformation of the Public Services, introducing the *Batho Pele* principles as the key pillars of governance transformation (Terrance & Oupa, 2023:51).

The eight key pillars of transformation are widely recognised as the *Batho Pele* principles. According to Joel (2022:208), these principles were established by the South African Government under the Mandela administration on October 1, 1997. The phrase *Batho Pele* originates from a Sesotho language adage that means ‘People First’. These principles urge public officials to strive to provide better service delivery to their constituents effectively and efficiently. Specifically, the *Batho Pele* White Paper (Sec. 1.1.1) states that the South African Public Service will be judged by one criterion: its effectiveness in delivering services that meet the basic needs of all South Africans. This is emphasised by the following statement: “Public services are not a privilege in a civilised and democratic society, they are a legitimate expectation, hence meeting the basic needs of all citizens is one of five (5) key programs of the Government Reconstruction and Development Programme (RDP)” (Department of Public Service and Administration, 1997, s. 1.1.1).

Mojapelo, Modiba, and Saurombe (2023:2) explored the *Batho Pele* principles, established in the late 1990s by the Department of Public Service and Administration. These principles focus on enhancing community consultation and collaboration to improve the provision of basic services such as WASH in South Africa. Additionally, Mojapelo et al. (2023:1) reported that these principles were established to ensure a reliable and customer-oriented approach in the South African local government. Zwane and Matsiliza (2022:8) asserted that the lack of public participation among stakeholders in the eDumbe municipality could be enhanced by officials promoting the *Batho Pele* principles. These principles require public servants to achieve their service delivery goals effectively. Public accountability is fostered by treating people as clients and empowering constituencies through the *Batho Pele* principles. The South African Government prioritises providing WASH services ecologically and sustainably to address the needs of its constituencies. Access to WASH is recognised as a basic human right, as water is essential for life and livelihoods (Obaideen, Shehata, Sayed, Abdelkareem, Mahmoud & Olabi 2022:8). Communities depend on government for various basic services and pay for them directly via taxes, thereby having a right to expect adequate services such as clean drinking water and basic sanitation to be delivered effectively and efficiently. Local municipalities must strive to provide basic services as required by the community as customers. Failure to provide essential services leads to service delivery protests in various South African municipalities (Mojapelo et al., 2023:361). The ongoing service delivery protests being recorded is due to the decline in the efficiency of local government in South Africa (Makhaye & Subban, 2024:110).

The provision of service delivery, such as WASH, can be regarded as the paramount function of any government under the *Batho Pele* principles. The national and provincial governments must ensure local governments perform their functions effectively. If the municipality fails, the Member of the Executive Council (MEC) should take over those responsibilities from the provincial level. In this regard, the government explores local government as a key to poverty reduction in the provision of free basic services such as WASH to poor households, especially in rural informal settlements. Local government, being closest to the population, is constitutionally obligated to deliver basic services to the communities. Three decades after independence in 1994, most municipalities have not fulfilled their constitutional and *Batho Pele* principles

obligations to provide good governance. The eight *Batho Pele* principles promote a people-first approach and set the expected quality of service provided to constituencies.

Figure 0.1 Batho Pele principles

Source: Mofuoa (2024:12)



The *Batho Pele* principles adapt private sector service norms to the public sector, prioritising public participation. Enwereji and Uwizeyimana (2020:3) stated that democracy is reinforced by public participation, providing networks for the public to be heard. Hence, it is regarded as an inclusive participation of the stakeholders and constituencies in decision-making and high-quality service delivery. These principles sought to explore two issues: 'putting people first' and that the 'recipients of services be viewed as customers' as conceptualised in the eight *Batho Pele* principles and

aligned with the UN principle of '*A call to Action*', '*Leave No One Behind*' and meeting the Sustainable Development Goals (SDGs) for 2030.

3.3 CONCEPTUALISING BATHO PELE PRINCIPLES

The following section will discuss the *Batho Pele* principles applied in this study. The principles are essential for understanding the context of the research and offer insight into providing WASH as a public service within South African local municipalities.

3.3.1 Consultation

Consultation is the main ingredient for public participation and service improvement and involves engaging communities in decision making about WASH to ensure that services effectively meet their needs and expectations. The SDGs were established through a rigorous consultation process that involved civil society, citizens, scientists, scholars and multinational commercial enterprises. Mamokhere (2022a:28; 2022b:28; 2022c:28; 2022d:28) asserted that the SDG effective governance principle of inclusiveness advocates consultation and promotes zero discrimination and non-racism to achieve SDG-6 in the provision of WASH.

The concept of consultation which embraces community participation such as mass gatherings was prohibited for community consultations during the COVID-19 pandemic which led to a prominent threat to attaining the SDG's targets 6.1 and 6.2 in South African local municipalities (Zindi *et al.*, 2022:7). The concept of consultation involves attitudes, surveys, questionnaires, zoom meetings, road shows and public inquiries with relevant stakeholders like NGOs and Community-Based Organisations (CBOs) (Masiya, Davids Mangai, 2019:31). Rural informal settlements face significant challenges in accessing digital consultation platforms, such as Zoom meetings and online surveys. This limited access highlights the need for improved infrastructure and resources to ensure that these communities can fully participate in digital consultations. Constituencies should be consulted to understand their aspirations, needs and desires when municipalities render WASH services. Molobela (2024:152) reported that consultation implies engaging regularly with the public concerning the quality of public services they ought to render to the constituencies. The concept of consultation forms the basis of governance. Rodriguez and Komendantova (2022:16) refer to consultation as the ability of constituencies to participate in the decision-making process. However, these are often seen as weak forms of participation and

serve as another window-dressing exercise. One can argue that ward councillors are tasked with facilitating consultations within local municipalities, yet their effectiveness varies, resulting in disparities in constituency participation in the planning of WASH service delivery (Lavhelani, 2024:193). This inconsistency highlights weaknesses in both representation and facilitation. Consequently, it creates a disconnect between local and national governance structures, thereby perpetuating a fragmented administrative system. Addressing these challenges is crucial for strengthening governance and ensuring more inclusive and effective service delivery.

One could argue that constituencies often express their aspirations and needs; however, a gap frequently exists between their requirements and the resources available to the national government, especially within the constraints of current service standards for WASH. This challenge necessitates innovative solutions and a collaborative approach to bridge the divide and better align service delivery with community expectations. Arguing against the concept of consultation, Matloga, Mahole and Nekhavhambe, (2024:2) asserted that the South African Government has committed to genuine public participation that empowers citizens' consultation rather than tokenism or manipulation. Bridging the gap in effective WASH service delivery requires concrete efforts to ensure community participation which will empower citizens to engage in municipal affairs by sharing information and influencing public policies through consultations (Bazaanah & Litabe, 2023:24). Despite the lack of public involvement and inadequate WASH service provision in South African local municipalities being major concerns for communities in rural informal settlements in the CDM, it remains vital to implement WASH consultations within the CDM.

However, in rural informal settlements, the absence of consultation deters participation and cooperative relationships between WASH providers and users of public services. It also prohibits constituencies from providing objective evidence to determine the provision of service as their main priority, even as numerous individuals still do not have basic WASH for their households (Tshona, Lungisa & Mgweba, 2025:10). The outcomes are not sustainable as there is a mismatch between what constituencies want and what the national government and the global targets can afford, regarding the service standards in the provision of WASH services. The principles also consider whether constituencies have a choice in terms of the services provided by the

government. Hence, the perspectives of constituencies are normally crucial for improving efficiency and effectiveness in the provision of WASH services.

3.3.2 Service standards

Service standards require national and provincial governments to publish clear guidelines for service quality, including water quality, sanitation facilities and hygiene practices. The regulatory framework plays a crucial role in establishing and enforcing service standards. The Department of Water and Sanitation is the custodian of water service standards and regulations in South Africa. The South African National Standards (SANS) 241 and SANS 30500 are critical regulatory frameworks for water quality and sanitation (Maselela, Mokgobu & Mudau, 2024:2; Sindall, Cottingham, Sutherland, Mercer, Pocock, Arumugam-Nanoolal, Dhlamini, Magwaza, Shoji, Odili & Reddy, 2021:26; Sutherland, Reynaert, Sindall, Riechmann, Magwaza, Lienert, Buthelezi, Khumalo, Dhlamini, Morgenroth & Udert 2021:26). SANS-241 outlines acceptable limits for physical, chemical and microbiological factors in drinking water to ensure its safety for consumption, aligned with the international guidelines set by the World Health Organisation (Luvhimbi, Tshitangano, Mabunda, Olaniyi & Edokpayi, 2022:6059; Ndlangamandla, Sukdeo & Mukwakungu, 2024:1031).

The concept of basic sanitation standards can be seen in terms of the Water Services Act, of 1997 (Act 108 of 1997) which defines 'basic water supply' as the prescribed minimum standard of water supply services necessary for the reliable supply of sufficient quantity and quality of water to households, including informal households, to support life and personal hygiene (Nhokodi, Muntigwende, Maguire, Ristvej, Wilhelmi, & Tandlich, 2023:8). The Act gives legal force to the mandate of the Reconstruction and Development Plan (RDP) for setting national standards and norms for water tariffs (Ncube, 2022:229). These national standards and norms mandated by the RDP are also echoed in the *Batho Pele* principles for effective and efficient service delivery provisions in local municipalities. Apart from the government's implementing numerous service standards and regulations, Chamberlain and Potter (2022:6) indicated that the Free Basic Water Policy (FBWP) was introduced in 2001, connected with a set of regulations that set the national minimum standards for basic water supply as follows:

a minimum quantity of potable water of 25 litres per person per day or 6 kilolitres per household per month at a minimum flow rate of not less than 10 litres per minute, within 200 meters of a household; and which effectiveness such that no consumer is without a supply for more than seven full days in any year.

Despite the endorsement of SANS-241, numerous waterborne diseases have been reported in South Africa and globally due to drinking water contamination derived from unhygienic water sources, especially in the rural informal settlements of the Limpopo Province (Matimolane, Selane & Mathivha, 2024:4). Dr Ruth Segomotsi Mompati District Municipality in the North West Province, lacks adequate water quality service which deters the municipality from maintaining bulk water services standards for the community (Mouton, Motshabi, Jeje & Henrico, 2024:830).

The Water Services Authorities (WSA) should regularly sample water at designated points and frequencies, testing for specific substances to reduce the incidence of constituents drinking poor-quality water in their households. Service standards may define quality indicators and delivery timelines, such as those for handling customer complaints and quality services. For the purpose of effective quality services, municipalities should inform constituencies about the expected level and quality of public services they will receive so that they know what to expect, especially in the provision of WASH (Mnisi, 2023:318).

Everyone involved in the provision of quality drinking water must be familiar with the treatment of raw water according to the SANS-241 standard, which includes coagulation, pH adjustment, flocculation, sedimentation, filtration and chlorine disinfection (Mofokeng, Masuku & Andrews, 2025:25). In ensuring safe drinking water for constituencies, suppliers must effectively monitor the quality of the potable water produced using appropriate tools and methods for the sustainable livelihoods of communities in rural informal settlement in the CDM. The Water Services Act of 1997 (Act 108 of 1997) defines 'basic sanitation' as the prescribed minimum standard of services necessary for safe, hygienic and adequate collection, removal, disposal, or purification of human excreta, domestic wastewater and sewage from the household, including informal households (Twani & Soyapi, 2022:99). The South African Government implemented the Strategic Framework for Water Services of 2003, which

defines basic sanitation services (Kekana, Ruhiiga, Ndou & Palamuleni, 2023:3718) as follows:

a provision of a basic sanitation facility that is easily accessible to a household, the sustainable operation of the facility, including the safe removal of human waste and wastewater from the premises where this is appropriate and necessary and the communication of good sanitation, hygiene and related practices.

In 2019, South Africa became the first nation globally to adopt the International Organisation for Standardisation (ISO-30500), which was merged with the South African National Standard (SANS-30500) for Non-Sewered Sanitation System (NSSS) (Sindall *et al.*, 2021a:26; Sutherland *et al.*, 2021:26). The SANS-30500 standard specifies criteria for safety, functionality, usability, reliability, maintainability and environmental compatibility. The standard ensures that SANS-30500 NSSS-certified technologies are reliable, giving regulators and policymakers confidence in their safety and positive health and environmental outcomes (Akinsete, 2020:8). Additionally, these technologies effectively address basic sanitation needs while promoting sustainability by minimising resource consumption and converting human waste into safe outputs such as the following:

- Safe solid discharge or reuse
- Safe liquid discharge or reuse
- Air emissions
- Odour
- Noise

The relevant service standard for SANS-30500 – NSSS is a prefabricated integrated treatment unit (Neethling, Cottingham & Still, 2023:30). South Africa has adopted safety and performance requirements for design and testing to evaluate and measure the viability of non-sewered sanitation technologies. This standard aims to support stand-alone sanitation systems that address basic sanitation needs while promoting sustainability by minimising resource use, such as water and energy and safely processing human waste. The development of innovative sanitation solution standards is a national priority, according to the Industrial Policy Action Plan (IPAP), the National Development Plan (NDP) 2030 and the *Batho Pele* principles, which are merged within

the SDGs' Vision 2030. To achieve this, the government is expected to issue their service standard for both new and existing services to the constituencies.

3.3.3 Access

Access to clean water, proper sanitation and hygiene promotion are fundamental for human well-being, as they significantly influence health, dignity and overall quality of life. Kasker (2024) asserted that access refers to encompassing physical accessibility, economic accessibility, non-discrimination and information accessibility of potable water. Additionally, access to water is defined as having clean, reliable and equitable household running water. Access to clean drinking water and proper sanitation facilities is a basic human right recognised by goal six of the SDGs of the United Nations (Bazaanah *et al.*, 2024:1044). The target of SDG 6 is to ensure access to water and sanitation for all (Nannan, Neethling, Cois, Laubscher, Turawa, Pacella, Bradshaw & Pillay-van Wyk, 2022:730). While SDG Target 6.1 aims to achieve universal and equitable access to safe and affordable drinking water for all, Target 6.2 aims to achieve access to adequate and equitable sanitation and hygiene for all and end open defecation by 2030 (Arora & Mishra, 2022:271).

In the context of this study, the concept of access to sustainable WASH can be connected to the Bill of Rights in Section 27 (1) (b) of the South African Constitution of 1996, which stipulates that constituencies have the right to 'access to sufficient food and water' (Republic of South Africa [RSA], 1996:1255). This right is further elaborated on by the Water Services Act 108 of 1997, embracing the main objective of providing the right of access to basic water supply and the right to basic sanitation necessary to secure sufficient water and an environment not harmful to human health or wellbeing (RSA, 1997:10). Specifically, the White Paper on Basic Household Sanitation of 2001 embraced the provision of 'access' to basic sanitation services as a local government responsibility (Department of Water Affairs and Forestry [DWAF], 2001:12) as follows:

- *Local government has the constitutional responsibility to provide sanitation services.*
- *Provincial and national governments have a constitutional responsibility to support local government in a spirit of cooperative governance.*

Although South Africa has made significant progress in the water sector, challenges hinder access to water for rural households and equitable distribution (Mpongwana,

Shumba & Bracking, 2022:218). This issue is also noticeable in sanitation, whereby access to appropriate sanitation facilities remains an issue and has been translated into the Free Basic Sanitation (FBSan) policy in which essential sanitation facilities are required to be provided to many residents in informal rural settlements. For many constituencies, especially those in the rural informal settlements in the CDM, access to WASH facilities remains challenging. This statement is reinforced by the findings from the Lepelle Nkumpi Local Municipality of Limpopo Province, whereby rural communities commonly depend on boreholes and shallow wells for water access, while pit latrines are frequently used due to a lack of access to service provision (Bazaanah *et al.*, 2024:14224). Additionally, the pace of basic sanitation provision in South Africa is very slow (Bazaanah, Buthelezi & Afua Kobe Oppong, 2024:2024), particularly in rural informal settlements.

This statement is substantiated by the South African Human Rights Council (SAHRC), which has highlighted that ‘access’ to water and sanitation provisions has been a serious challenge for women and adolescent girls during their menstrual periods (Mamokhere, 2022b:193). Therefore, there is a pressing need for an inclusive and sustainable governance model to address the discrimination and subsequent difficulties experienced by women and adolescent girls. Additionally, despite significant government spending on sanitation, numerous constituencies still lack access to safely managed toilet facilities, resulting in the spread of communicable diseases such as diarrhoea across the country (Murwirapachena & Nyamazunzu, 2024:611). Taking the above into consideration, in terms of the *Batho Pele* principles and an understanding of the sustainable provision of WASH, the government plans to establish targets for improving access to public services and supporting public servants. To achieve this, special programmes such as WASH should be initiated and implemented to enhance services for individuals who are physically, culturally, socially or economically disadvantaged, particularly vulnerable women and adolescent girls.

3.3.4 Courtesy

In addition to the above principles, it is important to treat communities with respect and dignity in WASH service delivery. Courtesy involves providing customer care, including polite interactions and assistance with filling out WASH-related forms. As a governance principle, courtesy significantly impacts the delivery and access to WASH services. When public officials display courtesy, it cultivates trust and cooperation

between service providers and the community in the provision of WASH. The word *courtesy* originates etymologically from the Old French *courtoisie*, itself derived from *court*, referring to the refined behaviour expected within a royal court (Oxford English Dictionary, 2025) and is related to ethical behaviour (Rovida & Zafferri, 2022:37). Empirical research from 1936 has been preserved, indicating that the combination of persuasion and courtesy in advertising was perceived as the most effective in its target groups (Parowicz, 2022:1). Also, by responding to community enquiries with respect and professionalism, even in difficult WASH situations, courtesy should be demonstrated.

Efforts aimed at providing WASH by the local government are riddled with issues such as lengthy service processes and unpredictability of time, making it difficult for the communities in rural informal settlements to get equitable provision of services. Amir, Cavallari, Cavallari, Witjaksono, and Seerasarn (2023:182) indicated that courtesy influences the responses of consumers' wishes to establish contact or a personal relationship. A combination of tangibility, reliability, responsiveness, courtesy, security and competency significantly affects the implementation of good governance.

Kabir, Roy, Begum, Kabir, and Miah (2021:13) stated that the concept of courtesy also incorporates the adoption of improved hygiene practices and has become a symbol of politeness and standard courtesy in WASH behaviours. From a linguistic perspective, politeness can be understood as respectful verbal acts designed to avoid conflicts within a specific community of practice (Isingoma, 2021:7). Professional knowledge in resolving service deficiencies, courtesy and competency are the key measures of the quality of service provided (Wu, 2021:667). Constituencies in rural informal settlements appear to lack such assurance, which can be linked with courtesy, as knowledge and good manners or courtesy is needed in evaluating customers' satisfaction with the provision of WASH for sustainable livelihood.

Courtesy or politeness reflects one's attitude towards others, especially regarding constituencies accessing municipal WASH services. Greeting constituencies with a smile and addressing them by name when providing clear information about WASH services and procedures demonstrates courteousness and politeness. Also, responding to community inquiries respectfully and professionally, even when dealing with difficult WASH situations, denotes courtesy. Therefore, the WASH governance framework will ensure that public servants receive training to interact with the public

courteously and respectfully, treating all community members in rural informal settlements with dignity. Furthermore, public servants should be monitored and discourteous behaviour not be tolerated.

3.3.5 Information

Access to information is essential for assessing the status of WASH provision in rural informal settlements and the country at large. Constituencies should receive information in their native language for better understanding and contact numbers for relevant personnel should be provided for communication purposes (Molobela, 2024:152). Communities may perceive that their needs and concerns are overlooked, leading to frustration and potentially resistance to governance policies. These disparities are especially common in rural informal settlements and marginalised communities where access to WASH information, education and resources is often restricted. Bazaanah and Mothapo (2023:23) and Bazaanah and Litabe (2023:23) reported that municipalities must keep constituencies informed and actively involve them in all levels of planning and decision-making regarding the provision of WASH in South Africa.

The Department of Water and Sanitation (DWS) in South Africa, as the executive branch of the national government, is directly responsible for, the provision of information as the *“water services provider must give information concerning the provision of water services”*, stated in the Water Services Act 108 of 1997 (RSA, 1997:6). The provision of WASH and promotion of access to information in South Africa are based on various pieces of legislations and, more importantly, Section 195 of the 1996 Constitution of the Republic of South Africa. Steyn (2022:350) indicated that South African water legislation speaks to the DWS’ duties to collect reliable information, such as the status of the country’s water resources and the supply and demand. The Municipal System Act 32 of 2000 (RSA, 2000:14) stipulates that the administration of a municipality must *“(e) give members of the local community full and accurate information about the level and standard of municipal services they are entitled to receive.”* Through public participation, members of the community can voice their opinions on local government information for effective governance. Matloga *et al.* (2024:6) asserted that local government must create effective communication channels to ensure that information reaches every member as they can participate in community matters such as WASH.

The concept of 'information' is embedded in the White Paper on Basic Household Sanitation of 2001, as "community members have a strong interest in choosing a level of service for which they are willing and able to pay and in understanding the benefits of such a decision". Making an informed choice and being committed to that choice will only happen if ordinary people participate and have access to relevant information (DWAF, 2001:13).

To conclude, it is the duty of the accounting officer in the Municipal Finance Management Act 56 of 2003 to place information on the municipality website for "(e) *all service delivery agreements*" provided by the municipality (RSA, 2003:86), such as basic water supply, basic sanitation and hygiene promotion. The pieces of legislation are consistent with the South African Constitution, Act 108 of 1996, which states that: (1) Everyone has the right of access to (a) *any information held by the state* (Section 32). As outlined, the municipality ought to provide accurate and timely information about updated WASH services, including water quality and sanitation facilities, to communities, as it is their right to have access to such information.

3.3.6 Openness and transparency

Openness and transparency are considered essential for good governance by many institutions as a prerequisite for inclusive or democratic governance. Transparency is essential for local governance, as it enables citizens to hold institutions accountable for their policies and performance, thereby building trust in government and reducing corruption (Kessy, 2020:195). The South African government, in its efforts to encourage citizen participation in governance, has implemented an open government initiative to advance transparency, empower citizens, combat corruption and utilize new technology to enhance governance (Gegana & Phahlane, 2024:2). Transparency involves clarity and openness, ensuring honesty in all communications, transactions and operations (Naidoo & Ramphal, 2019:255). According to Rodrigues (2022:13), transparency is a contemporary term that necessitates an open public administration ensuring public access to information and allowing public control. The concepts of transparency and openness are essential for responsible and effective functioning and gaining significance in a democratic society. As a democratic government, South Africa ought to establish regulations to ensure accountability and transparency in water and sanitation management (Bazaanah & Mothapo, 2024:1048; Bazaanah *et al.*, 2024:1048). The SDGs can be used as a benchmark to enhance transparency,

accountability and communication in policy making as well as political responsiveness (Assubayeve, Xenarios, Li & Fazli, 2022:10; Erin, Bamigboye and Oyewo, 2022:781; Hambati, 2022:8; MacArthur, Carrard, Koh & Willetts, 2022:7; Martínez-García, Oller, Vincent, Rubiolo, Asiimwe, Muyanja, McGuigan, Fernández-Ibáñez & Polo-López, 2022:11; Rovida et al., 2022:2).

According to Stefanescu (2022:512), transparency and accountability not only build trust but are also believed to enhance sustainable development, with sustainability reporting serving as a key resource. Openness and transparency should be present at every stage of research, resource development and review, not just at the final stage of publishing, to foster a culture of WASH service provision. It is important to know that the transparency of public institutions is essential in the fight against corruption, as it has a significant implication for sustainable service delivery in WASH-related provision. This means that public servants, expenditures, WASH-related issues and performance against standards are disclosed in annual reports.

3.3.7 Redress

Since independence in 1994, under the *Batho Pele* principles, South Africans have sought to redress racial injustices in the provision of WASH services by the apartheid regime. In cases where the government has committed to provide a specific standard of service and fails to meet the standard, it is expected to provide the voters with an apology, a detailed explanation either in writing or in person and to promptly offer an effective remedy (Molobela, 2024:153). Affirmative action in South Africa serves as an interim measure from the Bill of Rights to redress inequalities stemming from the legacy of apartheid through substantive equality. Mamokhere (2022b:193) specified that the human rights-based approach seeks to address inequalities in development, focusing on redressing discriminatory practices and power imbalances that deter progress and leave certain groups behind. These groups include communities in informal rural settlements which still experience an urgent need for past imbalances to be redressed and to achieve broad representation within the core of public administration.

The concept of redress can relate to the Constitution, Act 108 of 1996, which targets low-income households and aims to redress historical injustices by ensuring that everyone has access to safe drinking water and basic sanitation services (Kasker,

2024:12). The redress principle guides public servants in responding to complaints and enhancing the provision of WASH service. Mabotha and Chauke (2023:314) stated that the CDM as a Water Service Authority (WSA) faces significant challenges in the provision of WASH services due to theft, ageing infrastructure and declining water quality. These issues undermine the constituency's rights and dignity as they the community frequently complains and reports bad WASH services provision. Generally, WASH service provision in South African municipalities is increasingly problematic and needs to be redressed. The Polokwane Local Municipality's water and sanitation directorate was criticised after Premier Dr Phophi Ramathuba and Mayor Mr John Mpe demanded immediate action against illegal water connections in Nobody, Ga Mothapo, Megerong and Matshelapata (Sekhwela, 2025).

"We cannot tolerate this any longer", Dr Phophi Ramathuba said, "we plead with our people to stop stealing water. Those selling it illegally must be arrested to send a strong message that will not be tolerated".(Sekhwela, 2025:n.p.)

It is important to create Electronic Municipal (e-municipality) mechanisms for rural informal settlement communities to report WASH-related complaints and receive prompt redress in the Polokwane Local Municipality (Nel-Sanders & Malomane, 2022:4). This will improve the provision of WASH service infrastructures. Figure 3.2 shows an illegal water connection at the Polokwane Local Municipality.



Figure 3.2 Polokwane Local Municipality illegal water connection

Source: Review Observer (2025: n.p.)

3.3.8 Value for money

The term 'value for money' is a poorly implicit concept in practice. Barton, Aibinu, and Oliveros (2019:210) asserted that constituencies frequently make value for money (VFM) choices, either intuitively or through a deliberate process. VFM assessments are used across public, private, commercial and industrial sectors to inform decisions about products, services, systems or organisations. The public and private sectors may assess value for money (VFM) differently due to their distinct values and priorities. While the private sector tends to focus on efficiency, the public sector places greater emphasis on service delivery and equity. This divergence in focus can lead to varying interpretations and approaches to achieving VFM, each aligned with the respective sector's core objectives. Molobela (2024:153) indicated that the value for money principle relates to providing public services effectively and economically, ensuring citizens receive the best possible value. Harris and Lawson (2022:1101) reported that attaining VFM in the public sector means ensuring public resources are used effectively to create and maximise public values. In terms of Public Administration, Chapter 10 Section 195 (1) (b) of the South African Constitution of 1996, a public

administrator should utilise government resources effectively, efficiently and economically.

The main concept in conceptualising VFM is commonly referred to as the four 'Es', which are highly interrelated. These 4 Es are regularly labelled as '*economy*' – getting the right inputs at the lowest costs or getting a good deal; '*efficiency*' – getting the most from the inputs or getting a lot for the efforts; '*effectiveness*' – getting the expected results from the outputs or doing the right things (Mamokhere, Musitha & Netshidzivhani, 2022:5). Additionally, this study includes '*equity*' – getting the right equity in rendering services or fairness in rural informal settlements. To effectively incorporate economy, efficiency, effectiveness and equity into WASH services, a comprehensive multi-stakeholder approach is essential. The main objective is to maximise the health, social and economic benefits of WASH for everyone, particularly for the most vulnerable women, adolescent girls and marginalised communities. Bose *et al.* (2024:278) indicated that the provision of improved WASH practices is essential for promoting a healthy lifestyle and has been shown to positively affect the **economy**.

Collaborations among governments, NGOs, private sector entities and communities promote resource sharing for long-term infrastructure development and maintenance. John and Ajibade (2024:5), Mynott and Kager (2024:5), Okesanya *et al.* (2024:5) and Riskind (2024:5) emphasised that adopting advanced technologies like affordable sanitation solutions and smart infrastructure can improve the **efficiency** and **effectiveness** of WASH systems. This improvement relies on consistent funding, strong governance and a collaborative multi-stakeholder approach. Mustapha, Laniyan, Reigns, Birke, and Zawide (2024:1) reported that a pathway to **equity** in WASH in Africa is perceived in challenges and opportunities, such as enhancing multi-stakeholder collaboration and investment in WASH programs, involving communities in program design and implementation, focusing on capacity building and local production of WASH equipment and reviewing policies and improving the transfer of WASH data and information.

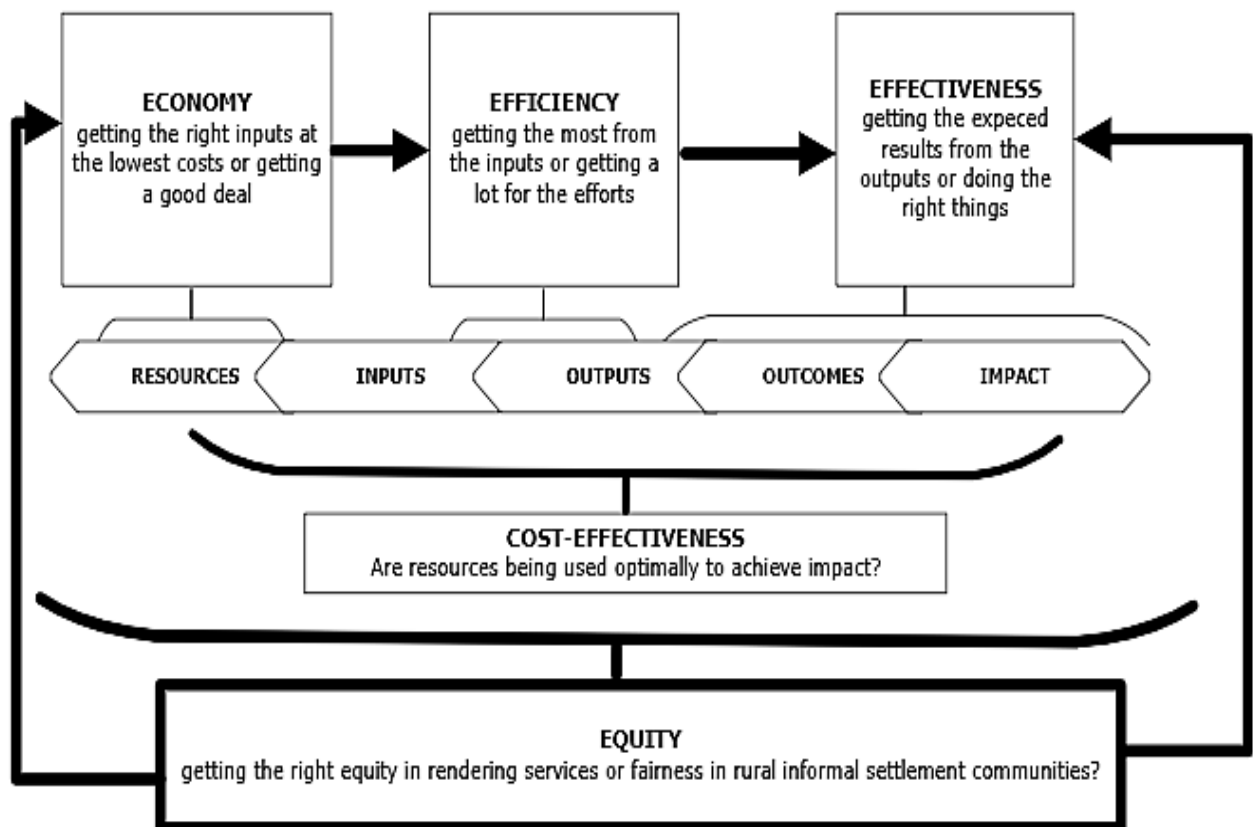


Figure 3.3 Conceptual framework for VFM

Source: Adapted from Harris and Lawson (2022:1102)

The concepts of economy, efficiency and effectiveness contribute to the overall assessment of cost-effectiveness, while equity ensures a positive impact on disadvantaged groups, such as the rural informal settlement communities, in the provision of WASH projects. The four Es framework makes VFM analysis essential for policymakers, such as WASH expenditure reviews focusing on ‘economy’ and ‘efficiency’ in evaluating the relationship between spending inputs and outputs. Impact assessments evaluate effectiveness and analyse the relationship between outputs and outcomes, while distributional analysis addresses issues of equity or fairness. Economy and efficiency are crucial in managing ongoing programs and in the day-to-day administration, as they support the achievement of VFM, while it is essential to use resources effectively for good governance and ensure fair and equitable WASH distribution as mandated by the Constitution of 1996. Molobela (2024:153) specified that the value for money principle relates to the efficient and economical provision of public services, ensuring that constituencies receive the best possible value. In this

study, constituencies ought to pay WASH municipal rates and other taxes to finance the administration government and they have the right to insist that public money be utilised properly in the provision of WASH services. Therefore, the government owes constituencies proof that WASH services are improved and provided effectively.

3.4 AN OVERVIEW OF SOUTH AFRICAN WATER, SANITATION AND HYGIENE LINKAGES AND APPROACHES WITH DIMENSIONS OF THE 2030 AGENDA

Inadequate infrastructure, substandard housing and resource theft have left many South African communities, both rural and urban, struggling with limited access to basic WASH services (Shayamunda, 2024:57). With less than five years remaining to attain the Sustainable Development Goals (SDGs), the world is not on track to meet SDG 6. While some progress has been made, it has been deeply uneven and the universal access to safe drinking water, basic sanitation and hygiene (WASH) by 2030 remains a distant goal for most, including in South Africa. Policymakers and implementers in the WASH sector face challenges as they seek to establish a new direction.

Inadequate access to WASH is linked to the disempowerment of women and adolescent girls, negatively affecting their well-being. Social justice principles are not upheld in this instance. The appropriate paradigm to discuss social justice is New Public Administration (NPA) because it emphasises values such as social equity, responsiveness and citizen participation. The lack of WASH infrastructure and services increases the risk of gender-based violence, although their presence does not eliminate it. The role of gender is part of a broader social identity. Nunbogu and Elliott (2022:2) asserted that in South Africa, the term 'liquid violence' illustrated how neoliberal water policies, combined with unequal power relations, have dispossessed marginalised populations from water, leading to systemic harm to their bodies.

As it stands, poor governance in South Africa has resulted in scarcer provisions for women and adolescent girls in poor rural households, schools and smallholders feeding their families, making it almost impossible for girls to go back to school (Rudolph, Muchesa & Sibanda, 2024:94). The inadequate quantity and quality of WASH in South Africa, disproportionately affects women and adolescent girls, impacting their safety, sustainable livelihoods and life-long opportunities. The significant presence of women

and adolescent girls in rural informal settlements has resulted in the government's gender equality policies failing to effect substantial change in the demographics related to women's emancipation from poverty and exclusion. According to Tseole, Mindu, Kalinda, and Chimbari (2022:14), the evaluation of the WASH conditions in South Africa reveals that these conditions do not meet the standards outlined in SDG 6.1 and 6.2 for access to water and sanitation for all.

Achieving SDGs 6.1 and 6.2 requires that the key factors necessary for providing equitable water, basic sanitation and hygiene promotion and eliminating open defecation be fully understood by 2020. Momberg, Voth-Gaeddert, Richter, Norris, and Said-Mohamed (2022:4) reported that a recent study in South Africa found that early exposure to specific WASH risk factors and nutritional status from birth to one year of age has varying effects on child development at different ages. The majority of individuals experiencing undernutrition and malnutrition reside in rural informal settlement communities in South Africa. The access, use and control of WASH are intertwined within a complex web of sociocultural and political networks that shape social relationships at various scales. Mutyambizi, C Mokhele, Ndinda, and Hongoro (2020:19) indicated that, despite informal settlements being upgraded, satisfaction with the provision of basic services in South Africa is low, especially compared to urban and rural areas, as informal settlements experience inadequate access to the provision of WASH. These upgrades affect communities residing in informal settlements, which often experience significant, rapid population growth, extreme poverty, high unemployment, crime, inequality, lack of health service provisions and a lack of basic services in the provision of WASH, especially for those without secondary education. Mokhele, Mutyambizi, Manyapelo, Ngobeni, Ndinda, and Hongoro (2023:12), demonstrated that the rapid growth of informal settlements in Gauteng, Western Cape and KwaZulu-Natal provinces underscores the need for developing health interventions, including programmes aimed at reducing illnesses and injuries, such as those related to inadequate WASH. Hlengwa, Malahlela, Mothapo, and Mathivha (2025:2) stated that, despite government efforts to provide basic services, informal settlements continue to exist, resulting in inadequate infrastructure for constituencies, particularly those residing in the Gauteng province, unlike those in the Limpopo Province. It is evident that, the health of individuals in the informal settlements is a growing concern due to inadequate housing, overcrowding, poor

WASH and lack of essential services in South Africa. The map of the informal settlements in the country is illustrated in Figure 3.4, which indicates that Gauteng province has the highest number of informal settlements compared to other provinces.

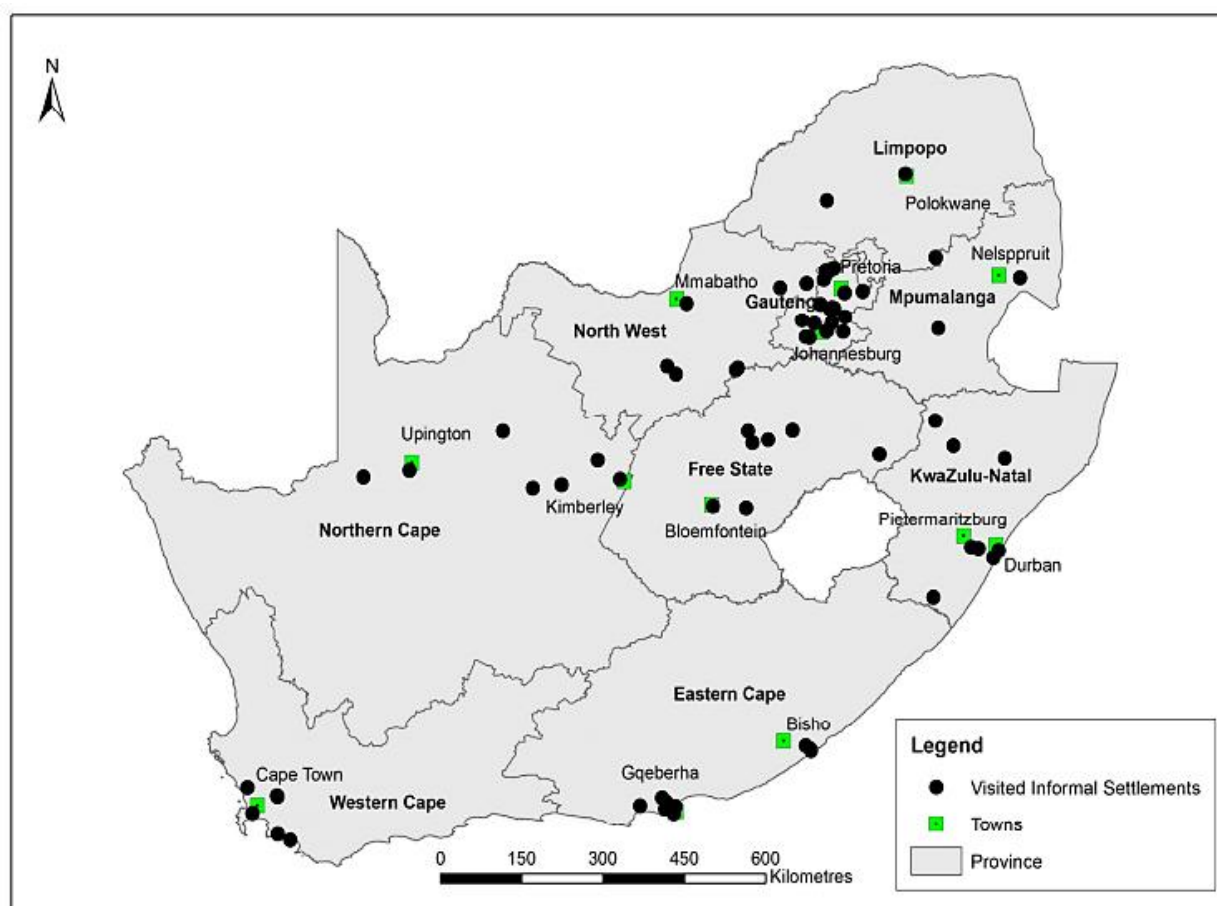


Figure 0.4 Informal settlements in South Africa

Source: Mokhele et al. (2023:4)

3.5 CONSOLIDATING WASH APPROACHES AND DIMENSIONS

South Africa's consolidated approach towards the provision of WASH requires a multi-faceted strategy that includes national policies aimed at ensuring equitable access to safe drinking water and sanitation facilities. The provision of WASH facilities are in a deplorable condition. Competency in bureaucratic structures deters the provision of WASH infrastructure and Bazaanah and Litabe (2023:4) specified that an elitist, top-down decision-making approach appears to have failed to provide optimum services in the municipality. The quality, speed and efficiency of numerous WASH infrastructures have not aligned with the level of dimensions. However, local governments face major challenges, including bureaucratic inefficiencies, social

justice values and individualism, which often deter their ability to effectively meet constituents' constitutional needs. Adom and Simatele (2024:68) reported that numerous related barriers pose constraints to implementing water, sanitation and hygiene (WASH) policies and strategies globally and more particularly in Africa. This has led to the dismantling of bureaucratic barriers in the provision of WASH in South Africa. Tseole *et al.*, (2022b:14) identified key obstacles to improving WASH practices, including rurality, climate change, low investment in WASH infrastructure, inadequate knowledge of waterborne illnesses and a lack of community engagement. However, dismantling bureaucratic obstacles requires focusing on efficiency, social justice and individualism to address the disproportionate impact on vulnerable groups, such as women and adolescent girls, in the provision of WASH in South Africa.

Shoniwa and Thebe (2020:533) indicated that the state's top-down planning has led to non-intervention policies, systematically excluding informal practices and leaving informal settlement communities to manage their own sanitation. Empowering local government and WASH management agencies with autonomy and resources enables faster responses to community WASH needs. Kaziboni (2024:60) showed that the implications of water scarcity are closely linked to the legacies of colonialism and apartheid, which systematically marginalised black communities and restricted their access to WASH resources. Within the NPG, securing women's access to WASH services is crucial, focusing on SDG 6. Hlahla (2022:4) specified that the WASH sector can help address inequality and significantly improve the social, political and economic status of women. Generally, individuals who are denied access to improved WASH services face reduced opportunities to realise their potential. Providing access to WASH is essential for women, and for adolescent girls who often miss school, which negatively affects their education (Hlahla 2022:3). Inefficient administrative processes, poor resource management and a history of inequality contribute to these ongoing obstacles in WASH provision in South Africa.

3.5.1 National government dimensions

WASH governance, as a cornerstone of sustainable development, requires a coordinated national approach that integrates policy, institutional frameworks and strategic implementation. The national government plays a critical role in shaping WASH outcomes through legislative mandates, resource allocation and collaboration across various sectors. This framework ensures the efficient delivery of services and

helps to prevent fragmentation in service provision at local and provincial levels. The national government approaches towards the provision of WASH are linked with various institutions such as the National Water and Sanitation Master Plan (NW&SMP) and the National Development Plan which focus on the achievement of goals linked to the SDGs for the water and sanitation sector in South Africa by 2030 (Makanda, Nzama & Kanyerere, 2022:8). The National government role is crucial for WASH in South Africa due to its constitutional mandate, effective policy and planning, financial allocations, regulatory oversight and development and management of large-scale infrastructure. In 2008, South Africa introduced the Blue Drop and Green Drop Certification Programmes to enhance drinking water quality and sanitation management through Wastewater Treatment Plants (WWTPs), with implementation commencing in 2009 (Kruger, Pieters, Horn, Van Zijl & Aneck-Hahn, 2022:84050). The Green and Blue Drop serve as a key dimension in the government's water and sanitation sector, functioning as an institutional framework designed to achieve equitable access, sustainable development and national policy objectives. Luyaba *et al.* (2024:26) highlighted the critical national government perspective on the suboptimal state of municipal water and sanitation services from 2019 to 2024, clearly indicating that municipalities are facing challenges with the Green Drop in South Africa. The dimensions and approaches of WASH in South Africa are shown in Figure 3.5 below.

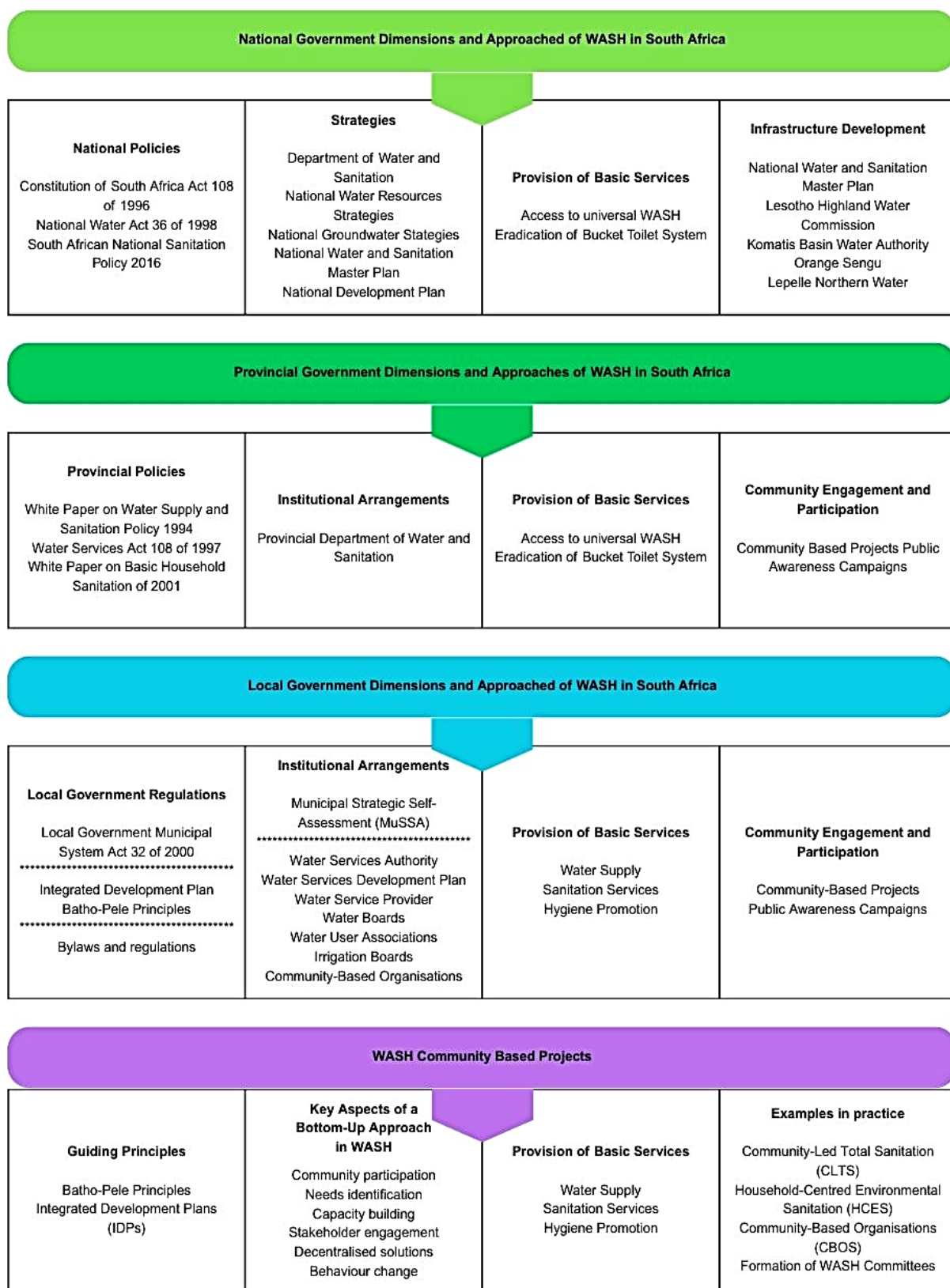


Figure 30.5 Dimensions and approaches of WASH in South Africa

Source: Author's own compilation

The dimensions and approaches of WASH in South Africa, as shown in the image above, demonstrate a hierarchical structure following a top-down approach from the national government to the local government, where national policies and strategies guide the implementation of WASH services at both provincial and local levels. The diagram emphasises the importance of policy and regulatory coherence. It suggests that national policies, such as the Constitution and the Water Services Act, establish the legal foundation for WASH services, with provincial policies interpreting these laws within their regional context. This ensures consistency in implementation while allowing for regional specificity. The diagram also highlights the need for institutional coordination.

In this regard, the DWS must develop macro-level strategies, while provincial and local authorities are responsible for implementing them. This coordination is essential to ensure that policies translate into tangible outcomes at the service delivery level. Another important aspect reflected in your diagram is the alignment between service delivery and national objectives. While national plans aim for universal WASH access, implementation occurs at the municipal level through water supply and sanitation services. This highlights the need for harmonised efforts between national and local authorities to achieve these goals. Hove, D'Ambruoso, Twine, Mabetha, Van Der Merwe, Mtungwa, Khoza, Kahn and Witter (2021:1) indicated that, despite commitments to participatory water governance in South Africa, progress in improving water infrastructure for marginalised rural communities has been limited and five million South Africans still lack access to safe drinking water. Municipalities should establish community forums that involve residents in planning and decision-making to ensure transparency regarding WASH policies and challenges in rural informal settlements.

Mukonavanhu and Nel-Sanders (2024:735) indicated that the DWS is responsible for promoting the effective and efficient management of water resources to support sustainable economic and social development. Regardless of the shortcomings in South Africa's water and sanitation infrastructure, effective management of water resources is crucial for ensuring human security, as well as food and ecological stability. The Municipal Strategies Self-Assessment (MuSSA) assesses the business health of a Water Services Authority (WSA) by identifying vulnerabilities in key business attributes. This helps municipalities allocate resources more effectively and

allows the Department of Water and Sanitation (DWS) to provide targeted support (see Figure 3.6 below).

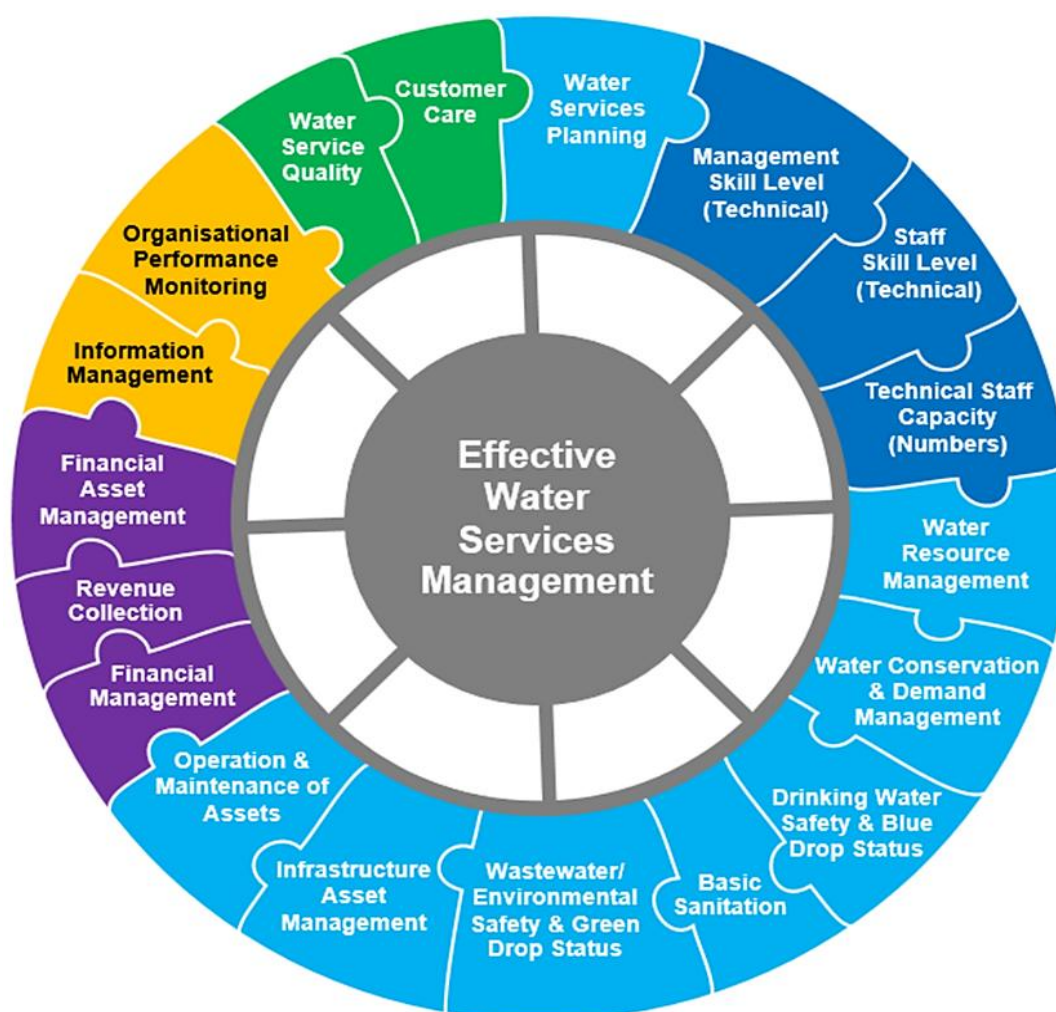


Figure 3.6 Municipal Strategies Self-Assessment (MuSSA)

Source: Luyaba *et al.* (2024:2)

Matlala *et al.* (2024:1080) stated that the MuSSA framework evaluates a municipality's vulnerability using a composite vulnerability index (VI) based on 16 business health attributes related to WASH services. Out of the 16 characteristics in the VI, revenue collection, financial management and asset management are directly linked to the ongoing concern status of any municipality. For the purpose of this research, MuSSA supports the Blue and Green Drop regulatory initiatives and has identified threats to sustainable service provision in WASH. The MuSSA has developed local, regional and national strategies to address the measures required to close the WASH 'sustainability

gaps'. This framework will significantly enhance the local government Turn-Around Strategy and serve as the basis for municipal interventions, whether from a 'quick win' or long-term sustainability point of view across provinces in South Africa.

3.5.2 Provincial government dimensions and approaches of WASH

The success of WASH initiatives depends on provincial governments, as they play a central role in adapting, implementing and ensuring the effectiveness of national policies on the ground implementations, especially in cases where municipalities lack capacity. The researcher focused on the White Paper on Basic Household Sanitation of 2001, as the cornerstone of the municipal setting in the provision of WASH. It has been highlighted that the provincial government plays a crucial role in assisting local municipalities in attaining their sanitation goals by providing financial, technical infrastructure and human resources support (DWAF, 2001:21-22). Norvixoxo *et al.* (2023:1751) argued that monitoring of sanitation provision is one of the primary roles of the White Paper on Basic Household Sanitation of 2001, which does not adequately address reporting crises that pose potential national health risks in various provinces, including the Khayelitsha informal settlements in Cape Town.

The White Paper on Basic Household Sanitation of 2001 highlighted the need for strategic intervention and the importance of community participation in addressing household sanitation infrastructure challenges in South Africa, especially in rural informal settlements (DWAF, 2001:35). This policy aims to improve health and hygiene by ensuring adequate sanitation facilities in households, schools and clinics, as well as promoting proper waste collection and disposal practices. The provision of sustainable and proper infrastructure is critical for the provision of WASH services. MuSSA has been developed by the DWS to reflect the health status of the 144 Water Services Authorities (WSAs) in South Africa and allows them to assess themselves based on 18 attributes developed by the Department (Seitlholo, 2024:653). The MuSSA offers information about provinces using a scale ranging from very high to low vulnerability. This allows municipalities to plan effectively and allocate their WASH resources to areas that need attention. Subsequently, it enables the DWS and the sector to provide more targeted support for the provision of WASH basic services to constituencies.

Luyaba, Moyo, Mbhele, and Mochotlhoane (2024:1) reflected on the critical condition of municipal water and sanitation services from 144 WSAs between 2019 and 2024, indicating high vulnerability from a municipal perspective in the Limpopo Province. Additionally, from 2019 to 2024, the top five recurring challenges were financial asset management, wastewater and environmental compliance, revenue collection, operations and maintenance of infrastructure assets and infrastructure asset management. Luyaba *et al.* (2024:6) also specified that the performance evaluation shows that the operations and maintenance of infrastructure assets are inadequate and require immediate attention regarding both financial and skill levels. This is needed for South Africa to ensure that the majority of constituencies have access to sustainable WASH basic services.

For the purpose of this research, the positive impact of MuSSA is that the WSAs can assess their performance, identify areas needing improvement, compare themselves against peers and monitor trends over time in the provision of WASH services. The results are compiled into regional summaries to help benchmark risk and vulnerability across municipalities in each of South Africa's nine provinces. This process assists provincial and national departments in implementing monitoring supportive interventions by identifying the most vulnerable municipalities and addressing regional issues. Given the fact that this research focuses on communities in rural informal settlements, it is imperative to focus on the dimensions and approaches of WASH in the local government to properly ground the need for developing a sustainable WASH model for the CDM.

3.5.3 Local government dimensions and approaches of WASH

Access to sanitation services in local government remains unequal, as evidenced by incidents of children falling into pit latrines. Although bucket-toilet systems, considered unimproved sanitation, are still used, they exist in very few households, especially in rural informal settlements. Seitholo (2024:651) indicated that some provinces are still using the bucket system for sanitation, despite the DWS' efforts to implement the Bucket Eradication Programme (BEP), though municipalities continue to provide bucket services to constituency households. Norvixoxo *et al.* (2023:1750) reported that according to the White Paper on Basic Households Sanitation of 2001, sanitation provisions and practices in the informal settlements of Masiphumelele Wetlands are inadequate and unhygienic for the constituencies. The adoption of alternative non-

sewered sanitation solutions that are off grid is essential for enhancing the provision of sanitation services. The first legislation to define basic sanitation was the Water Services Act 108 of 1997. This act also stipulates that Water Services Authorities (WSAs) are responsible for ensuring access to water services in the local municipalities. As there can only be one WSA, for this research, the focus is on the CDM responsible for the provision of WASH in the local municipalities.

The MuSSA aims to assess vulnerability and identify areas for improving reliable water and sanitation services using the MuSSA “Spider Diagram”, focusing on local government across nine provinces. The results of MuSSA are displayed to each municipality using easy-to-understand, colour-coded “Spider Diagrams” that clearly show the risk and vulnerability status of the municipal water quality management risk profile. Matlala *et al.* (2024:1081) indicated that out of the 18 Vulnerability Index (VI) attributes, such as water and sanitation services planning, drinking water safety and regulatory compliance, basic sanitation, operations and maintenance of assets and water and sanitation service quality, are related to this study and there are remedial measures stipulated in the MuSSA report that the municipalities are expected to implement as part of the municipal priority action plans (MPAP). See MuSSA “Spider Diagram” in Figure 3.7 below for the Capricorn District Municipality 2024.

Municipal Strategic Self-Assessment of Water Services (MuSSA) (2017)

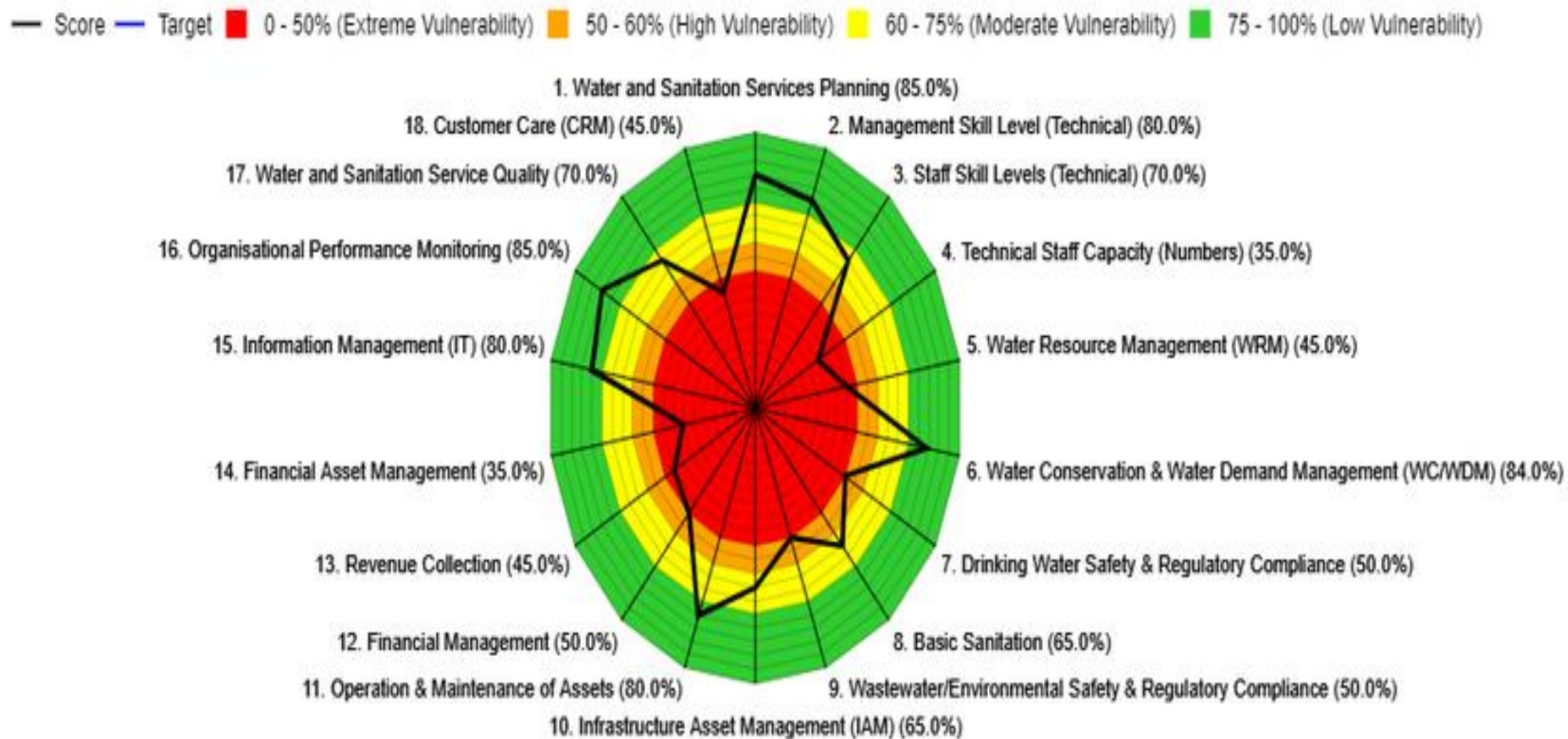


Figure 3.7 MuSSA "Spider Diagram" for Capricorn District Municipality 2024

Source: DWS website: Capricorn District (DWS, 2024)

In South Africa, various initiatives have aimed to address WASH challenges and master plans, although their effectiveness has been undermined by inadequate planning and poor implementation of policies and legislation. Jalisa (2024:2) asserted that the WSAs are required by the DWS to voluntarily assess their current performance and expected future performance in providing water and sanitation services as part of the MuSSA. The WSAs are required by legislation to develop the Water Services Development Plan (WSDP) to ensure structured planning by integrating information related to the provision of WASH services. The MuSSA “Spider Diagram” process is a collaborative four-step cycle involving senior municipal officials inputs from officials within Technical Services, Finance and Human Resources and the DWS, such as analysing the current situation, determining methods, creating a municipal priority action plan and monitoring the progress and providing support where it is most needed (DWS, 2024). The MuSSA steps are linked to the MPAP, which consists of the following:

- Step 1:** Analyse the current situation via the MuSSA with the WSA, DWS, to prioritise the WSA and improve targets.
- Step 2:** Determine the approaches to achieve the desired improvements.
- Step 3:** Set actions to achieve improved targets.
- Step 4:** Monitor, evaluate and communicate progress while updating the MuSSA with the WSA and the DWS regional office in the provision of WASH.

For the purpose of this research, the MuSSA serves as the vital tool for the provision of WASH to help identify key vulnerabilities and benchmark their performance against peers, monitor trends and develop the MPAP. This approach assists municipalities in allocating resources effectively and improving the provision of basic services and promoting WASH community-based projects.

3.5.4 WASH community-based project

Informal settlements in South Africa are facing inadequate housing challenges, which lead to poor living conditions where constituencies struggle with limited access to WASH services, solid waste accumulation, frequent shack fires and safety risks (Marutlulle, 2021:9). Constituencies reported that some individuals still engaged in open defecation. Schenck, Tyrrell, Grobler, Niyobuhungiro, and Kimani (2024:3) reported that some women and adolescent girls often dispose baby diapers as general

waste together with domestic waste in the municipality refuse collection services, which are ultimately taken to a landfill site. Slekiene, Swan, and Kalina (2024:2) specified that waste recycling, including baby diapers and feminine hygiene products, are often not recycled but are usually dumped or buried in landfills, especially in low-income communities, such as the informal settlements. In South Africa, there is no established waste management plan that includes resource recovery from used disposable diapers other than incineration and landfilling. Poor sanitation facilities and infrastructure, along with unhygienic practices, contribute significantly to South Africa's sanitation challenges.

In terms of community-based participation, the WASH education project is equally critical for the promotion and acceptance of WASH, as numerous constituencies are not aware of the causes of water contamination and the health effects of open defecation or littering. Ono and Adrien (2024:2) specified that the term community participation refers to the active involvement of voters in upgrading programs for informal settlements, which are recognised as best practices globally. The Upgrading Informal Settlement Programme (UISP) aims to enhance the lives of voters in informal settlements with minimal disruption to their livelihoods and social connections (Maganadisa, Letsoko, & Pretorius, 2021:111). This highlights the fact that most WASH projects in the urban areas are often built by poor people, emphasising the need to empower these communities residing in rural informal settlements. Community participation is essential for understanding the user needs and promoting affordability. Mamokhere (2022:7) specified that the provision of services in South African municipalities is governed by the Local Government: Municipal Structures Act 117 of 1998 and the Local Government: Municipal Systems Act 32 of 2000, which mandates that local municipalities provide essential services and ensure public participation in the decision-making process. To ensure sustainability and achievability, constituencies should be involved as partners and stakeholders in the upgrading process. Participation should involve ward committees, Community Development Workers (CDWs), ordinary community members and other relevant stakeholders such as NGO and WASH field experts (Maganadisa *et al.*, 2021:114).

Taking the above into consideration within WASH, an understanding of community participation, the provision of basic services and their legislative powers, responsibilities and functions are necessary. As indicated in item 3.2 regarding the

complaints about illegal water connections in the Polokwane Local Municipality, this unscrupulous practice limits both the quantity and quality of water available to the constituencies, as enshrined in the Constitution. Thus, the provision of water will be restricted in the rural communities of Nobody, Ga Mothapo, Megerong and Matshelapata due to the vandalism of the main infrastructure designed to regulate water within the Limpopo Province, specifically in the CDM.

The Premier of Limpopo Province, Dr Ramathuba, stressed the need to protect water infrastructure to ensure communities have access to clean water. Therefore, the Water services providers (WSP) should also take note of the fact that only individuals with permits to source water will be allowed to operate in the mentioned communities and anyone found selling water without permission will face severe legal consequences. Hence, the participation of constituencies in informal settlement upgrading, known as community participation, is pivotal for the prevention of WASH illegal connections.

3.6 CONCLUSION

Access to the provision of WASH involves human rights and hygiene promotion and the provision of proper water infrastructure in this regard would be lifesaving. The responsibility for the provision of WASH in South Africa is shared among the national government, provincial governments, water boards and municipalities. The South African Government faces a significant gap between policy formulation and the implementation of WASH-related public policies and directives, such as the *Batho Pele* principles. Implementing the *Batho Pele* principles and ensuring local government meets constituencies' needs and constitutional obligations is a significant challenge for many municipalities. This has led to rising constituency demands and increased WASH service delivery protests. Local government has increasingly been linked to financial mismanagement, corruption and non-compliance with financial regulations. These issues, along with a general lack of good governance, contribute to poor performance and hinder the provision of essential services such as WASH. Additionally, they undermine key transformation priorities such as the *Batho Pele* principles. Incorporating the MuSSA within the CDM is relevant to the known WASH challenges such as ageing infrastructure, financial stability, skills shortages and poor planning. The public officials within a municipality and the constituencies need to be updated about relevant knowledge of the WASH infrastructures in the municipality to

prevent service delivery backlogs, inefficiencies and protests. Global policies, legislation and WASH-related strategies link to the transformation of WASH in South Africa. The next chapter focuses on the socioeconomic characteristics of rural informal settlements regarding WASH in the CDM as a proposed sustainable WASH governance model.

CHAPTER 4:

SOCIOECONOMIC CHARACTERISTICS OF WASH

4.1 INTRODUCTION

Chapters 1 and 3 focused on introducing the study, detailing research objectives, analysing the conceptual framework for WASH and investigating sustainability theory and models. The Delphi Technique Model and the Nominal Group Technique were reviewed to assist in developing the governance model to promote the provision of WASH services for rural informal settlements in the Capricorn District Municipality (CDM) of the Limpopo Province. In this chapter, the current state of the provision of WASH in the Limpopo Province is discussed. This is done to address RO3 of this thesis: to examine the socioeconomic and psychosocial behaviours related to the provision of WASH in the CDM.

This chapter also discusses the psychosocial well-being and socioeconomic characteristics of communities in rural informal settlements and how they relate to accessing the provision of WASH using the Theory of Planned Behaviour (TPB) and the Risk, Attitude, Norm, Ability and Self-regulation (RANAS) framework. The TPB and RANAS framework analysed how socioeconomic characteristics might affect the psychosocial well-being of women in the provision of WASH and support household creative ability and self-regulation in operating WASH services.

4.2 AN OVERVIEW OF THE SOCIOECONOMIC CHARACTERISTICS OF WASH

Developing a sustainable governance model for WASH should be guided by a strong theoretical foundation, such as the New Public Governance (NPG) model (Denhardt & Denhardt, 2000:549), which emphasises inclusivity, democratic values and participation of citizens in governance processes. Unlike traditional models, the New Public Service (NPS) shifts the focus from hierarchical or top-down administration towards a collaborative and people-centred approach. This approach centrally positions communities as active participants in shaping the delivery of WASH services. Within the context of water, hygiene and sanitation, the NPS and Sustainable

Governance Model proposed in this study provide a lens through which equity, fairness and sustainability in access to WASH services can be examined. This perspective recognises the importance of citizen engagement and participatory decision making as strategies for fostering accountability and responsiveness to local needs, especially for people in economically constrained communities.

The theoretical models being proposed also highlight the role of public managers, not merely as implementers of policy, but more importantly as facilitators and enablers who empower citizens and strengthen community participation. In addressing gender disparities, the NPS and Sustainable Governance Model framework underscore the principle of social justice, ensuring that women's perspectives and contributions are meaningfully integrated into WASH governance structures. Additionally, it acknowledges pluralism and shared responsibility, thereby encouraging partnerships between government, civil society and local stakeholders. By highlighting inclusivity and sustainability, the NPS and Sustainable Governance Model provide a robust theoretical basis for advancing an inclusive and democratic governance framework in rural WASH contexts

The global impact and aftermath of the COVID-19 pandemic resulted in significant socioeconomic disparities (A., 2024:2) in accessing the provision of WASH, but few studies have investigated its impact on South African rural informal settlements (Oskam, Pavlova, Hongoro & Groot, 2021:15). The provision of WASH can tackle comprehensive issues of consuming unsafe drinking water and inadequate basic sanitation at various household levels in these settlements. While household socioeconomic characteristics (SECs) are often assumed to influence the psychological behaviours associated with WASH usage, limited research has rigorously assessed this hypothesis in rural informal settlements communities, especially in the Limpopo Province. Saha, Moray, Devadason, Samuel, Daniel, Peter, Jamshed, Harigovind, Manne, Evangeline, and Alexander (2020:5712) stated that communities in Jawadhi Hills, Tamilnadu in India are frustrated by the lack of WASH indicators globally, especially in rural areas despite water serving as an essential resource for individual health and well-being, because of its fundamental role in households, agriculture and economic activities. Azeez, Henderson-Mitchell, LaFevor, and Gregg (2023:876) emphasise the significant correlation between household purposes and psychosocial and behavioural influences, as well as socioeconomic

factors such as poverty, education, residential type, employment, marital status, age and gender in accessing WASH services and evaluating health behaviours within communities. This significance is also embedded in the SDGs' aim to "achieve universal and equitable access to safe and affordable drinking water for all by 2030" (SDG 6.1) (United Nations, 2015:6.1). This reflects a global commitment to ensuring a 24-hour supply of affordable potable water that is free from water contamination in every household. Despite a shared blueprint, Daniel, Pande, and Rietveld (2020:2350) asserted that SECs are strongly associated with the use of Household Water Treatment (HWT) to address issues of unsafe drinking water in households.

Comprehending the knowledge gap in this research requires unpacking the notion of HWT within the SECs. Admasie, Abera, and Feleke (2022:1) indicated that the global use of HWT describes the process of treating water in households by reducing the contamination attributed to communicable diseases and improving the quality of drinking water. To improve the effectiveness of the HWT, increased access to affordable potable water is crucial for rural informal settlement communities (Onyutha *et al.*, 2024:2). While access to affordable water is vital for societal well-being, social norms influencing households' behaviour often play a key role in ensuring that drinking water is safe for consumption. HWT is closely linked to the SECs as they play a huge role in society, as can be seen in individual's behaviour, which is affected by social norms. The HWT practices are thus varied as a driver of personal water treatment practices (Perkins, Kakuhikire, Baguma, Meadows, Abayateye, Rasmussen, Satinsky, Gumisiriza, Kananura, Namara & Bangsberg, 2024:627).

The affordability of HWT technologies is considered a challenge in numerous low-income countries, affecting societal well-being. Many households rely on common sources such as shallow wells, ponds, streams, rivers and lakes which are highly contaminated with faecal pathogens (Admasie *et al.*, 2022:2). Due to inadequate HWT, access to high-quality and affordable drinking water from various water treatment processes should be prioritised, with the primary aim of protecting public health from communicable diseases that are widespread across developing countries. The HWT practice ranges across multilevel influences, such as frequent educational messages, which can improve the appropriate use of the treatment and quality of drinking water before consumption – a cost-effective method that could reduce the risk of communicable diseases (Tamene, 2021:1135). Globally, the most frequently used

and effective HWT method is boiling water (Admasie *et al.*, 2022:2; Asefa, Ashenafi, Dhengesu, Roba & Lemma, 2023:2; Atalay, Gebeyehu & Gelaw, 2024:1; Geremew & Damtew, 2020:67), followed by chlorination and filtration (Admasie *et al.*, 2022:1; Atalay *et al.*, 2024:2) in numerous rural households. The selection of the most appropriate HWT method depends on various factors such as the size of the family, availability of technology and the quality of water being purified. A qualitative study conducted in rural Ethiopia indicated that the adoption and continued use of HWT methods involve regular interpersonal contact and social support from friends and family, aimed at reducing the burden of frequently fetching drinking water, which impacts the health and well-being of the water carrier (Tamene, 2021:1137). Currently, the collection and safe storage of drinking water for extended periods are associated with health-related risks such as pain, fatigue and emotional distress.

Generally, safe storage of drinking water can reduce health risks and prevent communicable disease caused by pathogens, thereby improving the microbial quality of drinking water at the household level (Nkwatoh, Yakum & Itor, 2024:52). In the absence of municipal provision of WASH to communities in rural informal settlements, HWT methods and safe storage can help prevent and control the spread of communicable diseases by removing pathogens and other contaminants from collected household drinking water (Huang, Zhou, Zeng & Yao, 2024:1). Thus, the absence of HWT methods poses a significant global threat, impacting the socioeconomic aspects of WASH within societal livelihoods and households. Notably, adequate skills in HWT methods and safe storage would be beneficial for this study in developing a sustainable governance model to promote the provision of WASH in rural informal settlements within the CDM. This foundation sets the stage for exploring the following section.

4.3 GENDER-TRANSFORMATIVE APPROACHES TO WASH

Despite the ambition for universal access to WASH, public policies must be more sensitive to gender-transformative approaches in South Africa (Naidoo, Sibanda, Chidley, Rainford & Puckle, 2025:1). Given the country's democratic connection to human rights, the provision of WASH in households remains marginalised compared with other sectors. There is also a growing acknowledgement of the need to connect practical gender needs with strategic gender interests to achieve transformational

gender equity in WASH (MacArthur, Carrard & Willetts, 2020:2). In discussing the notion of gender transformation, MacArthur *et al.* (2023) stated that despite transforming the gender norms, dynamics and structures still sustain gender inequalities, transformation within WASH nevertheless emerges with notable psychosocial behaviours (such as women and girls still expected to walk long distances to collect water), more especially in rural informal settlements. Based on the researcher's observations for nearly 20 years during her master's data collection (Mothapo, 2020), limited recent work has been conducted on determining the gender transformative approach through an intersectional lens by considering the nuances of different gendered experiences, risks and vulnerabilities and few studies have connected these trends with psychosocial behaviours.

Munive, Donville and Darmstadt, (2023:1) assumed that opting for a gendered transformative leadership in public policies by targeting women and men could reduce gender social norms in the WASH sectors and achieve the SDG goals, specifically goal 5 (gender equality) and goal 6 (clean water and sanitation) by 2030 and beyond. Realistically, when tracking progress on socio-economic and WASH projects and the need to improve HWT through gender equality, a transparent description of 'gender' grounded in feminist progress is mandatory. 'Gender' is a complex and multidimensional social hypothesis, shaped by the values, norms and attitudes of a given society (Ervin, Scovelle, Churchill, Maheen & King, 2023:2; Kaufman, Eschliman & Karver, 2023:666).

According to MacArthur *et al.* (2023:2), 'gender' is a social hypothesis structure that governs societal perspectives of masculinity and femininity based on sex assigned at birth.

Discussing the notion of gender, Briggs and George (2023:6) indicates that 'gender' as a definition doesn't pick out any one thing as there is equivocation with many repeated statements such as:

- Gender is the social interpretation of sex.
- Gender is an oppressive system that ties certain behaviours and character to sex.
- Gender is a performance of the role prescribed for one's sex.
- Sex is female, male, etc.; gender is feminine, masculine, etc.

- Sex is female, male, etc., gender is woman, man, etc.

The assertion of gender as a socioeconomic matter in the provision of WASH is fundamentally tied to equity as a key concern (Robinson, Barrington, Evans, Hutchings & Narayanaswamy, 2024:2). Without safely managed WASH basic services, women and adolescent girls are more vulnerable to abuse, attack and school absenteeism during their menstrual period. This burden is rooted in traditional roles regarding household water collection, lack of gender-segregated facilities and vulnerabilities to violence when accessing sanitation. Alongside these arguments about gender, there is a contention regarding the social hypothesis and intersectional historical oppression associated with accessing WASH for households. Shah, Harris, Menghwani, Stoler, Brewis, Miller, Workman, Adams, Pearson, Hagaman, and Wutich (2023:371) asserted that 'intersectionality' was coined by Black feminism in the 1980s for understanding oppression, not exploitation. Billups, Thelamour, Thibodeau and Durgin, (2022:2) described 'intersectionality' as the concurrent and interconnecting effects of multiple groups of individuals or society with minoritised conditions, which are often relegated and perceived in an imbalanced manner compared to the additive contributions of those groups in the community, such as 'women'. An intersectional approach to 'gender' examines how different forms of historical oppression intersect and shape people's experiences.

This study's aim to develop a sustainable model for WASH in rural informal communities uses intersectionality by examining how socioeconomic characteristics of WASH are interrelated with race, sexual orientation and gender equity to address a knowledge gap in this regard. Although the influence of gender equality is paramount across the globe and is geared towards attaining the improvement of WASH in rural informal settlements, a gap in this regard remains the most prominent in historically non-white communities in South Africa, as one of the countries rooted in patriarchy in all cultural groups, despite professing 'gender equity' as permitted in the Constitution and Bill of Rights of 1996 (Masenya, 2023:412).

According to di Bella, Fachelli, López-Roldán, and Suter (2023:2), gender equality is broadly considered to be when men and women participate equitably in the community or households, with tasks such as cooking, collecting household drinking water or washing dishes. Notably, gender equality is distinct yet closely connected to a transformed societal status with women's empowerment and equity as critical

precursors. Gender transformative approaches to the provision of WASH have partially reflected transformation in the wider development environment, with a shift highlighting the need to promote gender equality. For instance, the impact of public policies on gender equality across various policy areas has been well documented in numerous studies. The White Paper on Basic Household Sanitation 2001 focuses specifically on the provision of basic levels of household sanitation to mainly rural communities and informal settlements (Department of Water Affairs and Forestry [DWAF], 2001:5), aligning with corresponding policy approaches that encourage women to address several social and psychological challenges in rural informal settlements. Table 4.1 depicts the key definitions of a diverse gender analysis framework focused on welfare, equity, anti-poverty, efficiency, empowerment and lastly, sustainability, which transforms policy approaches to women (MacArthur *et al.*, 2023).

Table 4.1 Gender analysis framework

APPROACH	PURPOSE
Welfare 1950s	Focused on practical gender needs to “bring women into development as mothers” as passive beneficiaries <i>ga</i> . “Purely welfare projects are those to deliver information, education and sometimes free handouts (money, food, technology) to poor women in their roles as homemakers, reproducers and child rearers. Examples are projects in material and child health, hygiene, nutrition, home economics and home-based appropriate technologies” (Buvinić, 1986:653)
Equity 1960s	To equitably meet the strategic gender interests of both women and men. Women are seen as active participants in the development process, and the approaches challenged women’s subordination. Other scholars saw this approach as more instrumental than transformative in practice (Kabeer, 1994)
Anti-poverty 1970s	To increase women’s productivity and income generation, to meet women’s practical needs. Coates (1999) noted that in this approach, poor women were often instrumentally only recognised for their productive roles
Efficiency 1980s	To promote efficient and effective development programmes, to meet women’s practical needs. Coates (1999) described that women are often seen in their capacity to strengthen economic efficacy (“smart economics”).

Empowerment 1990s +	To empower women in greater self-reliance, reaching strategic gender interests. This more radical approach aimed to support bottom-up initiatives to overcome oppression.
Sustainable 2015–2030	To achieve gender equality and empower all women and girls. Sustainable Development Goal 5 Target 5.1 – End discrimination against women and girls Target 5.2 – End all violence against and exploitation of women and girls Target 5.3 – Eliminate forced marriages and genital mutilation Target 5.4 – Value unpaid care and promote shared domestic responsibilities Target 5.5 – Ensure full participation in leadership and decision-making Target 5.6 – Universal access to reproductive health and rights Target 5.7 – Equal rights to economic resources, property ownership and financial services Target 5.8 – Promote empowerment of women through technology Target 5.9 – Adopt and strengthen policies and enforceable legislation for gender equality
	To ensure availability and sustainable management of clean water and sanitation for all. Sustainable Development Goal 6 Target 6.1 - Achieve universal and equitable access to safe, affordable drinking water for all Target 6.2 – Achieve adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

Source: MacArthur *et al.* (2023:3) modified.

The primary reason this study's 'problem identified' exists is due to a fragmented understanding of gender – treating each approach as isolated incidents rather than a holistic and interconnected issue. The core issue arises when gender perspectives are approached statically rather than dynamically. A dynamic, interrelated approach recognises how these frameworks interact and complement each other, rather than viewing them in isolation.

The evolution of the gender analysis framework in Table 4.1 articulates a strategic breakdown against the backdrop of the White Paper on Basic Household Sanitation 2001 and practical approaches related to gender roles on which it was focused to meet

the gender needs that were envisioned. In discussing the notion of a gender analysis framework. Anditi, Musango, Smit, and Ceschin (2022:2) stated that none of the frameworks have been integrated and specially adopted in rural informal settlements for effective achievement of gender-transformative approaches to address unsympathetic gendered challenges for the provision of WASH as is rooted in the White Paper on Basic Household Sanitation 2001. A gender analysis framework assists in identifying gender-specific barriers to access and promotes women's leadership in WASH decision making by ensuring that facilities are safe and usable for everyone. The gendered welfare approach focuses primarily on physical health outcomes. Quan-Baffour and Johnson (2022:2) indicated that women play a huge role in educating their households, aiming to improve the health status and the welfare of their children, linked to lifelong learning and progress in the provision of WASH. Women and adolescent girls may lack formal education or experience due to gendered norms, but they possess valuable basic or indigenous knowledge about the WASH needs of their households. Municipalities often lack the skills to effectively address the WASH needs, meaning that rather than undermining the expertise of women and adolescent girls, efforts should focus on building their skills and leveraging their indigenous knowledge for sustainable livelihoods.

Robinson *et al.* (2024:2) asserted that a lack of equity contributes to numerous social disparities attributed to gender and physical impacts on affected communities which are burdened with the inaccessibility of WASH, and further contributing to households' vulnerability rooted in gendered behaviour. Nunbogu and Elliott (2022:2) and Stoler, Guzmán, and Adams (2023:6) identified imbalances regarding collecting water for household chores, disempowerment, negative well-being and contributions towards socio-economic activities as being attributed to poverty in rural informal settlements. Women are primarily efficient in carrying out household chores such as cooking, cleaning and collecting drinking water, while men are resourceful in performing tasks associated with household maintenance, repairing WASH infrastructures and decision making related to WASH systems in rural communities (Dickin & Caretta, 2022:4; Macura, Foggitt, Liera, Soto, Orlando, Del Duca, Carrard, Hannes, Sommer & Dickin, 2023:1). Women empowerment positions women at the centre. Carrard, MacArthur, Leahy, Soeters, and Willetts (2022:2) hypothesise empowerment constitutes a stepladder towards gender equality and an inclusive tool for people of all genders

working towards greater equality, particularly men participating in public policy. Public policy may support gender equity, but only the role and status of women's empowerment in decision making can be conducive to the promotion of gender equity in rural informal settlement societies. Societal policies related to the provision of WASH have the most prominent role in promoting sustainable gender equity. WASH is extensively predicted to stimulate the attainment of the SDGs by 2030. Global gender WASH progress reports from 2000 to 2022 acknowledged the issue of gender as a growing concern in gender-WASH programmes, describing three factors: (i) moving from an instrumental orientation towards a transformative change, (ii) finding solutions to gain insight beyond the household level and interpreting (iii) using the Joint Monitoring Programme (JMP) data carefully to understand gender dynamics, due to the progress of greater reinforcement in the provision of WASH and gender equity (Willettts, MacArthur & Carrard, 2023:1).

Transforming traditional gender roles and norms to improved gender roles and norms among individuals and groups in society might improve the provision of WASH in rural informal settlements. An essential agenda such as gender analysis frameworks is important in rural informal settlements for individuals, groups, society, public-private partnerships and municipal administrators, to integrate efforts towards achieving SDG:6 targets 6.1 and 6.2 and to reinforce the gender integration continuum in the provision of WASH.

The notion of a gender continuum can be perceived as an umbrella construct that evaluates gender documentation, transcending the female and male traditional category and corresponds to how a component is sustained in society, such as gender roles and their biological individualities (Castleberry, 2019:404). The gender continuum is pertinent to WASH in societal mainstreaming as it is positioned centrally in the provision of WASH. It contributes such that it makes service delivery more effective and sustainable, and monitors the achievement of SDGs through gender sensitisation of societies, programmes and developments in rural informal settlements. Figure 4.1 depicts the Gender Integration Continuum (GIC) aimed at the provision of WASH.

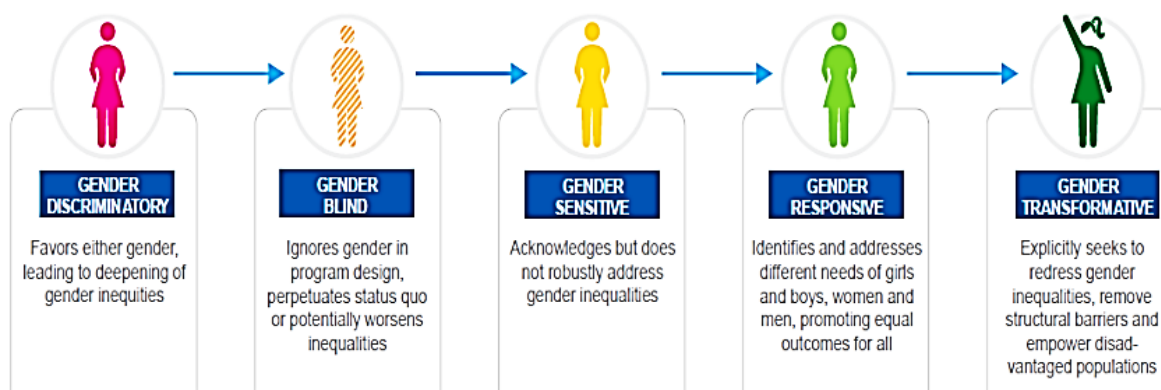


Figure 4.1 Gender integration continuum for WASH

Source: Perezniето and Holmes (2023:5)

Gender inequality and inadequate provision of WASH are mutually reinforcing. Unequal gender norms contribute to inadequate WASH at individual and community levels. Structured inequalities such as socioeconomic inequalities increase vulnerability to violence. These GIC inequalities are shared drivers of both violence against women and adolescent girls in the community. The purpose of GIC aimed to help constituencies to understand how violence against women and teenage girls intersects and how social and gender norms impact both forms of violence in the provision of WASH. Failure of transformation exacerbates gender discrimination. The label 'Gender *discriminatory*' in the GIC denotes population regulation, migration, lack of birth registration and indirect gender discrimination, primarily impacting global statelessness (Beninger & Manjoo 2022:21). This phenomenon refers to an individual not being seen as a citizen of a state and is therefore treated unfairly. Statelessness is a significant issue affecting human rights globally and barriers to the provision of WASH in South African rural informal settlement communities. The WASH programmes often actively exclude women and adolescent girls and other LGBTQ+ gender individualities in the community which leads to indirect gender-discriminatory impacts on public policies that have an unequal negative impact on women. The GIC is a strategic framework that guides organisations to incorporate gender consideration into programmes and policies.

The study found the White Paper on Basic Household Sanitation 2001 to be a gender 'blind' policy which neglects gender-specific needs and roles and perpetuates gender inequalities in rural informal settlements. Macura, Dickin, Waddington, Liera, Soto,

Orlando, Foggit, Pross, McArthur and Fadhila (2023:10) stated that gender ‘blind’ involvement is a clear obstacle to positive safety outcomes characterised by poor socioeconomic conditions connected to WASH. The GIC is a strategic approach designed to promote long-term, systematic transformation towards inclusive and equitable development by integrating gender considerations into the core of its operations. Public policies that are implemented should be revised to address the systematic barriers associated with the GIC, empowering marginalised groups and ensuring inclusive participation and representation in the provision of WASH services in informal settlement communities.

The gender ‘*blind*’ system in the provision of WASH is a harmful approach which does not consider implemented public policies and disregards gender norms, political roles, rights, entitlements, power dynamics biases and stereotypes, reinforcing gender disparities in society. Gender ‘*sensitive*’ programmes acknowledge the differences between men and women and the inequalities, but neglect to focus precisely on inequality (Wahid, Cuddy, Bastola, Shrestha & Almeida, 2024:11). Municipalities can incorporate specific strategies to enhance women’s participation or collect disaggregated statistics on programme participation and outcomes in rural informal settlements. McKague, Harrison, and Musoke (2021:4) stated that the gender ‘*responsive*’ category seeks to recognise and transform gender interactions in promoting equality and achieving programme objectives, indicating that women and men might face diverse gender-based constraints, risks and health outcomes that are both interconnected. The knowledge gap addressed in this study looks to the promotion of diverse voices and recognition of different groups related to age, class, gender and socioeconomic status, which are related to gender transformative approaches.

MacArthur *et al.* (2020:1) and MacArthur *et al.* (2023:12) emphasised that the connection between gender and WASH is profound and gender ‘*transformative*’ WASH programmes can synergistically address gender and social inequalities by improving the provision of WASH outcomes beyond an instrumentalist approach to gender development interventions. Thus, strategies should be developed to build the resilience of women and adolescent girls in certain perspectives by overcoming structural barriers and reducing psychosocial behaviours they may face in the provision of WASH, especially in rural informal settlements. Socioeconomic factors

create a context for psychosocial factors that might limit constituencies' perceived ability to purchase clean drinking water, even if they maintain a positive attitude. The Theory of Planned Behaviour (TPB) is a psychosocial model that discusses how a person's behaviour is influenced by their intentions, which in turn are shaped by three components, namely, attitudes, subjective norms and perceived behaviour control.

4.4 THEORY OF PLANNED BEHAVIOUR

In 1950 Erik Erikson introduced his 'psychosocial theory of personal development' and highlighted that social situations shape individual growth and that development continues throughout life (Tettey, Sarfo-Mensah & Osei, 2023:93), an idea that was innovative at the time. The psychosocial theory in the provision of WASH emphasises the subjective experiences, emotions and social dynamics that influence access to WASH services through societal situations and development. Fulfilling the needs for WASH often faces challenges in certain household groups, highlighting the complexities of psychosocial health problems. Kusumawaty and Siswanto (2022:93) specified that psychosocial health, as a component of overall health related to WASH in the SDGs, has been formulated; however, many aspects remain to be addressed in its implementation. The psychosocial impact of WASH is limited, yet the effects related to water insecurity, poor sanitation, stigma and shame require special attention, more specifically in the rural informal settlement communities.

Integrating public administration with psychosocial theory can enhance WASH governance by strengthening public administration principles, establishing a robust system for delivering WASH services infrastructure and ensuring transparent accountability through an understanding of individual behaviours. Williams, Thomas, Kuhl, Bisimwa, Coglianese, Bauler, Francois, Saxton, Sanvura, Bisimwa, and Mirindi (2021:2) asserted that WASH interventions that integrate psychosocial theory elements and address multiple behavioural determinants are more likely to be effective than those that promote WASH behaviour solely through information distribution. A robust public administration governance framework is essential for effective WASH services, as it establishes policies and structures that enhance access, quality and sustainability, ultimately promoting psychosocial well-being and lowering the risk of disease in the community.

Nnindini and Dankwah (2023:194) indicated that social normative influences have become a key component of various social-psychological models of behavioural decision making, including the Theory of Planned Behaviour (TPB). This thesis integrates the Theory of Planned Behaviour (TPB) adopted in 1991 as a social science theory that is fundamentally used to predict human behaviour and identify psychological elements resulting from decisions that access the provision of WASH (Ajzen, 2020:314).

This research attempts to fill this gap in the literature by applying the TPB to determine whether societal attitudes towards the provision of WASH are associated with the attitude and intention to implement a sustainable governance model of WASH services for rural informal settlements in the Capricorn District Municipality of Limpopo Province of South Africa. Si, Duan, Zhang, Su, and Wu (2022:1) asserted that the notion of TPB can be considered one of the theories of social psychology which have been used extensively to predict behaviour in a multitude of behavioural domains, such as water-saving intention amongst household residents. According to Oehman, Babbitt, and Flynn (2022:2), the TPB is proven to identify and acknowledge the beliefs that inform an individual's behaviour. This social-psychological theory attempts to predict and understand why individuals may follow certain choices of behaviour. Numerous studies have applied the TPB to predict and explain individuals' intentions to exhibit behaviour at a certain time and location, such as rural household women washing hands with soap, and menstrual waste disposal amongst adolescent girls residing in informal settlements (Ejigu & Yeshitela, 2024:4; Kosoe & Osumanu, 2018:154; Savari, Mombeni & Izadi, 2022:2; Shahangian, Tabesh & Yazdanpanah, 2021:2; Sreekumar & Dwivedi, 2024:2; Thakur & Onwubu, 2024:2; White, Thorseth, Dreibelbis & Curtis, 2020:2). Despite TPB having been used effectively in numerous studies, no previous research could be found that has applied the TPB to assess human behaviours related to the provision of WASH and menstrual waste disposal amongst adolescent girls and women in rural informal settlements at the Limpopo Province. Due to the unpredictable population growth there is no continuous improvement in the quality of lifestyle, household water consumption at rural informal settlements shas continued to increase and poses a negative impact on people's socioeconomic and psychosocial behaviours in the Limpopo Province (Seretlo-Rangata, Sodi & Govender, 2025:5). Therefore,

population growth has become a major challenge in the provision of WASH influenced by individual behavioural intentions based on the TPB in the Limpopo Province.

The TPB postulates three conceptually independent determinants of intention towards the study of public policy, guided by indirect prognosticators or underlying beliefs such as 'attitude' which is the predisposition towards a behaviour as favourable or unfavourable, 'subjective norm' which is perceived social pressure to perform or not to perform the behaviour and 'perceived behaviour control', which refers to societies' 'perceived ease or difficulty of performing the behaviour' (Sogari, Pucci, Caputo & Van Loo, 2023:3; Yanamandra & Indiran, 2023:129). It should be noted that in this study, determinants of TPB are regarded as independent, yet interacting influences, meaning that while each aspect contributes uniquely to shaping intention, their combined influence offers a more lucid understanding of WASH behaviour. For instance, a positive attitude towards hand hygiene may not translate into practice without supportive social norms, or the perceived ability to access soap and water. Therefore, this research explores how attitudes, societal norms and perceived behavioural control converge to shape the ways community members, especially women and adolescent girls in rural informal settlements, undertake WASH practices in their households and how these dispositions, separately and together, affect their psychosocial well-being and livelihood. The study aimed to explore how women and adolescent girls in rural informal settlements perceive and provide WASH in their households and the impacts of their dispositions on their socioeconomic and psychosocial behaviours. Following are the WASH intentions discussed to ensure universal access to safe drinking water, adequate sanitation and good hygiene practices. The goals are to protect public health, reduce communicable diseases and enhance well-being, economic development and human dignity.

4.4.1 WASH intentions

Intentions are assumed to capture the motivational factors that influence behaviour; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, to perform the behaviour. Generally, the stronger the intention to engage in a behaviour, the more likely should be a performance (Icek, 1991:181).

Positive or negative intentions act as agents of conduct in providing WASH. They are the values of the sum of personal attitudes and social pressure (subjective norm)

towards shaping the desired behaviour. The notion of intention can be assumed as essential for an individual performing a desired behaviour such as the provision of WASH in their households, such as, collecting drinking water, responding towards the use of sanitation and hand hygiene with soap (Alhamad & Donyai, 2021:5).

The knowledge gap addressed in this study concerns examining the validity of the TPB in understanding rural women and adolescent girls' intentions for participating in WASH usage related to hand hygiene intention to perform behaviour (Bülbül Maraş & Kocaçal, 2024:2), household intention to comply with solid waste management and practices, for example menstrual waste disposal (Thakur & Onwubu, 2024:1) and water effectiveness behavioural intention in households (Shahangian *et al.*, 2021a) as well as psychosocial theories of behavioural change. Psychosocial behaviours in the provision of WASH are volitionally controlled and can to a larger extent be predicted by intentions.

Conner and Norman (2022:1) defined intention as a form of self-instruction that reflects an individual's underlying motivation to engage in a specific behaviour. In general, an individual's intention to engage in specific behaviour is expected to be stronger when they have more positive attitudes and subjective norms, and a higher level of perceived control over the behaviour might reduce the intention-behaviour gap that can be developed in rural informal settlement households.

Mbewe and Phiri (2023:3) asserted that it is assumed that intention is influenced by personal and social factors and individuals are expected to act according to their intentions despite unforeseen events bringing about changes. Therefore, women and adolescent girls are more likely to practice WASH behaviour if they have a positive attitude and feel social pressure to do so. Numerous scholars have contributed to the dissemination of the TPB intentions in the use of drinking water sources, sanitation facilities and hygiene promotion (Kusumawaty & Siswanto, 2022:94; Seretlo-Rangata *et al.*, 2025:2), but limited research exists concerning WASH in the context of rural informal settlement women and adolescent girls, the disparities in socioeconomic characteristics, psychosocial behaviour in their households and discrepancies contributing to their day-to-day personal lifestyles.

Thakur and Onwubu (2024:3) discussed intentions in household waste management practices, whereby actual behavioural practices amongst communities at the Shannon

Drive informal settlements in eThekweni Local Municipality in Durban, reveal that societies perceive that only some women and adolescent girls have positive attitudes towards managing household waste. The overall implication is that inadequate infrastructure, limited government services and misaligned responsibilities, pose a significant threat to effective waste management in South Africa's informal settlements. This signals the need for improved policy implementation and infrastructure development to align community behaviours with intended outcomes. The DWAF's White Paper on Basic Household Sanitation of 2001 focused on providing a basic level of sanitation to those with the greatest need through a demand-driven and community-based approach. However, it is clear that due to the unavailability of infrastructures and limited government services in the informal settlements of South Africa that this has not been accomplished and has led to a variation of intentions present in these communities.

Societal impacts on intentions within the structure of TPB have also been reported in other behavioural domains. For example, Sreekumar and Pandey (2024:1), in a study of menstrual waste behaviour of young adolescent girls in India, found predictive impacts for a measure of self-identity on women, adolescent girls, transgender and non-binary individuals who menstruate, concerning sustainable and safe disposal of used menstrual products. Saefi, Fauzi, Kristiana, Adi, Islami, Ikhsan, Ramadhani, Ningrum, Setiawan, and Muchson (2023:1) found that the extent to which students viewed drinking tap water as important to their self-concept contributed to their intentions to engage in sustainable education aimed at reducing bottled-water use. Savari *et al.* (2022:1) observed that socio-psychological factors influencing water-use reduction among rural households in southwestern Iran significantly shape intentions to conserve water and participate in activities that address the global water crisis. Prasetya, Darmayanti, and Setyorini (2024:110) observed that behaviours such as mask-wearing and handwashing played a key role in COVID-19 transmission and help explain individuals' behavioural intentions to prevent communicable diseases during and beyond the pandemic.

4.4.2 Attitude and intention to adopt behaviour

Rural women and adolescent girls' attitudes, as a hypothesis, are formed according to salient beliefs about outcomes of the behaviour and evaluations of those outcomes of in the provision of WASH in their households. Gibson, Lamm, Lamm, and Holt

(2023:2) indicated that an ideal attitude of women towards the provision of WASH in the household can be predicted in a positive or negative behaviour of individual outcomes in performing a specific behaviour. In other words, an individual with a positive attitude towards a behaviour would be motivated to perform that specific behaviour. Si *et al.* (2022:2) asserted that attitude includes two extended aspects: (*first*) instrumental attitude which focuses on the discussion of the results and (*second*) emotional attitudes, which focus on the practical aspect and have stronger descriptive capabilities. Women and adolescent girls' psychosocial well-being in the provision of WASH in households are positively related to their emotional attitudes. Thus, adopting a preferred behaviour would depend upon developing a positive attitude, which makes attitude a key element in achieving a positive behavioural change or outcome.

This study found that negative attitudes can lead to rural women and adolescent girls adopting negative behaviour in terms of their hygiene, health and socio-economic norms regarding WASH in rural informal settlements. Slekiene, Swan, and Kalina (2024:1) asserted that in the eThekweni Municipality in Durban, safe disposal of Absorbent Hygiene Products (AHPs) remains poorly applied in the informal settlements which led to psychosocial factors within society and polluting the environment, thereby spreading contagious infections from nonrecyclable feminine hygiene products (sanitary pads), disposable tissues and baby diapers (nappies), .Proper disposal of AHPs is important to avert contagious infections and maintain human dignity, especially for women and adolescent girls in rural informal settlements who menstruate.

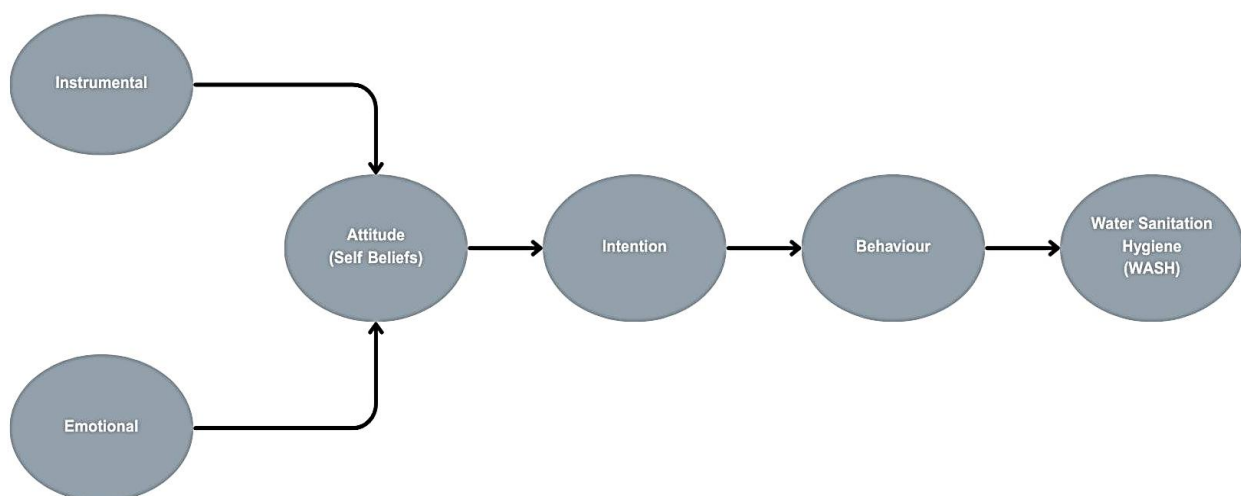


Figure 4.2 Extended attitude norms

Source: Author's own compilation

Figure 4.2 illustrates that women and adolescent girls often display positive attitudes and higher intentions to adopt safe WASH practices due to their direct responsibility for household tasks and greater concern for environmental issues, though their adoption behaviour can be influenced by their socioeconomic conditions and cultural practices. A plethora of studies (Greibe Andersen, Kallestrup, Karekezi, Yonga & Kraef, 2023:1; Ngcamu & Mantzaris, 2021:3; Weimann, Kabane, Jooste, Hawkrigde, Smit & Oni, 2020:2) have reported that communicable diseases related to the provision of WASH and other pandemics such as COVID-19 are largely attitudinal problems impacting socioeconomic and psychosocial behaviours of societies residing in rural informal settlements communities. Prasetya *et al.* (2024:109) reported that during a pandemic outbreak, the World Health Organisation (WHO) proposed hand hygiene using alcohol-based sanitiser and disinfectants as the standard protective behaviour intending to prevent infectious diseases and urged societies and individuals to implement it daily in their lifestyles and households, even for the next generation. There is no doubt that the attitude of women towards health and environmental sanitation is closely linked to the sustainable provision of WASH in any community and it plays a central role in the achievement of WASH (Leelavathi & Reddy, 2024:2083). Personal characteristics of women and adolescent girls involved in sustainable environmental sanitation in informal rural settlement communities depend on their attitudes and knowledge acquired in hygiene, cleanliness and menstrual waste disposal.

Leelavathi and Reddy (2024:2084) also argue that negative attitudes which affect women's and adolescent girls' health while accessing sustainable environmental sanitation and hygiene, will not achieve the desired outcome of WASH as they are often faced with challenges related to sexual harassment, physical attacks and violence in their environments. The TPB indicates that attitudes towards the provision of WASH behaviour are shaped by salient beliefs about the involvement of women and adolescent girls in performing the behaviour and the outcomes of the specific behaviour. Caruso, Conrad, Patrick, Owens, Kviten, Zarella, Rogers, and Sinharoy (2022:29) reported that in the negative, communal water tap collection sites could be a place of tension, conflicts, danger and sexual exploitation for women and adolescent

girls collecting drinking water for their households, which then results in a greater negative outcome concerning performing WASH-related roles outside their households.

In other words, as behavioural intentions are influenced by attitude, the knowledge gap addressed by this study compares women's and adolescent girls' negative attitudes linked to socioeconomic behaviours towards the provision of WASH, which influences their intention to adopt the desired psychosocial behaviour. Hence, men should be willing to engage themselves in the household and at the community level for the reduction of burdens and risks related to the provision of WASH that women and adolescent girls face daily in their lifestyles.

Women and adolescent girls' subjective norms depend on their beliefs about whether performing a specific behaviour would be approved by significant others, such as people who are important to them, for increasing their intention towards the provision of WASH in their households. Therefore, it is hypothesised that;

H1: Socioeconomic attitudes towards WASH provision have a direct and positive relationship with actual psychosocial WASH behaviour.

H2: Women and adolescent girls' attitudes towards WASH provision are directly and positively related to their psychosocial behaviours.

4.4.3 Subjective norm and intention to adopt behaviour

Subjective norms as a hypothesis of TPB refers to a normative belief held by women and adolescent girls regarding the provision of WASH in households due to perceived social pressures that are put on an individual to engage in a specific psychosocial behaviour (Nnindini & Dankwah, 2023:194). For example, when family pressure prioritises drinking water this practice might inhibit proper menstrual hygiene management, leading to unhygienic disposal practices. This demonstrates how water scarcity reinforces gendered behaviours and health risks. If women and girls feel societal or familial pressure to conserve water, their ability to practice hygienic menstrual waste disposal may be compromised, perpetuating health risks and reinforcing gender inequalities. Therefore, the provision of WASH potentially has a positive impact on subjective norms of societal behaviour in rural informal settlement households.

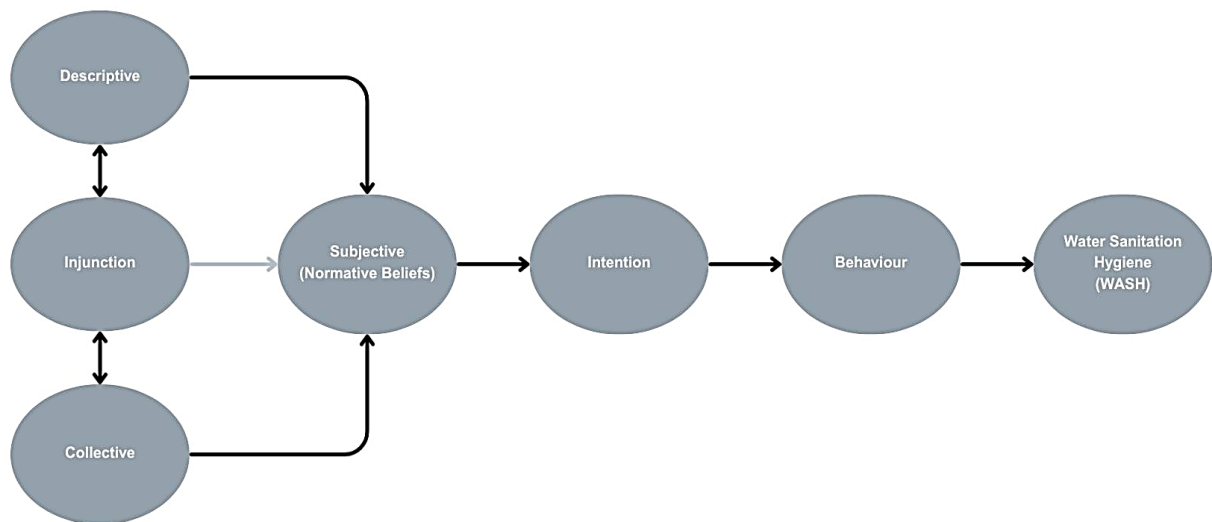


Figure 4.3 Extended subjective norms

Source: Author's own compilation

The notion of subjective norms includes an extension of TPB as descriptive norms such as social pressure on women and adolescent girls' behaviours originating from relevant family members, society, friends and social groups, and injunctive norms which refer to what the individual thinks others require of himself and herself in rural informal settlement communities (Fantechi, Contini & Casini, 2024:2; Fielmua, Guba & Mwingyine, 2021:444) (Figure 4.3). For instance, in numerous rural informal settlements, descriptive norms can relate to the socioeconomic status of women and adolescent girls adopting household water consumption curtailment (Savari *et al.*, 2022:2).

The study indicates that in dealing with population growth and water scarcity as the major challenges in the community, WASH behaviours need a participatory society to make and accept voluntary choices not enforced by external benefactors such as politicians, researchers and private service providers. Understanding social normative perceptions and behaviours is fundamental for WASH government representatives to monitor and adhere to the household water guidelines legitimised in the South African National Standard (SANS 241) drinking water quality guidelines (Kruger, Pieters, Horn, Van Zijl & Aneck-Hahn, 2022:84050).

Lahiri, Bingenheimer, Sedlander, Munar, and Rimal (2023:2) and Franken, Smit, de Leeuw, van Woudenberg, Burk, Bevelander, and Buijzen (2023:2) asserted that

having an ideal social normative perception impacts WASH behaviours, and individual perceptions of how commonly and correctly individuals regularly use WASH within a specific reference group, and these are fundamentally measured through social interaction and observation. This research referred to women and adolescent girls' normative social behaviour as reference groups, looking at perceptions categorised by descriptive and injunctive norms constructed in the provision of WASH in rural informal settlement communities.

With regard to the notion of injunctive norms, Rimal and Yilma (2022:1573) argued that the theory of normative social behaviour consider what women and adolescent girls approve or disapprove of regarding their behaviours when dealing with the provision of WASH in their households. Descriptive and injunctive norms are closely connected and they can each independently and collectively influence normative social behaviours related to the provision of WASH amongst women and adolescent girls in rural informal settlements communities. An additional extension of TPB such as a collective norms' perception might reveal the actual occurrence of women and adolescent girls' behaviour, actions or phenomenon in the rural informal settlement communities (Pokharel, Lillie, Jensen, King, Ratcliff & Barbour, 2024:2). According to Rimal and Yilma (2022:1573), collective norms operate at the societal level and are comparable to “odes of conduct that either prescribe or proscribe behaviours which members of a group can enact”. Perceptions of women and adolescent girls are collective norms in this study and serve as reliable predictors in the promotion of WASH influenced by socioeconomic behaviours. Hence this study proposes that:

H3: Socioeconomic subjective norms towards WASH provision have a direct and positive relationship with actual psychosocial WASH behaviour.

H4: Women and adolescent girls' subjective norms towards WASH provision are directly and positively related to their psychosocial behaviours.

4.4.4 Perceived behavioural control intention to adopt behaviour

The notion of perceived behavioural control as a hypothesis involves the belief about whether one can control his or her performance of specific psychosocial behaviour, notably considering women and adolescent girls' control of their behaviour in terms of the provision of WASH in rural informal settlements' households. Nnindini and Dankwah (2023:195) and Russell and Knoeri (2020:942) indicated that perceived

behavioural control refers to an individual's belief in having the opportunity and ability to perform a particular behaviour. According to Oteng-Pepurah, De Vries, and Acheampong (2020:2), perceived behavioural control refers to individuals' perceptions of their ability to perform a presumed behaviour. Phang and Ilham (2023:693) indicated that perceived behavioural control is an individual's perception of performing a specific behaviour based on their ability and adequate resources.

So as to address the knowledge gap in existing research, this study, therefore considers perceived trends in women and adolescent girls' behaviour prevalent in the provision of WASH in rural informal settlements from the point of view of perceived behavioral control. Such behaviour could mean the ease with which women and adolescent girls can be enabled to adopt a behaviour following an evaluation of skills, resources and opportunities needed to perform the specific behaviour, seen in the context of friends or family members, e.g., an adolescent girl beginning to carry a 20-litre water bucket on the head needs to be guided by mature women who have the requisite knowledge and experience.

The perceived behavioural control towards collecting water with a 20l bucket is often assessed by the ease or difficulty of the behaviour (e.g., I find it difficult to carry a 20l bucket of water three times a week), while self-efficacy is operationalised by an individual's confidence in being able to carry out the behaviour in the face of extenuating circumstances (e.g., I am confident that I can carry a 20l bucket of water three times a week even when schools are not on recess).

The socioeconomic characteristics and household behaviour of women and adolescent girls are primarily influenced by perceived behavioural control and subjective norms. Likewise, when women and adolescent girls intend to perform behaviours, they are concerned with the opportunities, resources and barriers that are available to them. Palamuleni, Nde, du Plessis, and Bakuwa (2024:2) stated that perceived behavioural controls are highly influenced by the geographical locality of women and adolescent girls and are subject to their ability to engage in societal behaviours in rural informal settlements. An unhealthy environment can predict disease transmission behaviour and malnutrition and sanitation levels among children in rural households.

Hawa, Utari, and Parahyanti (2024:589) indicated that perceived behavioural control towards washing hands with soap and water has a significant relationship with the behaviour of pregnant women and mothers in Sub-Saharan countries. The perception of behavioural control in using clean water is significantly related to the behaviour of pregnant women and mothers perceived with extended variables of *self-identity* and *moral norms* in the TPB (Figure 4.4).

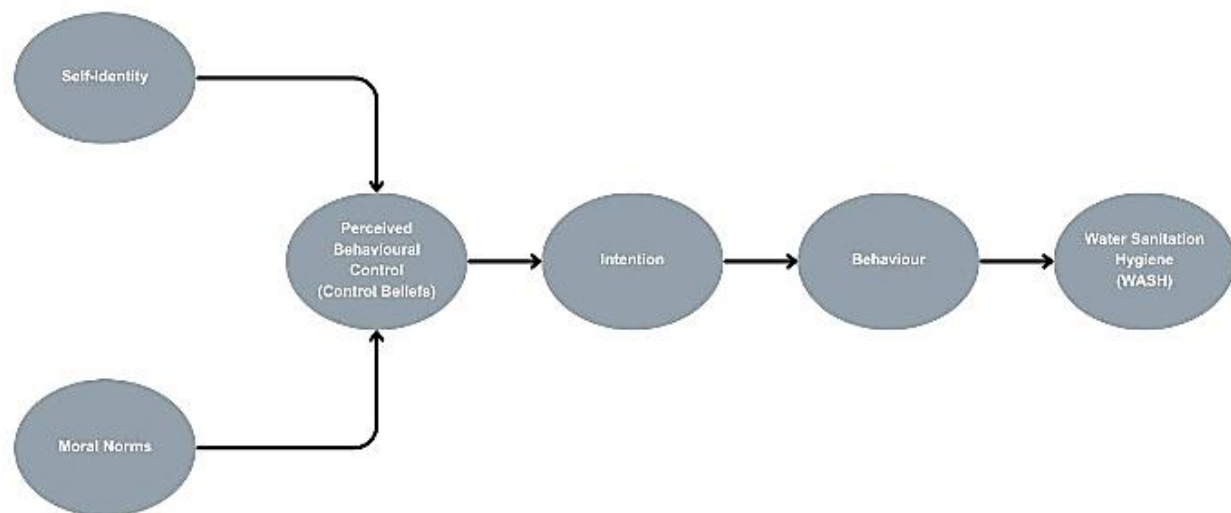


Figure 0.4 Extended perceived behavioural control

Source: Author's own compilation

Renowned scholars such as Biddle, Bank, and Slavings (1987) and Charng, Piliavin, and Callero (1988) reasonably included *self-identify* from empirical evidence in which an identity process is measured when predicting specific behaviours, as *self-identify* predicts behavioural intentions after attitudes and norms. Coherently, *self-identity* has been proposed as an additional predictor of both intention and behaviour within the framework of the TPB, yet Fishbein and Ajzen decided not to include self-identity when they published the Reasoned Action Approach (Capasso, Califano, Caracciolo & Caso, 2023:3; Snippe, Peters & Kok, 2021:48; Truelove, Largo-Wight, Siuda, Gowans, Minichiello & Hill, 2023:2). As posited by Mishra, Shukla, Malhotra, Chatterjee, and Rana (2023:200), the word *self-identify* derives from the word 'self' which denotes a 'warm feeling associated with an individual, where s/he feels an association, "about me" or "about us" as the part of a person's persona, which is associated with a

particular behaviour that makes them unique. Capasso *et al.* (2023:2) perceived *self-identity* as a set of stable characteristics that define one's identity and self-perception regarding a specific behaviour. Cao, Qiu, and Morrison (2023:2) consider self-identity as another critical TPB driver of human behaviour, comprised of roles corresponding to individuals' positions in their societal structures. This study addresses the knowledge gap in this regard by connecting the salient and enduring aspects of individuals such as women and adolescent girls' self-perception in the context of the provision of WASH as the driver of change in their *self-identity*.

The role of *self-identity* in the provision of WASH can be viewed as a strong measure of perceived ethical responsibility within the structure of TPB. This perception of *self-identity* and moral norms behaviour of women and adolescent girls is found in their answering questions regarding, "Who am I?" in terms of socio-demographic characteristics (e.g., gender), social roles (e.g. mother, sister, aunt), social types (e.g. breastfeeding, household head) and even personal traits (e.g., honest, idealist). Moral norms are termed by Schwartz and Tessler (1972) as expectations that people hold for themselves, thus translating into how the household head may perceive the household's norms to contribute to changing the environment.

Truelove *et al.* (2023:3) indicated that personal norms, like moral norms, predict moral obligations to perform specific behaviour based on value belief norm theory. The notion of moral norms plays a mediating role. It encompasses ethical principles guiding access, management and distribution of essential resources amongst women and adolescent girls such as human dignity behaviour in the provision of WASH in rural informal settlements. Self-identity and moral norms can overlap as different forms may encompass moral dimensions if individuals perceive the principle of universality of accessing WASH as a human right (Capasso *et al.*, 2023:7).

There is an existing knowledge gap with regard to the role of women and adolescent girls as key agents of change in overcoming barriers like limited infrastructure, cultural norms and government inadequacies, as well as the significance of strengthening inclusive and democratic principles through behavioural change in rural informal settlements' communities. It is in this light that this study hypothesised:

H5: Socioeconomic perceived behavioural control towards WASH provision has a direct and positive relationship with actual psychosocial WASH behaviour.

H6: Women and adolescent girls' perceived behavioural control towards WASH provision are directly and positively related to their psychosocial behaviours.

4.4.5 WASH behaviours

It is no accident that the acronym WASH points to solutions for addressing the spread of waterborne diseases including sanitation and hygiene-related aspects which promote societal well-being. Behavioural intention refers to an individual's intent to perform WASH-related behaviours (Suntornsan, Chudech & Janmaimool, 2022:6). Quite simply, some behaviours need to occur to prevent contaminations and to redress associated WASH problems. Ginja, Gallagher, and Keenan (2021:2) indicated that treating household drinking water can greatly reduce deaths from diarrhoea even without using additional measures, as WASH interventions have yielded insignificant achievement in either changing or maintaining those behaviours. Within the rural informal settlements, where communicable diseases are widespread, WASH interventions are to be targeted by government investment in key infrastructures and individual actions for personal protection against diseases. Figure 4.5 depicts the overall extension of the TPB in the provision of WASH in the rural informal settlement.

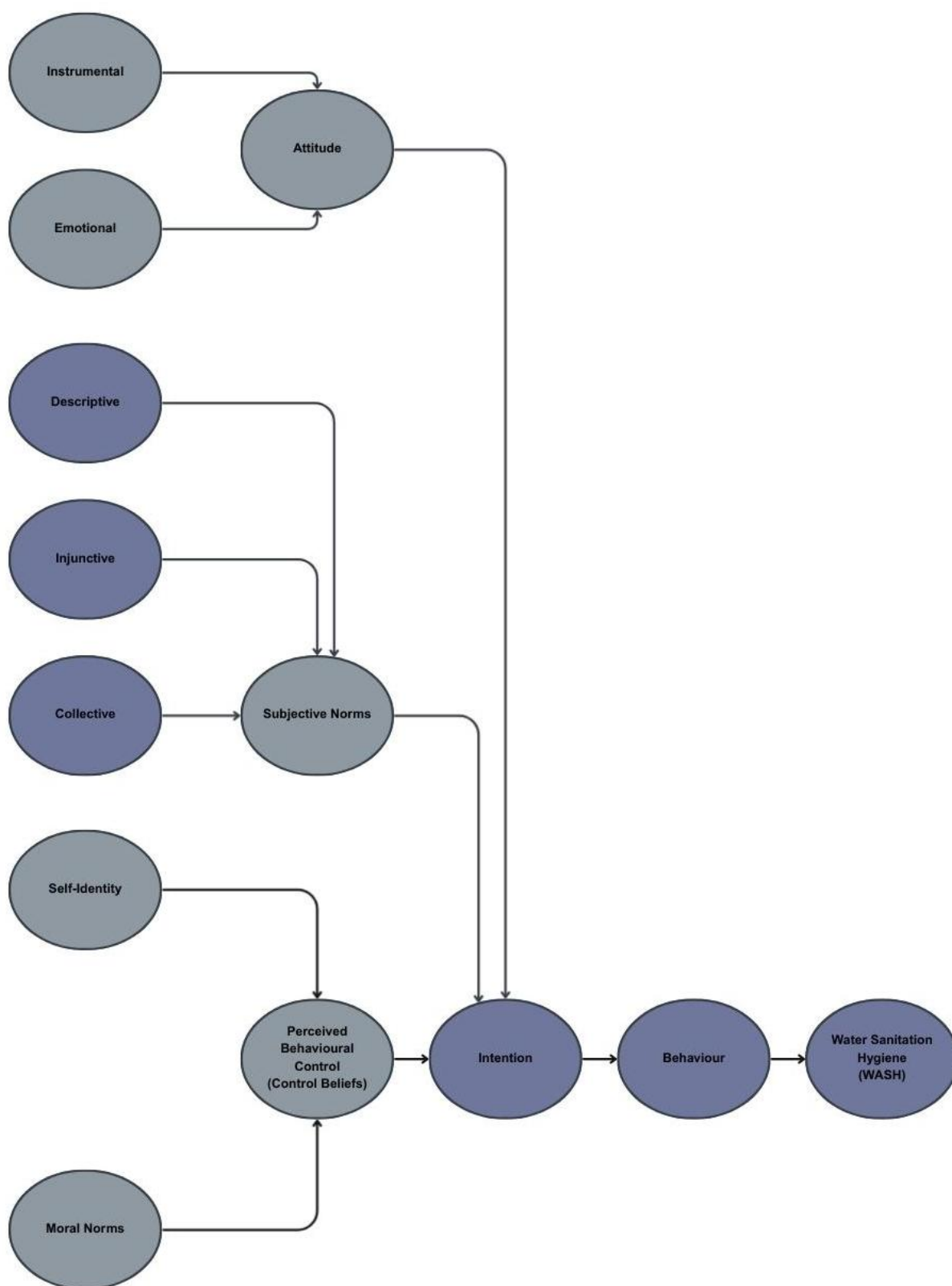


Figure 4.5 Extended TPB in the provision of WASH

Source: Author's own compilation

Stoler *et al.* (2023:1) reported that global progress towards SDGs' targets 6.1 and 6.2 are behind schedule, causing financial challenges for WASH interventions. These impacts have led to the development of various indicators for measuring the effectiveness of WASH behaviours, such as handwashing frequency, toilet use and maintenance, water quality and standard, hygiene practices and menstrual hygiene management, as important attributes for WASH intervention accomplishments. Generally, at the household level, women and adolescent girls are regularly responsible for inspecting specific WASH behaviours that could occur, but often do not; such as HWT and proper storage of drinking water, cleaning water bucket materials regularly, using clean utensils and washing hands with soap before handling water.

In the section below, it is imperative to understand the psychological concepts to adhere to the provision of WASH as espoused in this study. This is presented next.

4.5 CONCEPTUALISING RISKS, ATTITUDES, NORMS, ABILITIES AND SELF-REGULATION CONCEPTS

As indicated above, psychosocial behaviour is based on the interaction between individuals, societies and the mind. To develop a sustainable model, the clarification of key concepts such as Risk, Attitudes, Norms, Abilities and Self-regulation (RANAS) strategy in the provision of WASH is mandatory.

4.5.1 Risks

Risks – the potential for adverse consequences for human or ecological systems, recognising the diversity of values and objects associated with such systems [...] risks can rise from potential impacts of climate change as well as human responses to climate change. [...] risks result from dynamic interactions between climate-related hazards with the exposure and vulnerability of the affected human or ecological system to the hazards (Adamo *et al.*, 2024:5).

In the RANAS strategy, the Risk component is important in the provision of WASH by identifying community vulnerabilities and influencing behaviour to better understand perceptions of WASH risks. Alabi, Akintayo, Odeyemi, Oloche, Babalola, Nwimo, Popoola, Mogeni, Marks, and Okeke (2024:346) reported that water is an essential element for sustaining life and yet access to safe and clean household drinking water sources remains a significant ecological health risk in Africa. Yan, Wan, Wang, Lai, Ali,

He, Liu, Li, Nasir, and Coulon (2024:2), specified that health risk refers to hazardous pathogenic bacteria found inside stored containers of household drinking water. Ecologically, contaminated household drinking water from poor water quality poses the risk of communicable diseases such as diarrhoea and cholera due to inadequate access to WASH (Bonso, Bedada & Dires, 2023:1). A study conducted in a rural community at Mankweng in the Limpopo Province of South Africa, revealed a high health risk of diseases such as gastrointestinal effects, dental fluorosis and skin lesions from faecal contamination of groundwater sources attributed to inadequate provision of WASH infrastructures (Maliehe, Mavingo, Selepe, Masoko, Mashao & Nyamutswa, 2024:2).

Risks in the provision of WASH in a society denote perceptions of vulnerability to disease contamination, such as diarrhoea and knowledge about inadequate access to handwashing facilities not done properly at crucial times (Rahaman, Ramos, Harter & Mosler, 2022a:3). Globally, diarrhoea remains the leading cause of communicable disease amongst children and its potential spread is promoted by the risk of poor access to handwashing with soap before preparing food and after using the toilet, especially in rural households (Williams *et al.*, 2021:1).

Women and adolescent girls can pose a high risk as their hands are the drivers of the transmission of infectious communicable diseases from persons and (Jaber, Boelee, Bleser, & Bartram, 2024:8) by placing hands in water storage containers and dirty water containers. Although, handwashing can stop the spread of many diseases and is key to prevent the spread of diseases globally, access to soap and water is limited in many households. Fig 4.6 depicts documented water insecurity and gender-based water violence within Sub-Saharan Africa and South Asia countries.

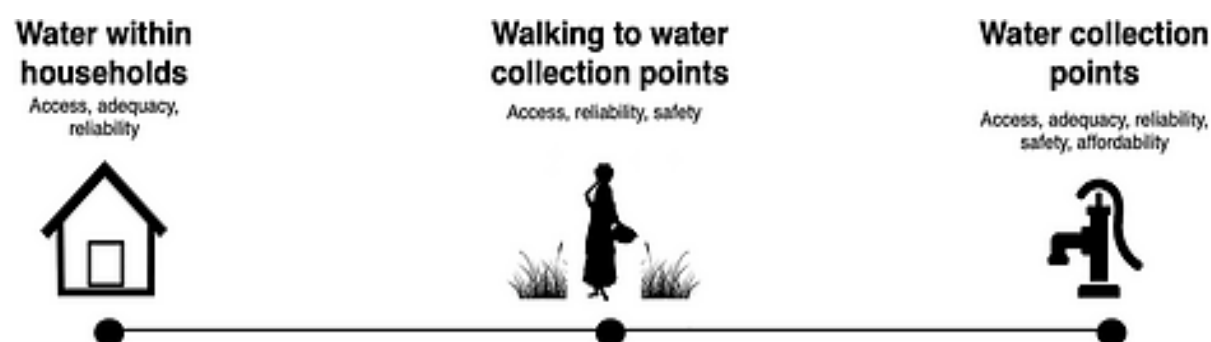


Figure 0.6 Documented water insecurity and gender-based water violence

Source: Tallman, Collins, Salmon-Mulanovich, Rusyidi, Kothadia and Cole (2023:10)

Tallman *et al.* (2023:9) asserted that in Sub-Saharan Africa and South Asia, water insecurity and gender-based violence increased the risk of sexual and physical violence for women and adolescent girls who walk long distances accessing safe drinking water for their households. Notably, water scarcity, practices and behaviours increased the vulnerability of communicable diseases in women and adolescent girls and prompted the risk of violence. To reinforce the aforementioned, one of the most common concerns expressed and perceived by women and adolescent girls accessing clean drinking water for their household from various water source points are risks related to sexual violence, harassment, assault, bullying and rape (Tallman *et al.*, 2023:5).

A study conducted in India concurred that women and girls are at higher risk of sexual harassment and rape when accessing WASH-related provision (Nunbogu *et al.*, 2023:2). Psychosocial violence amongst women and adolescent girls can entail criticism and rejection that cause isolation which leads to humiliating behaviour. This indicates how women's and adolescent girls' traumas could exemplify historical and sociocultural processes which impact gender disparities tied with social behavioural characteristics which are more prevalent in accessing WASH in rural informal settlement communities.

The notion of risks is described in the work of Chidziwisano, Slekiene, Mosler, and Morse (2020:1104) as a psychosocial barrier in the promotion and improvement of health programmes connected to the provision of WASH in the balanced feeding programme, negatively impacting child growth in rural households. (Slekiene *et al.*, 2024:4) asserted that risk factors are target behaviours and psychosocial factors related to health knowledge, perceived vulnerability and severity. Sclar, Bauza, Bisoyi, Majorin, Mosler, and Clasen (2024:2) indicated that the vast improvements achieved globally in the access to basic sanitation and open defecation reduction amongst adults, while ignoring open defecation amongst children, poses a huge health risk through mouthing and other investigative behaviours in rural households.

A study conducted in Haiti revealed that open defecation driven by inadequate sanitation facilities poses serious health risks related to hygiene among adolescents (Kim, Shin, Kim, Cajuste & Kwon, 2024:448). Mostly, risk can relate to individuals' understanding and awareness of the health risks behaviour connected with contracting communicable diseases (Mulopo, Kalinda & Chimbari, 2020:2). Despite plans and

procedures for attaining Vision 2030 of the SDGs, the need for global access to WASH practices in Sub-Saharan African countries persists, with public health risks burgeoning up to almost twofold in the face of high population growth and limited WASH facilities (Okesanya *et al.*, 2024:2). Inadequate WASH practices increase the risk factors of communicable infection and diseases which could lead to elevated morbidity and mortality rates, further constraining existing healthcare situations.

Psychosocial factors paired with geographical topography pose huge risks of increased infectious diseases and child mortality due to poor access to healthcare facilities in rural communities (Jeyakumar, Giri & Godbharle, 2024:1126). A study conducted in Portugal revealed the psychological impact of extreme drought which poses safety risk behaviour related to changing weather patterns. High level of water risk are classified as *Water scarcity* (high risk), *flooding* (medium risk), *water quality* (high risk) and *ecosystem services status* (high risk) in the Portugal river basin (Velooso, Tam & Oliveira, 2024:2). In most cases, rural communities are faced with persistent poverty, inadequate infrastructure, limited access to WASH and insufficient transportation alternatives. However, the provision of WASH plays a crucial role in mitigating the risk of communicable diseases and promoting overall societal well-being. A secured WASH is essential for the mitigation of environmental health risks, promotion of public health and socioeconomic development. Risk perception strongly shapes behaviour change by increasing willingness to adopt new practices such as HWT and support infrastructure changes. such ase improved sanitation policies.

4.5.2 Attitudes

Attitudes are a focal psychological concept within social psychology. From an etymological perspective, the word attitude was derived from the Latin word *aptus*, which simply means *fit and ready for action* (Lebsir, 2022:91). Decades of studies by experimental sociologists have documented the concept of attitude such as American sociologists Willian Thomas and Florian Znaniecki, who defined attitude in social psychology as a science of attitudes tangled with an individual's psychological perception of the value, function or individual perception of the social value of certain things (Huajian, 2024:1).

Gordon Allport defined attitude as “probably the most distinctive and indispensable concept” in 1935, Louis Thurstone in the 1920s argued that the unique aspect of

attitude was assessing or affective predisposition towards an object or an idea (Fishman, Yang & Mandell, 2021:2). The study of attitudes remains at the forefront of social psychological research and Gordon Allport's theory remains equally valid nowadays in describing the attitudes of women and adolescent girls in the context of accessing WASH.

Attitude can be defined as a constant tendency to respond in a particular way, either positively or negatively, towards any matter as it possesses both cognitive and emotional components and is influenced by socio-economic background and personal characteristics (Maseka, Hong & Wang, 2024:1094). The provision of WASH sources for transporting water for home and household on-site-use such as bathing, cooking, drinking, washing dishes, washing clothes and washing menstrual cloths are often influenced by personal circumstances such as menstruation or health status. Women and adolescent girls' attitudes towards the provision of WASH are influenced and characterised by the water itself and various water sources daily such as private and public well, private and public pond, river, tap water, purchased water and tank water.

4.5.3 Norms

Promoting the moral importance of clean water access as a collective societal goal can align individual behaviours with policy objectives. Heyes (2024:14) indicated that 'norm' refers to "a rule or principle that specifies actions which are required, permissible or forbidden" and has "independent normality" and "intrinsic motivation". Norms permeate human life. Human lives are drenched in social norms and some norms vary in many dimensions and appear to be present in all cultures. Zhang, Liu, Dong, He, Yao, Xu & Mu, (2023:2) asserted that social norms differ from other types of norms like conventions and legal norms as they are inherently social and considered strongly social, reflecting others' perceptions and behaviour in specific situations. Women and adolescent girls' clothes, eating habits, ways in which they collect household drinking water, sexual and parental behaviours and day-to-day modes of interaction with one another can be influenced by rules (norms) about what is appropriate, allowed or required in various segments of society.

Westra and Andrews (2022:39) concurred that since norms are drenched in social norms as rules, they dictate behaviours that are appropriate, permissible or obligatory in different situations for various members of society. Deshpande (2023:289) asserted

that norms are rules and often informal which specify customary behavioural, societal and spatial boundaries for members of cultural groups. Rimal and Yilma (2022:1574) indicated that norms can be divided into two perceptions such as *descriptive* and *injunctive* norms. Violating social norms has a significant impact on society because of the consequences in societal acknowledgement in the sense that social norms have a strong descriptive aspect that captures ‘what is done’ or ‘the way we do things around here’ or ‘what I think others do’.

The notion of descriptive norms can be unearthed as the primary driver in normative influences which leads to descriptive norms’ behaviours controlled by the presence of moderators such as behavioural identity and self-efficacy (Rimal & Yilma, 2022:1573). Descriptive norms can lead to gender-based violence against women and adolescent girls and their perception of the prevalence of a behaviour accessing the provision of WASH for their households. Women and adolescent girls’ negative behaviours are often driven by describing their perceived experiences in terms of male control while accessing WASH sources, which includes behaviours such as verbal disputes, physical violence, sexual harassment and poor economic conditions because they think that males in their community and social circle exhibit the same behaviour.

Table 4.2 depicts descriptive norms as an empirical expectation perceived by women and adolescent girls in accessing household WASH-related sources. Injunctive norms reflect ‘what I think others approve of’. Gavrillets (2020:2) specified that injunctive norms constitute behaviour that one is expected to follow and expects others to follow in each social condition, and are sustained by social threats. Injunctive and descriptive norms typically interact with each other to influence societal behaviours. Women and adolescent girls can perceive social threats with the expected outcomes of males controlling WASH sources and their response if they do not engage in negative behaviours such as verbal and physical violence while accessing household water from numerous water sources.

Table 4.2 Descriptive norms related to WASH sources

	Water within households	Walking to water collection points	Water collection points
	(access, adequacy, reliability)	(access, reliability, safety)	(access, reliability, safety, adequacy, affordability)
Verbal	Verbal disputes/violence as a result of insufficient water in household	Verbal and sexual harassment due to isolation of water collection points	Verbal and sexual harassment due to isolation of water collection points
Physical	Physical violence against children; intergenerational violence to enforce water collection roles Physical violence as failure to meet prescribed gender roles, for requesting help with water or opportunity cost of fetching water Punishment against daughters-in-law for failing to provide sufficient water	Physical assault/attack due to long distances and isolation at water sources, predictability of water gathering schedules, darkness and other forms of cover (e.g., brush, grass) that permit targeting of women	Physical assault/attack/ non-partner violence due to isolation of water points Fighting between individuals gathering water due to water availability issues (e.g., long queues)

Sexual		Sexual harassment/assault/rape/bribe, abductions due to long distances and isolation at water sources, predictability of water gathering schedules, darkness and other forms of cover (e.g. brush, grass) that permit targeting of women	Sexual harassment/assault/rape/bribe, abductions due to long distances and isolation at water sources, predictability of water gathering schedules and male control water points Transactional sex between water vendors and women/girls due to male control of water points
Economic			Transactional sex between water vendors and women/girls due to male control of water points

Source: Tallman et al. (2023:10b) (Modified)

4.5.4 Abilities

Improving and eradicating barriers to matters such as skills development and availability of resources can enhance behavioural control and empower communities to adopt desired behaviours. Decades of experimental studies have documented the concept of ability: Ferguson (1954:100) described it as a “skill learned to a crude level of stability”, Fleishman (1958:79) assessed ability as “an initial performance on an experimental task,” while Swaab, Schaerer, Anicich, Ronay, and Galinsky (2014:1582) defined ability as “consistency in performance at very high levels” (Iso-Ahola, 2024:3). Naturally, human beings have innate competencies to understand and learn information for developing physical and cognitive skills, especially for accessing the provision of WASH sources.

According to Rahaman, Ramos, Harter, and Mosler 2022 (2022b:1127), abilities comprise individuals’ feelings and beliefs about the cost-benefits of a particular behaviour (e.g., time and difficulties collecting household drinking water). Women and adolescent girls have the abilities regarding knowledge (knowledge of how to access

household water sources) and confidence (perceived ability to execute and continue household water sources and recover from setbacks of not using household water sources) in rural informal settlements.

4.5.5 Self-regulation

Promoting self-regulatory behaviours (through, education campaigns and community engagement) can help individuals take initiatives in managing WASH challenges effectively. Self-regulation became popular in the 1980s and integrated into pedagogical research by famous scholars such as Bandura (1986) and Zimmerman (1989), concerning the regulation of personal thinking and actions (Sinkkonen & Tapani, 2024:132). Fan and Cui (2024:5) opine that the concept of self-regulation encompasses numerous interconnected processes which include goal setting, monitoring progress, emotional regulation and the application of strategic learning techniques, collectively covering the entire language learning paradigm. Self-regulation shapes the overall learning experience of society and fosters problem-solving.

The notion of self-regulation can be perceived as the capacity to change ideas and feelings according to the ever-changing needs of society (Saleh & Almejadi, 2024:4). Self-regulation strategies can equip women and adolescent girls with the skills to manage their water collection time effectively, set realistic household goals and overcome procrastination, leading to improved language and being able to read and understand household WASH-related ingredients for their overall well-being. The proposed RANAS strategy creates a supportive environment for gender transformation by addressing inequalities through education, policy reform and resources allocation. At the same time, it empowers women and adolescent girls by promoting inclusive leadership, increasing access to technology and property rights and challenging restrictive cultural norms. This comprehensive approach ensures that advancement in socioeconomic and cultural inclusion is sustainable and driven by participation of empowered women, rather than being hindered by entrenched systems of discrimination.

4.6 CONCLUSION

The White Paper on Basic Household and Sanitation of 2001 addresses the challenges of implementing service backlogs in low- and high-density rural areas in South Africa, especially where on-site non-sewered toilets are generally the most

suitable technical option in informal settlements households. It is fundamental for relevant stakeholders and government officials to be involved in the provision of basic services such as WASH, to adhere to the intervention of implemented public policies in the informal settlements and to protect human life. Gender transformative approaches to WASH were reviewed, due to feminine involvement and the importance of women and adolescent girls accessing the provision of WASH, for their voices to be heard and protected during public policy interventions. This chapter builds upon the Theory of Planned Behaviour (TPB) and the Risk, Attitude, Norm, Ability and Self-regulation (RANAS) aim to understand and modify human behaviour. The policy focuses on household involvement and health health-oriented approach and complements TPB's emphasis on attitudes and perceived behaviour control as well as RANAS-tailored interventions. Together, these strategies can encourage WASH health-promoting behaviour such as using sanitation facilities and promote the implementation of public policy in rural communities. The next chapter analyses the perception of rural informal settlements about proposing a sustainable WASH governance model for the implementation of WASH in local municipalities.

CHAPTER 5:

PERCEPTIONS AND CHALLENGES IN THE PROVISION OF WASH AT RURAL INFORMAL SETTLEMENTS: EMPIRICAL EVIDENCE

5.1 INTRODUCTION

Chapter Four explored the psychosocial well-being and socioeconomic characteristics of communities in rural informal settlements, as well as their relationship with access to water, sanitation and hygiene (WASH) provisions. In Chapter Five, the empirical findings of the study are outlined with the aim of informing the development of a sustainable governance model to empower informal settlements in rural Capricorn District Municipality (CDM). The findings from various data collection instruments utilised in this inquiry support RO4, detailed in Section 1.5.2, concerning whether the perceptions and challenges faced by residents of these settlements will guide the formulation of sustainable governance principles for WASH in the area. Finally, the chapter concludes with a comprehensive discussion of the results and the extent to which they have addressed the research questions (RO5).

5.2 AN OVERVIEW OF WASH IN THE CAPRICORN DISTRICT MUNICIPALITY

The WASH issues in rural South Africa have persisted for decades, continuing to affect the poor. Murei, Mogane, Mothiba, Mochware, Sekgobela, Mudau, Musumuvhi, Khabo-Mmekoa, Moropeng, and Momba (2022:2) and Seretlo-Rangata *et al.* (2025:1) reported that the Limpopo Province is known as one of the most water-stressed rural provinces in South Africa, heavily affected by the WASH crisis tied to its economic status. The total population of Limpopo Province has grown from 5,941,439 in 2022 to 6,822,375 in 2024, with a rural population growth of 5,602,432 in 2024 (Department of Water and Sanitation [DWS], 2024a, 2024b). The province covers an area of approximately 125,754 km² and has a highest elevation of 2,126 m, characterised by isolated mountains. The local government in Limpopo Province comprises 33 audited and five district municipalities including the CDM, three municipal entities and 25 local municipalities (Matoane & Mukonza, 2024:79). The South African Government has categorised municipalities into three types: A – metropolitan municipalities, B – local

municipalities and C – district municipalities (Cheruiyot, Lengaram & Siteleki, 2024:7). Capricorn is one of the five districts in the Limpopo Province (Capricorn District Municipality, 2022:55).

The CDM is classified as a Category C municipality, encompassing several local municipalities within its jurisdiction. Matimolane, Strydom, Mathivha, and Chikoore (2023:278) asserted that the CDM experiences warm to hot, wet summers and cold, dry winters with colder temperatures. High temperatures signify increased water use, as they lead to residents using/consuming more water for drinking, sanitation and other purposes. While warm and wet summers increase the risk of waterborne diseases. These issues identify the need to place the designed sustainable governance model within context-appropriate WASH systems. More WASH services are needed when temperatures are high, particularly during drought and summer months due to more extreme rainfall events and increased demand. Additionally, Matimolane *et al.* (2023:277) indicated that the climatic environment of the Limpopo Province is characterised by severe drought and high evaporation rates, often resulting in severe water shortage. The District is located in the centre of Limpopo Province, bordered by Vhembe (CD34) to the northeast, Mopani (DC33) to the east, Sekhukhune (DC47) to the south and Waterberg (DC36) to the west, which includes the provincial capital, the City of Polokwane, that is vital for economic development (Capricorn District Municipality, 2022:55). The district is strategically placed in the centre of main districts. This district is closer to provincial decision-making. One can expect that this area is at a far greater advantage than other rural villages in Limpopo. It can also be expected that there is significant pressure on water and sanitation services due to the strategic location of this district.

The key roads in the area include the N1 National Road to Zimbabwe, the P33/1 (R37) to Burgersfort/Lydenburg, the P94/1 to Alldays and Botswana and the P17/1 (R71) to Tzaneen and Phalaborwa. Capricorn comprises four local municipalities that fall within one district, along with local municipalities responsible for infrastructure and the provision of basic services, such as WASH (Capricorn District Municipality, 2022:55).

The CDM provides WASH-related services across four municipalities: Lepelle-Nkumpi Local Municipality, Polokwane Local Municipality, Blouberg Local Municipality and Molemole Local Municipality. The Lepelle and Polokwane are the only municipalities with the informal settlement according to the CDM's Integrated Development Plan

(IDP). Bazaanah and Mothapo (2023:3) reported that constituencies living in rural informal settlements at the Lepe-Nkumpi municipality usually have inadequate access to improved sources of drinking water and basic sanitation for their households. Pieterse, Ludick, and Chilwane (2023:37) indicated that changes in land cover, including urbanisation, vegetation loss and land degradation from poorly managed cultivation, diminish a catchment's ability to store or retain water in the Polokwane Municipality. The improvement to WASH is essential as communities in rural informal settlements are at risk near the big city due to population growth, leading to insufficient housing and increased employment being sought in the city industries.

Access to WASH is a fundamental human right, as well as a constitutional right. Contaminated WASH adversely affects social and physical health, infringing upon human dignity. The study argues that addressing WASH service provision challenges requires understanding constituencies' feasibilities and perceptions of the WASH service provision efficiencies, which enhance local government through public participation as a constitutional right (van Koppen, Nohayi, Jacobs-Mata & Nortje, 2024:1). Lack of constituencies' participation and inadequacy in the provision of WASH services in South African municipalities is a major concern for rural informal settlement communities. According to Matloga, Mahole, and Nekhavhambe (2024:2), the district municipalities must ensure that constituencies actively participate in the governance process and be informed about WASH services, which include mechanisms and methods for providing effective basic services. This process would encourage local government and municipalities to create effective WASH methods and mechanisms to promote constituencies' participation, mostly in the rural informal settlements of the Limpopo Province. Rankoana (2023:252) stated that numerous rural areas in South African municipalities are increasingly dissatisfied with the quality, quantity, accessibility of services and frequency of water provision interruptions. The alignment of municipal strategies with the SDGs explores the intersection of global development frameworks and local governance in the Limpopo Province (Hungwe & Munyaradzi, 2024:156). Moreover, while the CDM has progressed in health (SDG 3) and education (SDG 4), both the Polokwane Local Municipality (PLM) (Hungwe & Munyaradzi, 2024:171) and for comparative analysis Vhembe District Municipality (VDM) also face challenges regarding WASH (SDG 6), poverty reduction (SDG 1) and hunger alleviation (SDG 2). Local municipalities, as the closest level of government,

play a crucial role in promoting sustainable development. Providing basic WASH services for all, especially in rural informal settlements, is essential for sustainable municipal development. This need informed the creation of the Blue Drop and Green Drop programmes by the Department of Water and Sanitation (DWS) in South Africa to enhance the improvement of drinking water quality (Blue Drop) and wastewater treatment facilities (Green Drop) (Mnguni & Leonard, 2024:286). See Figure 5.1 for the Water Treatment Works at Limpopo Province, including the Blue Drop and Green Drop status at the CDM.

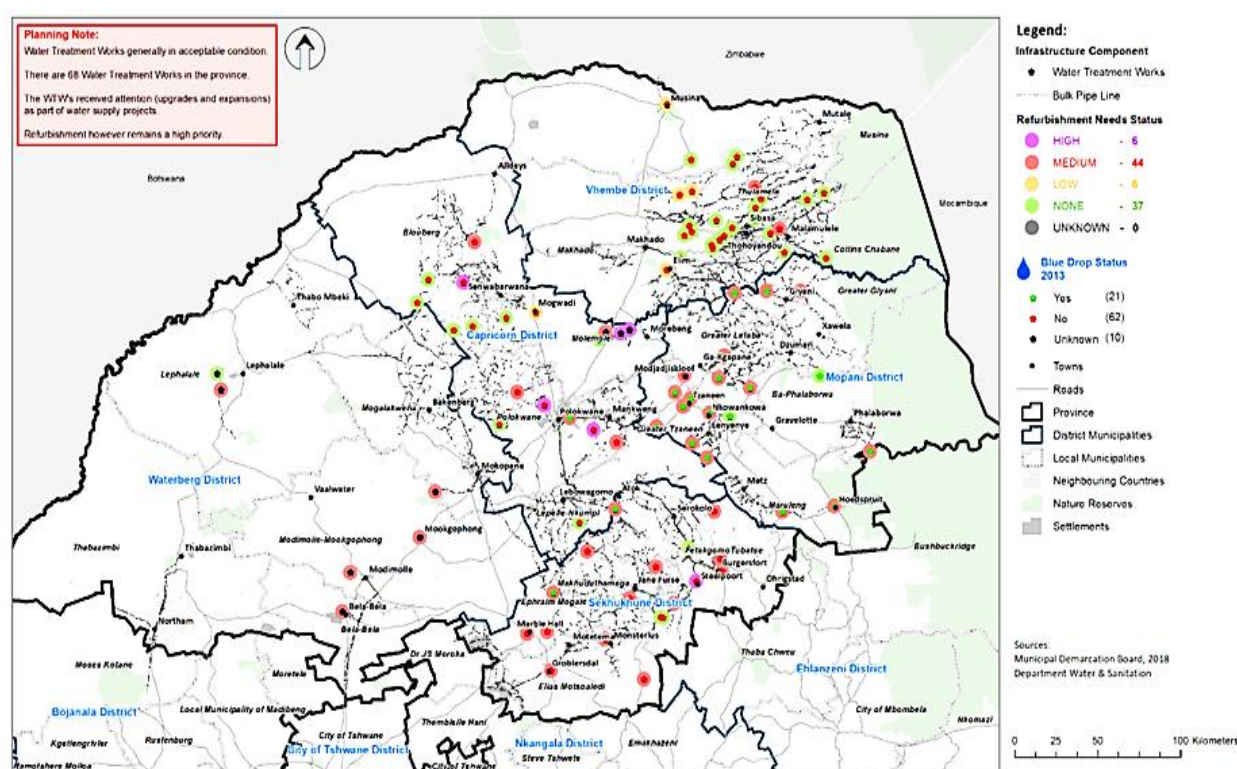


Figure 5.1 Wastewater Treatment Works

Source: Limpopo Development Plan 2020-2025

The CDM has a blue drop status of 38.1%, which is significantly below the 95% benchmark, making it one of the poorest-performing Water Services Authorities (WSAs) in the country (Ramathabatha, 2024). In 2024, as a matter of urgency, the Democratic Alliance (DA) urged the then Minister of Water and Sanitation, Senzo Mchunu, to place the CDM under regulatory investigation (Ramathabatha, 2024). As such, the annual report of the CDM published the water quality status for the CDM from July to December 2024, indicating that numerous water supply systems within

the CDM do not meet the SANS 241 drinking standards, which ensure the provision of safe drinking water (Capricorn District Municipality, 2025:par.1) The 2023 Green Drop report indicated that 51% of the Waste Water Recovery Facilities (WRRFs) in South African municipalities are critically managed and produce non-compliant sewage (Maremane, Belle & Oberholster, 2024:2).

5.2.1 Selected local municipalities in the CDM

The Polokwane Local Municipality (PLM) and Lepelle-Nkumpi Local Municipality (LNLM) are the two selected local municipalities in this study that have many households in rural areas with various perceptions about their access to WASH. These study locations are mainly comprised of rustic communities with varying levels of access to WASH services, and various types of infrastructure, facility conditions and privacy, perception and treatment practices and handwashing facilities. However, their accessibility to and reliability of WASH provision are declining due to the negative impact of non-operational boreholes and infrastructure upgrades at the PLM and LNLM.

5.2.1.1 Polokwane Local Municipality

Polokwane, meaning 'Place of Safety' in seSotho, is the capital city of Limpopo Province and the largest urban centre in South Africa, north of Gauteng. The municipality covers approximately 539,982.5 hectares, making up 3% of the province's total area of about 124,000 square kilometres (Polokwane Local Municipality, 2022:15). According to the Polokwane Annual Report, 2023/2024, the municipality's household population increased from 203,605 to 249,443 households that have access to piped water inside their houses. Meanwhile, there are 42,935 households without access to piped water (Polokwane Local Municipality, 2022:15). Based on Statistics South Africa's 2022 Census Report, the total population of the city of Polokwane has risen to 843,459, consisting of 406,945 males and 436,514 females (StatsSA, 2024). The PLM appears to have more informal settlements based on population growth, which aligns with the focus on rural and informal contexts. Polokwane is predominantly urban but also encompasses peri-urban informal settlements and traditional rural villages.

5.2.1.2 Lepelle-Nkumpi Local Municipality

The LNLM is one of four local municipalities in the CDM, located in southern Limpopo's Capricorn District. This predominantly rural area has a population of approximately 233,925 and spans 3,464 hectares, comprising 16% of the district's total land mass. It is divided into 30 wards with 94 settlements and about 95% of the land falls under Traditional Authorities (Lepelle-Nkumpi Local Municipality 2021:27). Furthermore, the LNLM has a total of 61,305 households, an average household size of 3.8 and consists of 30 wards, each with an average population of 8,000 people.

5.3 DATA COLLECTION AND PRESENTATION OF EMPIRICAL RESULTS

Chapter one notes that data was collected using a questionnaire adapted from the United Nations Children's Fund (UNICEF)/World Health Organisation (WHO)/ Joint Monitoring Programme (JMP) core WASH survey (see Annexure C1) and through semi-structured interviews. The data collection process faced challenges that complicated the research.

5.3.1 Challenges encountered while conducting the empirical study

One of the major challenges encountered was the aftermath of the seventh national election held on Wednesday, 29 May 2024, in South Africa. This election was considered one of the most competitive since the advent of democracy. It was followed by municipal by-elections on Wednesday, 19 June 2024, during which many respondents were reluctant to participate in the interviews. Load shedding (power blackouts) also impacted households' access to water, especially in areas reliant on grid-powered boreholes or water treatment plants. Despite these challenges, data saturation was reached while collecting qualitative data as the process did not yield any new insights, themes or significant information relevant to the research questions. This indicates that the data set analysed is robust and comprehensive.

- ✓ low Community Development Workers (CDW) response rate;
- ✓ low constituent response rate;
- ✓ dilapidated road infrastructure constraining access;
- ✓ inaccessible physical locations of households;
- ✓ political and legal restrictions;
- ✓ time management and financial challenges;

- ✓ religious and cultural barriers;
- ✓ municipal by-elections; and
- ✓ load shedding

5.4 QUANTITATIVE DATA PRESENTATION AND ANALYSIS

Quantitative data was collected through questionnaires distributed in rural informal settlement communities. The aim was to identify the most effective sustainable governance model for improving WASH provision at the CDM. This descriptive survey research design ensured that the findings are systematic and verifiable, incorporating regression analyses of the relevant variables. The researcher opted for SPSS as it is well known for its user-friendly graphical interface, while STATA is favoured for its powerful command-line syntax and advanced statistical capabilities.

5.4.1 Descriptive Analysis

Quantitative data consist of a total of 391 randomly selected households residing within the jurisdiction of the Lepelle-Nkumpi Local Municipality (LNLM) and Polokwane Local Municipality (PLM) who were interviewed, 35.8% (n=140) of them were males, while 64.2% (n=251) were females. The respondents were not randomly selected as it was not feasible to do so. Data were collected from the participants in the LNLM and PLM who agreed to participate in the study. Figure 5.2 shows the number of genders in rural informal settlement communities. This gender provision aligns with the population characteristics of the study area, based on data published by Statistics South Africa, with women representing approximately 51.1% (30,5m) and males representing 48.9% (29,1m), with a total of 59.62 million in the country (StatsSA, 2023). The female-headed households represented 49% in the CDM, while of the LNLM, this figure was 56% compared to 45% in the PLM. These figures might comparatively be attributed to the prevalence of women in the CDM's IDP (2022/2023).

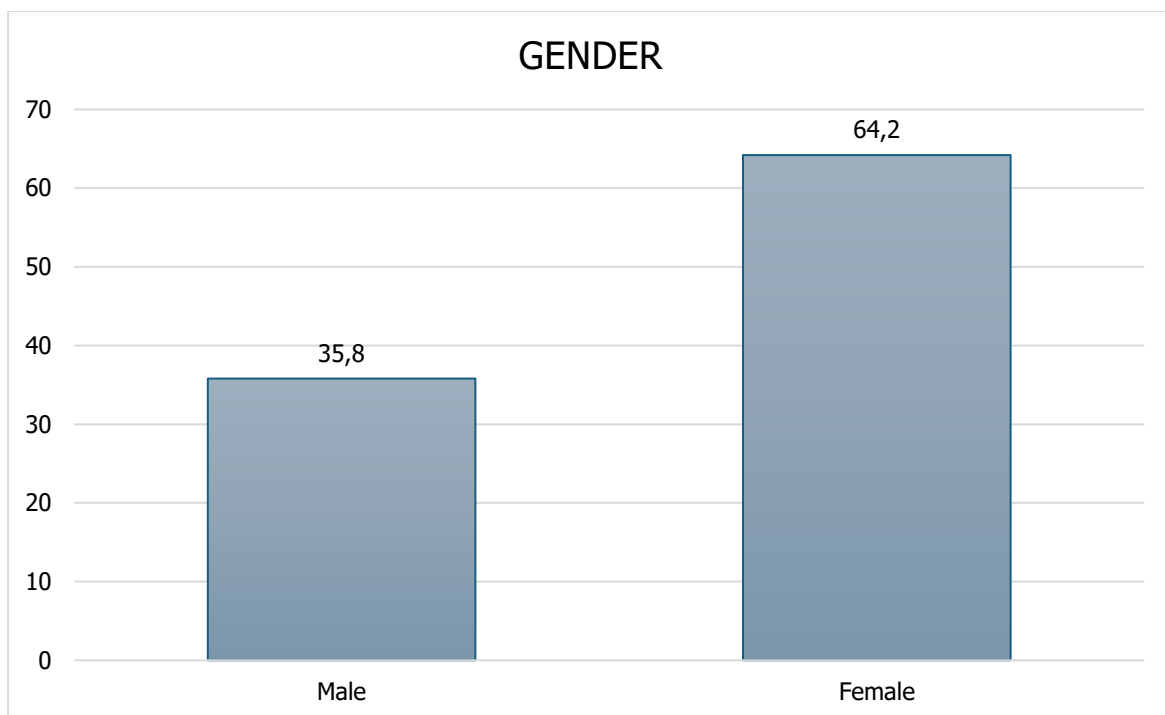


Figure 5.1 Gender of respondents

Source: Researcher's own compilation

The rural informal settlement constituencies provided valuable insights into the community's demographics. Among the respondents, a significant 51.9% (n=203) were adolescents aged 18-29 years, while 36.6% (n=143) fall within the 30-49 age group. Together, these groups made up 88.5% of the active population. In contrast, only a small percentage of respondents were aged 65 years or older. Regarding literacy in the sample, Table 5.1 below shows that the majority of 63.7% were educated with 8.4% (n=33), 10.5% (n=41) and 44.8% (n=175) having a degree, diploma and certificate, respectively. About 36.3% (n=142) did not have any form of education, which impacted societal development in adhering to the WASH regulations imposed upon them. Makgoba and Mlambo (2024:917) asserted that in South Africa, the unemployment rate reached 32.9% in the first quarter of 2024 compared to 32.1% in the fourth quarter of 2023.

The CDM vision to become “the home of excellence and opportunity for a better life” is supported by the IDP goals that the Local Economic Development (LED) (Capricorn District Municipality, 2022:5), plan includes to fulfil the five-year goal plan, which includes: 4% annual economic growth; a drop in the unemployment rate to below 50.1%; a reduction in the percentage of households living below the poverty line of R1.800 per month; improved access to economic possibilities and a rise in municipal income. It was evident that most

respondents were unemployed, 65.2% (n=255), with a smaller portion of 16.1% (n=63) employed and others in various roles such as students, full-time housewives and pensioners.

Table 5.1 Demographic categories of constituency respondents

AGE		
18 – 29 years	203	51.9%
30 – 49 years	143	36.6%
50 – 64 years	35	9.0%
65 years and above	10	2.6%
QUALIFICATION		
Degree	33	8.4%
Diploma	41	10.5%
Certificate	175	44.8%
None	142	36.3%
EMPLOYMENT		
Employed	63	16.1%
Unemployed	255	65.2%
Student	38	9.7%
Fulltime housewife	10	2.6%
Pensioner	17	4.3%
Unable to work	3	0.8%
Labourer	1	0.3%
Teacher	4	1.0%

Source: Researcher's own compilation

Table 5.2 further indicates that the majority, 74.2% (n=290), attended schools where a large portion completed secondary school and a small percentage of individuals, 13.6% (n=53) and 3.6% (n=14) attended tertiary and primary schools, respectively. However, about 25.3% (n=99) of respondents did not attend school. Over half of the

respondents, 51.2% (n=200), reported having no income, indicating a high level of unemployment caused by acute poverty that impacts inequalities and criminal tendencies in the rural informal settlement households. However, about 49.1% (n=191) have varied income levels ranging from R100 to R5000. Consequently, issues related to education, unemployment and the status of women and adolescent girls remain the primary socio-economic challenges in the targeted rural informal settlements sampled for purposes of this research. This analysis is consistent with that of the municipal CDM-IDP (2022/2023), indicating an unemployment rate of 17.5% including the Vhembe District Municipality (VDM), which comprised a rate of 29.0% unemployment and worsening economic vulnerability (Pieterse, Ludick, Chilwane & Motaung, 2024:20).

The primary source of income in households of participants reflects their sustainability and perceptions of their livelihoods in the provision of WASH. About 7.2% (n=28) of rural informal settlements sustain their household through farming, while 18.4% (n=72), of respondents earn a salary. A diverse range of income sources is evident, with wage/salary and assistance of relatives being the most common, followed by various others such as pensions, farming and government aids. The size of community members' households varied: 41.4% (n=162) have 4-6 members, followed closely by those in households with 1-3 with (36.8%) (n=144). Larger households with 7-10 members constituted 19.7% (n=77). Most respondents in the rural informal settlements have lived in the area for over 15 years, 42.7% (n=167), while 39.4% (n=154) have been there for 1-5 years. Tlhoale and Palamuleni (2025:2) stated that the global goals of ensuring universal access to safe water, adequate sanitation and community empowerment provide avenues and policy routes for implementing and enhancing ecological sanitation technologies and systems. This poses numerous challenges for South African municipalities in upgrading municipal infrastructures, including the CDM.

Table 5.2 Socio-economic differentiation of respondents

EDUCATION		
No schooling	99	25.3%
Creche/Pre-school	2	0.5%
Primary school	14	3.6%
Secondary school	223	57.0%
Tertiary education	53	13.6%
TOTAL INCOME LEVEL		
None	200	51.2%
R100-R500	55	14.1%
R501-R1000	45	11.5%
R1001-R3000	42	10.7%
R3001-R5000	16	4.1%
Over R5000	33	8.4%
INCOME SOURCE		
Wage/salary	72	18.4%
Farming	28	7.2%
Husbandry	1	0.3%
Wood and wood products	5	1.3%
Tourism	4	1.0%
Trading	8	2.0%
Rental Income	8	2.0%
Assistance of relatives	57	14.6%
Pensions	35	9.0%
Other governmental aids/ assistance	57	14.6%
Aids/assistance from NGOs	1	0.3%
Allowances for elderly	15	3.8%
Other	100	25.6%

HOUSEHOLD SIZE		
1-3	144	36.8%
4-6	162	41.4%
7-10	77	19.7%
10-above	8	2.0%
DURATION SETTLEMENT		
Less than a year	9	2.3%
1-5 years	154	39.4%
6-15 years	61	15.6%
Over 15 years	167	42.7%

Source: Researcher's own compilation

5.4.1.1 Perceptions and challenges in the provision of WASH

The perceptions and challenges section describes the descriptive analysis of the demographic variables such as gender, age, level of education, total income and household size of the respondents residing in rural informal settlement communities. Questions used were adapted from the WHO/UNICEF/JMP core WASH survey. Responses were analysed to determine the indicators related to water quality, access, safety and sanitation in informal rural settlements. These insights were helpful to identify priority intervention areas and improve governance for sustainable WASH provisions. Table 5.3 presents descriptive statistics on perceptions of WASH variables, revealing that 89.9% (n = 348) of respondents felt confident in the acceptability of their main water source, with less than 11% (n = 43) citing issues with taste or colour. Over 40% of the global population lives in rural areas, typically served by small drinking water supplies (World Health Organisation, 2024:2). This supports the present findings, as communities in the study area also indicated they had limited access to potable water for their livelihoods.

According to Matimolane, Selane, and Mathivha (2024:3), the Department of Water and Sanitation has mandated that municipalities provide water to households, including 6,000 litres of free basic water monthly for those in need. Less than 50% of respondents believed they had safely managed drinking water, as only 52.9% (n =

209) used improved water sources that are safe and accessible. Gender disparities have led to 46.5% of households lacking adequate, safe water access. Furthermore, 14.9% of households reported health risks and sexual harassment due to sanitation safety, 31.2% used mobile objects like buckets or jugs for handwashing and 0.8% had no handwashing facility at all.

Table 5.3 Perceptions in the provision of WASH

	FACTORS	N	%
1	Acceptability of drinking water		
	✓ Yes, acceptable	348	89.0%
	✓ No, unacceptable taste	10	2.6%
	✓ No, unacceptable colour	4	1.0%
	✓ No, other (specify)	7	1.8%
	✓ Don't know	22	5.6%
2	Water Safely Managed		
	✓ Safely managed	187	47.8%
	✓ Basic	92	23.5%
	✓ Limited	88	22.5%
	✓ Unimproved	21	5.4%
	✓ Surface water	3	0.8%
3	Safety in water collection		
	✓ Water is not available from source	4	1.0%
	✓ Water is not available from source	178	45.5%
	✓ Water is too expensive	65	16.6%
	✓ Source is not accessible	91	23.3%
	✓ Other (specify)	36	9.2%
	✓ Don't know	17	4.3%
4	Sanitation Safety		
	✓ No risks faced	329	84.1%
	✓ Yes, risk to health	52	13.3%
	✓ Yes, risk of harassment	5	1.3%
	✓ Yes, other (specify)	1	0.3%
5	Handwashing facility		

✓	Fixed facility reported (sink/tap)	223	57.0%
✓	In dwelling	18	4.6%
✓	In yard/plot	19	4.9%
✓	Mobile object reported (bucket/jug/kettle)	122	31.2%
✓	No handwashing place in dwelling/yard/plot	3	0.8%
✓	Other (specify)	6	1.5%

Source: Researcher's own compilation

Table 5.4 portrays challenges in the provision of WASH variables: 71.4% (n=279) of the households had access to piped water into the dwelling, with 22.3% (n=87) into the compound and 6.4% (n=25) piped and connected to their neighbourhood. The majority – 85% (n=336) of households still do not know their sanitation facilities, indicating a lack of or limited mobility preventing members from using the toilet, 0.3% (n=1). Overall, 89.0% of households have access to bar or liquid hand soap to be able to wash their hands after using the toilet, while a smaller percentage, 2.3% (n=9) of households still use ashes, mud or sand to wash their hands after using the toilet. Interventions to improve WASH can save the lives of numerous women and adolescent girls in the communities; however, challenges persist in rural informal settlements. Seema, Molepo, and Maleka (2025:1) reported that in the Modimolle-Mokgophong Local Municipality (MMLM), there are frequent water pipe bursts, particularly in winter and illegal connections in the informal settlements strain WASH provision in the communities. The results of the study on the CDM, in which the respondents reported poor service delivery and vandalism of water infrastructure, clearly support those of Seema *et al.* (2025:1).

Table 5.4 Challenges in the provision of WASH

	FACTORS	N	%
1	Water accessibility and reliability		
✓	Piped into dwelling	279	71.4%
✓	Piped into a compound, yard or plot	87	22.3%
✓	Piped to neighbour	25	6.4%
2	Sanitation facility accessibility		
✓	Limited mobility prevents members from using the toilet	11	2.8%
		17	4.3%
✓	Distance/barriers prevent members from reaching the toilet	10	2.6%
		16	4.1%
✓	Toilet is not always available to all household members	336	85.9%
✓	Toilet is not always safe for all household members to use	1	0.3%
✓	Other (specify)		
✓	Limited mobility prevents members from using the toilet		
3	Types of soap		
✓	Bar or Liquid soap	348	89.0%
✓	Detergent (Powder / Liquid / Paste)	33	8.4%
✓	Ash / Mud / Sand	9	2.3%

Source: Researcher's own compilation

The researcher used the Chi-Square test to survey the relationship between total income and the household's main source of drinking water, type of household toilet and their handwashing facilities.

5.4.1.2 Total Income and Household Size Descriptive Statistics

Table 5.5 Results of Chi-Square analysis on gender differences and their income level

Category			Total income level								
			None	R100- R500	R501- R1000	R1001- R3000	R3001- R5000	Over R5000	Total	Df	Chi- Square
Gender	Male	Observed	64	9	9	29	5	24	140	5	55.10*
		Expected	71.6	19.7	16.1	15.0	5.7	11.8	140.0		
	Female	Observed	136	46	36	13	11	9	251		
		Expected	128.4	35.3	28.9	27.0	10.3	21.2	251.0		
		Expected	128.4	35.3	28.9	27.0	10.3	21.2	251.0		
Total		Observed	200	55	45	42	16	33	391		
		Expected	200.0	55.0	45.0	42.0	16.0	33.0	391.0		

*P<0.000

Source: Researcher's own compilation

Results in Table 5.5 show that there is a significant association between the respondents' gender and their total income level. The Chi-Square test carried out on the data was significant at 0.000 level (2 tailed $p < 0.000$; $X^2 = 55.10$, $df = 8$). The study concludes that there is a significant difference in the representation of gender across income distribution. Specifically, more male (20.71%, $n = 29$) than female (5.18%, $n = 13$) respondents earned R1001-R3000 total income in their households. About 10.74% ($n = 42$) of household combinations earn a total income of R1001-R3000, which is crucial for understanding the socio-economic realities of these communities. However, the major income sources of households were wages, social grants and other unspecified sources. These unspecified sources were information considered confidential by the majority of respondents, 51.1% ($n = 200$). In contrast, 14.0% ($n = 55$) of both genders admitted that they earned R100-R500 and 11% ($n = 45$) indicated R501-R1000, while 8.4% ($n = 33$) earned over R5000 total income for their households. Therefore, there is a significant association between gender and total income level in the study areas. Consequently, the null hypothesis is rejected and the alternative hypothesis accepted regarding the association between the participants' gender and total income level. This means that a significantly higher percentage of women than men in the study area reported that their household is associated with WASH-related

challenges. This finding is understandable given that women traditionally perform household chores, which often require WASH and are consequently more informed about the impact of household size on their domestic water needs.

Table 5.6 Results of Chi-Square analysis on gender differences and household size

Category			Household size						
			1-3	4-6	7-10	10-above	Total	Df	Chi-Square
Gender	Male	Observed	26	84	30	0	140	3	42.68*
		Expected	51.6	58.0	27.6	2.9	140.0		
	Female	Observed	118	78	47	8	251		
		Expected	92.4	104.0	49.4	5.1	251.0		
Total		Observed	144	162	77	8	391		
		Expected	144.0	162.0	77.0	8.0	391.0		

*P<0.00

Source: Researcher's own compilation

Results in Table 5.6 show that there is a significant association between the respondents' gender and household size. The Chi-Square test was significant at 0.000 level (2 tailed $p < 0.000$; $X^2 = 42.68$, $df = 3$). The study concludes that household size significantly affected the provision of WASH in the respondents' households. More female (19%, $n = 47$) than male (21%, $n = 30$) respondents reported that household size significantly affected the provision of WASH in their homes. About 20% ($n = 77$) of households often face significant challenges accessing WASH and improved sanitation remains a huge challenge facing service provision breakdown in these communities, often led by female-headed households. In contrast, 37% ($n = 144$) of both genders reported having household sizes of 1-3 and 4-6, 42% ($n = 162$) and over 2% ($n = 10$) household sizes affecting the provision of WASH for their households. Therefore, there is a significant association between gender and household size in the study areas. Consequently, the null hypothesis is rejected and the alternative hypothesis accepted regarding the association between the participants' gender and their household size. This means that a significantly higher percentage of women than

men in the study area reported that their household is associated with WASH-related challenges. This finding is understandable given that women traditionally perform household chores which often require WASH and are consequently more informed about the impact of household size on their domestic water needs.

5.4.1.3 Water descriptive statistics

Table 5.7 Results of Chi-Square analysis on gender differences and water availability

Category			Availability of water					
			Always available	Sometimes available	Rarely available	Total	Df	Chi-Square
Gender	Male	Count	90	48	2	140	2	16.29*
		Expected	106.3	32.2	1.4	140.0		
	Female	Count	207	42	2	251		
		Expected	190.7	57.8	2.6	251.0		
Total		Count	297	90	4	391		
		Expected	297.0	90.0	4.0	391.0		

*P<0.000

Source: Researcher's own compilation

Results in Table 5.7 show that there is a significant association between the respondents' gender and water availability. The Chi-square statistics of 16.29 is significant at $p < 0.000$, which indicates that more female (84%, $n=207$) than male (16%, $n=90$) respondents think that water is always available in their households. About 23% ($n=90$) of households' combination of gender demographics, sometimes did not have water available, which depended on population growth, poverty status, poor housing and a myriad of physical and environmental risks, which often compromise their health and social well-being. In contrast, 1.02% ($n=4$) of both genders admitted that water was rarely available and 76% ($n=297$) indicated that water was always available for their households. Therefore, there is a significant association between gender and water availability in the study areas. Consequently, the null hypothesis is rejected and alternative hypothesis accepted regarding the association

between the participants' gender and their availability of water. The significant gender association is probably due to the fact that women are traditionally more involved in performing household chores than men. They are more informed in providing reliable information about the availability of water in contrast to their male counterparts. The data shows that more women (n=207) double of the number of men (n=90) agreed that water was always available in their households.

Table 5.8 Results of Chi-Square analysis on gender differences in water treatment perceptions

Category			Water treatment perception					
			Treat Water	Do not Treat Water	Undecided	Total	Df	Chi-Square
Gender	Male	Observed	24	99	17	140	2	25.78*
		Expected	45.5	83.8	10.7	140.0		
	Female	Observed	103	135	13	251		
		Expected	81.5	150.2	19.3	251.0		
		Expected	127.0	234.0	30.0	391.0		
Total		Observed	127	234	30	391		
		Expected	127.0	234.0	30.0	391.0		

*P<0.000

Source: Researcher's own compilation

Results in Table 5.8 show that there is a significant association between gender and water treatment perceptions. The Chi-square statistics of 25.78 is significant ($p<0.000$), indicating that majority of male (70.7%, $n=99$) and female (53.8%, $n=135$) respondents did not treat water in their households. In total, almost 60% ($n=234$) of the households used untreated water, thereby increasing their vulnerability to waterborne infections. In contrast, 32.5% ($n=127$) admitted treating their water, while 7.7% ($n=30$) respondents of both genders were undecided. Therefore, there is a significant association between gender and water treatment perceptions. Consequently, the null hypothesis is rejected and alternative hypothesis accepted regarding the association between the participants' gender and their water treatment

perceptions. The observed difference in water treatment behaviours between male and female-headed households suggests that gender dynamics could play a significant role in determining vulnerability to waterborne diseases. As female-headed households are more likely to treat their water, they are generally less vulnerable to such diseases compared to male-headed ones. This implies that male-headed households may face a higher risk due to lower engagement in preventive water-treatment practices. This behavioural pattern may reflect broader societal issues where women often take more responsibility for household health and upkeep and are more proactive in seeking health-related solutions. Additionally, access to treatment resources and health awareness may be more common among women, further explaining the gender disparity in vulnerability.

Table 0.9 Results of Chi-Square analysis on gender differences in household drinking water levels

Category			Household drinking water levels							
			Safely managed	Basic	Limited	Unimproved	Surface water	Total	Df	Chi-Square
Gender	Male	Observed	63	40	18	17	2	140	4	31.60*
		Expected	67.0	32.9	31.5	7.5	1.1	140.0		
	Female	Observed	124	52	70	4	1	251		
		Expected	120.0	59.1	56.5	13.5	1.9	251.0		
	Total	Observed	187	92	88	21	3	391		
		Expected	187.0	92.0	88.0	21.0	3.0	391.0		

*P<0.000

Source: Researcher's own compilation

Results in Table 5.9 show that there is a significant association between gender and household drinking water levels. The Chi-square statistics of $X^2 = 31.60$ is significant at $p < 0.000$, thus indicating that 12.1% of the male ($n=17$) and 1.5% female ($n=4$) respondents depend on unimproved drinking water for their households. However, about 5.4% ($n=21$) reported that their households depended on unimproved water sources, which resulted in a higher prevalence of diarrhoeal diseases among their children. In contrast, 48% ($n=187$) testified that their water levels are safely managed, while 24% ($n=92$) had water at basic level and 23% ($n=88$) limited level, with 0.7%

(n=3) depending on surface water level. Therefore, there was a significant association between gender and household drinking water levels. Consequently, the null hypothesis is rejected and alternative hypothesis accepted regarding the association between the participants' gender and their household drinking water levels. In terms of gender comparison, the findings show that the male-headed households are more likely to use unimproved water sources than female-headed homes, thereby increasing their vulnerability to waterborne diseases.

Table 0.10 Results of Chi-Square analysis on gender differences in the use of multiple water sources

Category			Multiple water sources				
			Piped into the dwelling	Piped into compound, yard or plot	Piped to the neighbour	Total	Df
Gender	Male	Observed	89	38	13	140	2
		Expected	99.9	31.2	9.0	140.0	
	Female	Observed	190	49	12	251	
		Expected	179.1	55.8	16.0	251.0	
	Total	Observed	279	87	25	391	
		Expected	279.0	87.0	25.0	391.0	

*P<0.029

Source: Researcher's own compilation

Results in Table 5.10 show that there is a significant association between gender and their use of multiple water sources. The Chi-square statistics of $X^2 = 7.0$ is significant ($p < 0.029$), which suggests that majority of the male (64%, $n = 89$) and female (76%, $n = 190$) respondents have access to piped water in dwellings for their households. In total, 71.3%, ($n = 279$) of female have access to water piped into their household, which improves their health. This implies that female-headed households' access to water was time-saving and yielded potential economic benefits. In contrast, 35% ($n = 87$) have access to water piped into compound, yard or plot and 81% ($n = 25$) have piped connection to their neighbours. The above-mentioned are linked to the '*transect walk*' and the '*photovoice*' used for the PRA to assess the quality of their livelihood.

Therefore, there is a significant association between the respondent's gender and their use of multiple water sources. Consequently, the null hypothesis is rejected and

alternative hypothesis accepted regarding the association between the participants' gender and their use of multiple water sources. When women in rural areas, such as those in the location under this study, have access to pipe-borne water and multiple water sources, the time and labour spent fetching water are substantially reduced, thus enabling greater participation in income-generating activities. Improved water access also enhances household hygiene and health, lowering medical expenses. Girls' school attendance is also enhanced, as they usually carry out water collection duties. There is also the likelihood of economic empowerment as women can engage in small-scale entrepreneurial activities such as vegetable gardening, food processing and petty trading. Overall, women's access to multiple water sources boosts gender equity and improves overall quality of life.

Table 5.11 Results of Chi-Square analysis on gender differences and safety in water supply

Category			Safety in water							
			Water is not available from source	Water is too expensive	Source is not accessible	Other	Don't know	Total	Df	Chi-Square
Gender	Male	Observed	61	16	35	14	14	140	5	28.27*
		Expected	65.1	23.3	32.6	12.9	6.1	140		
	Female	Observed	121	49	56	22	3	251		
		Expected	116.9	41.7	58.4	23.1	10.9	251		
Total		Observed	182	65	91	36	17	391		
		Expected	182	65	91	36	17	391		

*P<0.000

Source: Researcher's own compilation

Results in Table 5.11 above show that there is a significant association between gender and safety in water supply. The Chi-square statistics of 28.27 is significant ($p<0.000$), implying that a few males (11.4%, $n=16$) and females (20%, $n=49$) indicated that water is too expensive for their households. Almost 17% ($n=65$) reported that expensive water for their household impacted their financial strain, reduced access to basic needs and increased potential health risks for their households. In contrast, 47%

(n=182) of the households do not have water from a local source and no source of water is accessible for about 23.2% (n=91). Therefore, there is a significant association between the respondents' gender and their safe water supply. Consequently, the null hypothesis is rejected and alternative hypothesis accepted regarding the association between the participants' gender and their safety in water supply. This finding suggests that women-headed households in rural areas face greater economic and resource constraints, which limit their capacity to afford safe water. In addition to increasing their vulnerability to waterborne infections, they also face the burden of meeting prohibitive health-related costs. This situation reflects broader gender disparities in income and access to essential services, usually skewed against women and girls in rural settings. There is a critical need to address this gap to achieve equitable WASH access and improve public health outcomes, particularly in resource-constrained communities like the CDM.

Table 5.12 Results of Chi-Square analysis on gender differences and the acceptability of water supplied from the main source

Category			Main source usually acceptable							
			Yes, acceptable	No, unacceptable taste	No, unacceptable colour	No, other	Don't know	Total	Df	Chi-Square
Gender	Male	Observed	115	9	0	0	16	140	4	33.11*
		Expected	124.6	3.6	1.4	2.5	7.9	140.0		
	Female	Observed	233	1	4	7	6	251		
		Expected	223.4	6.4	2.6	4.5	14.1	251.0		
Total		Observed	348	10	4	7	22	391		
		Expected	348.0	10.0	4.0	7.0	22.0	391.0		

P<0.000

Source: Researcher's own compilation

Results in Table 5.12 display that there is a significant association between the respondents' gender and the acceptability of water supplied from the main source. The Chi-square statistic of 33.11 is significant at $p < 0.000$, thus indicating that 6.4% (n=9) of males and less than 0.40% (n=1) females agreed that the taste of their water is

unacceptable for household drinking. In total, almost 2.3% (n=10) reported that the taste of their water is unacceptable for household drinking, whereas access to clean, safe and adequate amounts of water is vital for human well-being, social and economic development, health ecosystems, dignity and gender equality. In contrast, 89% (n=348) indicated that their household drinking water is acceptable, while 1.0% (n=4) reported unacceptable colour. Therefore, there is a significant association between the respondents' gender and the acceptability of their water supplied from the main source. Consequently, the null hypothesis is rejected and the alternative hypothesis accepted regarding the association between the participants' gender and their acceptability of water supplied from the main source.

5.4.1.3 Sanitation descriptive statistics

Table 5.13 Results of Chi-Square analysis on gender differences and the main reason their household members were unable to use the toilet day or night

Category			The main reason household members are unable to use the toilet day or night								Def.	Chi-Square
			Limited mobility prevents a member from using the toilet	Distance/Barriers prevent members from reaching the toilet	The toilet is not always available to all household members	The toilet is not always safe for all household members to use	Other	Limited mobility prevents members from using the toilets	Total			
Gender	Male	Observed	7	9	8	6	110	0	140	5	16.32*	
		Expected	3.9	6.1	3.6	5.7	120.3	4	140.0			
	Female	Observed	4	8	2	10	226	1	251			
		Expected	7.1	10.9	6.4	10.3	215.7	6	251.0			
	Total		Observed	11	17	10	16	336	1			391
		Expected	11.0	17.0	10.0	16.0	336.0	1.0	391.0			

*p<0.05

Source: Researcher's own compilation

Results in Table 5.13 show that a significant association exists between the respondents' gender and the main reason their household members were unable to use the toilet day or night. The Chi-square statistic of 16.32 is significant at $P < 0.006$, which indicates that a few of the males (5.8%, n=8) and females (0.80%, n=2) reported

that their toilet is not always available to all household members because of geo-physical, economic, legal and socio-political challenges. In total, almost 2.5% (n=10) reported that their toilet is not always available to all household members. However, 4.3% (n=17) reported that distance or barriers prevent members from reaching the toilet; while 4.10% (n=16) agreed their toilet is not always safe for all household members to use and 2.55% (n=11) reported that limited mobility prevents members from using the toilets. Therefore, there is a significant association between the respondents' gender and the main reason their household members were unable to use a toilet day or night. Consequently, the null hypothesis is rejected and alternative hypothesis accepted regarding the association between the participants' gender and the main reason their household members were unable to use the toilet day or night. This finding implies that in rural areas, women face greater safety and security risks while accessing sanitation facilities and further highlights gender-based differences in access to safe toilets. This situation could be precarious as it can lead to increased vulnerability to violence such as mugging and rape, reduced dignity and health issues. It is vital to address this gap for the provision of equitable sanitation facilities to women and girls in the study area.

Table 5.14 Results of Chi-Square analysis on gender differences in household members facing risk using the toilet

Category			Household members facing risk using the toilet						
			No risk faced	Yes, risk to health	Yes, risk of harassment	Yes, other	Total	Df	Chi-Square
Gender	Male	Observed	117	18	4	0	140	4	8.31*
		Expected	117.8	18.6	1.8	1.4	140.0		
	Female	Observed	2112	34	1	4	251		
			Expected	211.2	34.4	3.2	2.6		
Total		Observed	329	52	5	4	391		
		Expected	329.0	52.0	5.0	4.0	391.0		

*P<0.081

Source: Researcher's own compilation

Results in Table 5.14 show that there is a significant association between the respondents' gender and their household members facing risk using the toilet. The Chi-square statistics of 8.31 is significant at $P < 0.081$, thereby indicating that a minority of males (12.9%, $n=18$) and females (13.5%, $n=34$) admitted that their household members face risk when using the toilet. In total, almost 13.30% ($n=52$) admitted that a lack of effective waste management planning and littered waste impacts household members facing risk when using the toilet. In contrast, 1.28% ($n=5$) admitted the risk of harassment, while 1.02% ($n=4$) mentioned risk without any specification. Therefore, there is a significant association between the respondents' gender and household members facing risk while using the toilet. Therefore, the null hypothesis is retained and the alternative hypothesis accepted regarding the association between the respondents' gender and household members facing risk while using the toilet.

Table 5.15 Results of Chi-Square analysis on gender differences and their household members' privacy while using the sanitation facility

Category			Household members' privacy while using the sanitation facility				
			Privacy	No Privacy	Total	Df	Chi-Square
Gender	Male	Observed	124	16	140	1	10.59*
		Expected	131.1	8.6	140.0		
	Female	Observed	243	8	251		
		Expected	235.6	15.4	251.0		
Total		Observed	367	24	391		
		Expected	367.0	24.0	391.0		

* $P < 0.001$

Source: Researcher's own compilation

Results in Table 4.15 show that there is a significant association between the respondents' gender and their household members' privacy while using the sanitation facilities. The Chi-square statistic of 10.59 is significant at $P < 0.001$, revealing that a

greater proportion of male respondents (11.4%, n=16) reported lacking privacy compared to female (3.19%, n=8) respondents did not have privacy while using the sanitation facilities. In general, almost 6.1% (n=24) admitted not having privacy, which causes users to feel uncomfortable while using sanitation facilities. In contrast, 93.9% (n=367) household members admitted having privacy while using sanitation facilities. Therefore, there is a significant association between the respondents' gender and household members' privacy while using the sanitation facility. Consequently, the null hypothesis is rejected and the alternative hypothesis accepted regarding the association between the respondents' gender and household members' privacy while using the sanitation facility.

5.4.1.4 Hygiene Descriptive Statistics

Table 5.16 Results of Chi-Square analysis on gender differences and their household members' handwashing facilities

Category			Household members' handwashing facility								
			Fixed facility reported sink/tap	In dwelling	In yard/ plot	Mobile object reported bucket, jug, kettle	No handwashing place in dwelling/ yard/plot	Other specify	Total	Df	Chi-Square
Gender	Male	Observed	7	9	8	6	110	0	140	5	7.45*
		Expected	3.9	6.1	3.6	5.7	120.3	4	140.0		
	Female	Observed	4	8	2	10	226	1	251		
		Expected	7.1	10.9	6.4	10.3	215.7	6	251.0		
Total		Observed	11	17	10	16	336	1	391		
		Expected	11.0	17.0	10.0	16.0	336.0	1.0	391.0		

*P<0.019

Source: Researcher's own compilation.

In Table 5.16, results show that there is a significant association between the respondents' gender and their household members' handwashing facilities. The Chi-square statistics of 7.45 is significant at P<0.019, reveals that a few male (34.2%,

n=48) and female (29.4%, n=74) respondents use mobile objects such as bucket/jug/kettle as the handwashing facilities in their household. In total, almost 31.2% (n=122) admitted using mobile objects such as bucket/jug/kettle while washing their hands which shapes the handwashing behaviour and practices in their household. In contrast, 86% (n=336) household members admitted not having handwashing facilities in their household dwelling/yard/plot. Therefore, there is a significant association between the respondents' gender and household members' handwashing facilities. Consequently, the null hypothesis is rejected and the alternative hypothesis accepted regarding the association between the respondents' gender and household members' handwashing facilities. The use of mobile devices like buckets and kettles for handwashing suggests limited access to fixed handwashing stations and poor access to potable water. This may lead to poor hygiene practices, especially after toilet use or before meals. Such infrastructural gaps can compromise disease prevention. Access to proper handwashing facilities is important for effective sanitation behaviour and practices.

Table 5.17 Results of Chi-Square analysis on gender differences and their household members' type of soap used

Category			Household members' type of soap used					
			Bar or Liquid Soap	Detergent Powder Liquid paste	Ash Mud Sand	Total	Df	Chi-Square
Gender	Male	Observed	111	28	0	140	3	43.65*
		Expected	124.6	11.8	3.2	140.0		
	Female	Observed	237	5	9	251		
		Expected	223.4	21.2	5.8	251.0		
Total		Observed	348	33	9	391		
		Expected	348.0	33.0	9.0	391.0		

*P<0.000

Source: Researcher's own compilation.

Results in Table 5.17 indicate that there is a significant association between the respondents' gender and types of soap used by their household members. The Chi-square statistic of 43.65 is significant at $P < 0.000$, which indicates that a minority of male (20%, $n=28$) and female (2%, $n=5$) participants used detergents such as powder or liquid paste in their household. In total, almost 8.4% ($n=33$) admitted using a detergent such as powder or liquid paste as their type of soap, which is affordable and available for their household members. In contrast, 2.3% ($n=9$) household members admitted using ash/mud/sand, while the majority of 89% ($n=348$) reported observing their household members using bar or liquid soap. Therefore, there is a significant association between the respondents' gender and the type of soap used by their household members. Consequently, the null hypothesis is rejected and the alternative hypothesis accepted regarding the association between the respondents' gender and the type of soap used by their household members.

5.4.2 Factor Analysis

To explore the underlying dimensions of WASH factors, a Principal Components Analysis (PCA) was conducted on the study's questionnaire's nine variables: education level, household size, income level, water treatment perception, sanitation safety, facility privacy, water reliability, handwashing facilities and types of soap. The aim of the PCA was to reduce data complexity while identifying latent constructs which account for the interrelationships among the variables. The suitability of the data for PCA was first assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. The overall KMO was **0.50**, while the individual KMO measures were all greater than 0.7, thus ranging from 'middling' to 'meritorious' according to Kaiser (1974).

Further computations indicated a significant Bartlett's test of sphericity ($p < 0.001$), which confirmed the appropriateness of the data for factorial analysis. In the analysis, PCA revealed **four** components that had eigenvalues higher than one, thus respectively explaining **20.6%, 15.1%, 14.3% and 12.1%** of the total variance. Both tests confirmed the appropriateness of the data for factor extraction. In order to identify the number of components to retain, the Kaiser criterion (eigenvalues ≥ 1) and visual inspection of the scree plot were applied. Consequently, **three** principal components were retained, which in combination accounted for a cumulative variance of **50.0%**,

thus showing an acceptable level of data compression or reduction. Table 5.18 presents component loadings and communalities of the rotated solution.

Table 5.18 Component loadings and communalities of the rotated solution

Component Matrix				
	Component			Communalities
	1	2	3	
Household size	0.73	-0.07	-0.07	0.58
Water Treatment Perception	0.67	0.42	-0.10	0.70
Handwashing facilities	0.61	-0.52	-0.18	0.68
Income level	0.51	0.27	-0.31	0.61
Sanitation safety	0.21	-0.66	0.05	0.49
Water reliability	0.34	0.50	0.40	0.66
Facility Privacy	0.14	0.09	0.73	0.62
Type of soap	0.16	-0.24	0.63	0.63
Education Level	-0.17	0.29	-0.20	0.62

Source: Researcher's own compilation.

Notes:

- Component Loadings ≥ 0.60 are generally considered significant and are often bolded.
- Communalities represent the proportion of each variable's variance explained by the extracted components (sum of squared loadings across retained components).
- Table 5.18 assumes 3 components were extracted using Varimax rotation.
- The variables seem to load into three thematic components:
 - ✓ Component 1: Socioeconomic Status (e.g. household size, income level, water treatment perception, handwashing facilities)
 - ✓ Component 2: Sanitation Safety
 - ✓ Component 3: Hygiene Awareness & Practice (e.g., facility privacy and type of soap)

Based on the need to improve the interpretation of the components, Varimax rotation was undertaken as it maximises the variance of squared loadings across the variables. This allowed for distinct identification of variable groupings within the components, which yielded the meaningful thematic categories. that are broadly interpreted thus:

1. Socioeconomic and Knowledge Factors (e.g. household size, handwashing facilities, income level and water treatment perception)
2. Sanitation Conditions (e.g., sanitation safety)
3. Facility Privacy and Hygiene Infrastructure (Hygiene Awareness & Practice (e.g., facility privacy and type of soap

Finally, the analysis yielded the following four latent factors:

Factor 1 – Access to water infrastructure

Factor 2 – Facility condition and privacy

Factor 3 – Water treatment practices

Factor 4 – Handwashing facilities

The study used SPSS to analyse the data collected, which generated outputs in the form of tables. For both inferential statistical analyses, questions were categorised under variables from the adapted WHO/UNICEF/JMP core WASH survey, including education level, household size, income level, water treatment perception, sanitation safety, facility privacy, water reliability, handwashing facilities and types of soap. These variables were subjected to factor and regression analyses to reduce the variables into a smaller set of underlying factors or dimensions which impact WASH in the rural informal communities. According to Karuga, Steege, Njoroge, Liani, Wiltgen Georgi, Otiso, Muturi, Okoth, Theobald, and Tolhurst (2022:245); and Shrestha (2021:4), Factor Analysis (FA) simplifies complex variables to identify key factors and their relationships.

5.4.2.1 Factor loadings and interpretation

This analysis examines factors influencing the feasibility of WASH implementation in the CDM, identifying constructs that can inform policy interventions. A factor analysis of twelve perception-based variables from the WASH survey, covering water acceptability, treatment, availability, sanitation, safety and hygiene, was conducted. Data was standardised before analysis and four relevant latent factors were extracted.

Key variables included: Water Acceptability, Safety in Water Collection, Water Quality Perception, Acceptability of Drinking Water, Burden of Water Collection, Water Accessibility and Reliability, Water Treatment Perception, as well as factors related to sanitation and handwashing facilities. Table 5.19: below shows the factor loadings analysis. Loadings above 0.40 are considered significant for interpreting the underlying structure of latent factors.

Table 5.19 Factor matrix regarding key variables influencing the feasibility of WASH implementation in the CDM

FACTOR MATRIX					
		FACTORS			
		Access to Infrastructure	Facility Condition and Privacy	Water Treatment Practices	Handwashing facilities
1	Availability of water	.608	.022	.023	-.012
2	Safety in Water	.560	.189	.070	-.206
3	Water Quality	.543	-.360	-.152	-.010
4	Water acceptability	.470	-.190	-.065	-.087
5	Burden of Water Collection	.118	.645	-.117	.535
6	Water Accessibility & Reliability	.316	.610	.144	-.198
7	Water Treatment Perception	.276	.279	.503	-.086
8	Sanitation Facility Access	-.596	-.014	.308	.078
9	Sanitation Safety	.293	-.123	-.105	.244
10	Facility Privacy	.333	.150	-.210	-.104
11	Handwashing Facility	.509	-.425	.463	.334
12	Type of soap	.246	.056	-.249	.133

Source: Researcher's own compilation.

Interpretation of Factors

Based on the above analysis, the four latent factors are interpreted as follows:

✓ **Factor 1 Access to Infrastructure**

This factor has high positive loadings from variables related to water availability, sanitation safety and drinking water acceptability.

✓ **Factor 2 Facility Condition and Privacy**

Variables like sanitation facility, accessibility and facility privacy show meaningful association here, indicating perceptions linked to infrastructure quality and user safety.

✓ **Factor 3 Water Treatment Practices**

This dimension highlights concerns regarding water treatment and individual perceptions of water quality and health risks.

✓ **Factor 4 Handwashing facilities**

This dimension highlights concerns with hygiene and handwashing facilities, as well as the types of soap observed by users.

INFERENCE: The factor analysis indicated that water and safety infrastructure, along with accessibility, affect WASH feasibility in the CDM. Additionally, the condition and privacy of water facilities, as well as perceptions of water treatment practices, significantly impact WASH feasibility. Understanding these dimensions could enable public policymakers to tailor interventions based on specific infrastructure, behaviour and safety needs, ensuring more targeted and sustainable outcomes in the provision of WASH. The suitability of principal component analysis (PCA) was assessed prior to analysis. Inspection of the correlation matrix showed that all variables had at least one correlation coefficient greater than 0.3. The overall Kaiser-Meyer-Olkin (KMO) measure was 0.83 with individual KMO measures all greater than 0.7, classifications of 'middling' to 'meritorious' according to Kaiser (1974). Bartlett's test of sphericity was statistically significant ($p < .0005$), indicating that the data was likely factorisable. PCA revealed five components that had eigenvalues greater than one and which explained 26.9%, 13.4%, 11.6%, 8.1% and 4.2% of the total variance, respectively. Visual inspection of the scree plot indicated that four components should be retained (Cattell, 1966). In addition, a four-component solution met the interpretability criterion. As such, four components were retained. The four-component solution explained 59.9% of the total variance. A Varimax orthogonal rotation was employed to aid interpretability. The

rotated solution exhibited 'simple structure' (Thurstone, 1947). The interpretation of the data was consistent with the personality attributes the questionnaire was designed to measure with strong loadings of motivation items on Component 1, dependability items on Component 2, enthusiasm items on Component 3 and commitment items on Component 4. Component loadings and communalities of the rotated solution are presented in Table 5.18. To explore the underlying dimensions of WASH factors, a Principal Components Analysis (PCA) was conducted on nine variables: education level, household size, income level, water treatment perception, sanitation safety, facility privacy, water reliability, handwashing facilities and types of soap. The aim of the PCA was to reduce data complexity while identifying latent constructs which account for the interrelationships among the variables. The suitability of the data for PCA was first assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. Both tests confirmed the appropriateness of the data for factor extraction. To identify the number of components to retain, the Kaiser criterion (eigenvalues ≥ 1) and visual inspection of the scree plot were applied. Consequently, three principal components were retained, which in combination accounted for a cumulative variance of 72.4%, thus showing an acceptable level of data compression or reduction.

Based on the need to improve the interpretation of the components, Varimax rotation was undertaken as it maximises the variance of squared loadings across the variables. This allowed for distinct identification of variable groupings within the components, which yielded the meaningful thematic categories. which are broadly interpreted thus:

1. Socioeconomic and Knowledge Factors (e.g., education, income, water treatment perception),
2. Sanitation and Privacy Conditions (e.g., sanitation safety, facility privacy),
3. Water and Hygiene Infrastructure (e.g., water reliability, handwashing facilities, type of soap).

5.4.3 Regression analysis

This section presents a focused logistic regression analysis to determine key predictors influencing the perceived acceptability of drinking water in the CDM. According to Starbuck (2023:223), logistic regression is a type of generalised linear model that relaxes key linear assumptions. It is particularly useful for modelling relationships with

outcomes that are not continuous, which is a limitation in linear regression. The findings support the development of a sustainable governance framework for WASH. The binary dependent variable was acceptability of drinking water, coded as 1 for acceptable and 0 for unacceptable. Independent variables included: education level, household size, income level, water treatment perception, sanitation safety, facility privacy, water reliability, handwashing facility and types of soap.

5.4.3.1 Logistic regression analysis

Binary logistic regression was performed to ascertain the effects of education level, household size, income level, water treatment perception, sanitation safety, facility privacy, water reliability, handwashing facilities and types of soap on the likelihood on respondents' accessibility to drinking water. In the regression analysis, Water Acceptability was coded as 0 for Unacceptable and 1 for Acceptable. The regression model was statistically significant, $X^2 = 40.5$, $p < 0.0001$. The model explained 19.7% of the variance in acceptability of drinking water and correctly classified 87.5% of cases. The omnibus tests of model coefficients and the model summaries are provided in Tables 5.20 and 5.21.

Table 5.20 Omnibus Tests of model coefficients

		Chi-square	df	Sig.
Step 1	Step	40.523	9	.000
	Block	40.523	9	.000
	Model	40.523	9	.000

Source: Researcher's own compilation.

Table 5.21 Model summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	230.410 ^a	.098	.197

Source: Researcher's own compilation.

Table 5.22 Water classification table

Observed			Predicted		
			Water Acceptability		Percentage Correct
			Unacceptable	Acceptable	
Step 1	Water Acceptability	Unacceptable	2	41	4.7
		Acceptable	8	340	97.7
	Overall Percentage				87.5

a. The cut value is .500

Source: Researcher's own compilation.

Table 5.23 Summary table for the logistic regression model

	B	S.E.	Wald	Df	Sig.
Education Level	.07	.12	.36	1	.55
Income Level	-.14	.11	1.63	1	.20
Sanitation Safety	-.58	.18	10.10	1	.00
Facility Privacy	-1.09	.58	3.50	1	.06
Water Reliability	-.62	.28	5.06	1	.02
Household Size	.18	.23	.57	1	.45
Water Treatment Perception	.06	.31	.04	1	.84
Handwashing Facility	-.44	.13	12.03	1	.00
Types of Soap	-.14	.12	1.48	1	.22
Constant	69.96	40.71	2.95	1	.09

Source: Researcher's own compilation.

The final logistic regression model, with estimated coefficients, is expressed as:

$$\text{logit}(P) = \beta_0 + \beta_1 * Q2 + \beta_2 * Q3 + \beta_3 * Q4 + \beta_4 * Q7 + \beta_5 * Q9 + \beta_6 * Q12 + \beta_7 * Q13$$

Substituting the estimated values:

$$\text{logit}(P) = 69.96 + 0.18\text{HOUSEHOLD SIZE} + 0.07\text{EDUCATION LEVEL} - 0.14\text{INCOMELEVEL} + 0.06\text{WATERTREAT} - 0.58\text{SANITSAFE} - 1.09\text{FACILPRIV} - 0.62\text{WATERRELIAB} - 0.44\text{WASHFACIL} - 0.14\text{SOAPTYPE}$$

Where:

Logit (P) = $\log (P / (1 - P))$, the natural logarithm of the odds of water acceptability

INTERPRETATION: Statistically significant predictors are those with p-values less than 0.05. Sanitation safety, water reliability and handwashing facilities are statistically significant predictors of water acceptability ($p < 0.05$). The negative coefficient for *INCOME LEVEL*, *SANITATION SAFETY*, *FACILITY PRIVACY*, *WATER RELIABILITY*, *WASH FACILITY AND TYPE OF SOAP* indicates that higher income level, higher sanitation safety, higher facility privacy, water reliability, higher handwashing facility and higher type of soap reduce the odds of water acceptability, while positive coefficients for *HOUSEHOLD SIZE*, *EDUCATION LEVEL* and *WATER TREATMENT PERCEPTION* show a strong positive association of water acceptability with household size, education level and water treatment perception. Table 5.24: below shows the final estimated logistic regression model, which determined key predictors influencing the perceived acceptability of drinking water in the CDM.

Table 5.24 Final estimated logistic regression model

Variable	Exp(B)	95% C.I. for EXP(B)	
		Lower	Upper
Education Level	1.07	.85	1.35
Income Level	.87	.70	1.08
Sanitation Safety	.56	.39	.80
Facility Privacy	.34	.11	1.05
Water Reliability	.54	.31	.92
Household Size	1.19	.76	1.88
Water Treatment Perception	1.07	.58	1.96
Handwashing Facility	.64	.50	.83
Types of Soap	.87	.69	1.09
Constant	2.42E+30		

Source: Researcher's own compilation.

INTERPRETATION: An odds ratio above 1 means an increased likelihood of perceiving water as acceptable. Water treatment perception, household size and

education level have odds ratios above 1, reinforcing their positive influence on water acceptability. Therefore, the results indicate that there is a likelihood of participants agreeing that the water treatment is acceptable, and this is influenced by their educational level and household size.

5.5 CHAPTER SUMMARY

The quantitative data analysed in this chapter identifies the strongest predictors of perceived water acceptability, informing intervention strategies that focus on household treatment behaviour and demographic targeting. In this chapter, a questionnaire adapted from the WHO/UNICEF/JMP core WASH survey was utilised to gain perceptions about WASH services in CDM (see Annexure C1). The data serves as a core evidence base for developing a sustainable governance model for WASH services in rural informal settlements such as CDM. The following chapter analyses qualitative data regarding the provision of WASH services at the CDM.

5.6 CONCLUSION

Quantitative data were obtained from 391 randomly selected households across the Lepelle-Nkumpi (LNLM) and Polokwane (PLM) Local Municipalities within the Capricorn District Municipality (CDM). Of these respondents, 35.8% (n=140) were male and 64.2% (n=251) female. Findings on perceptions and challenges in WASH provision revealed widespread dissatisfaction with service delivery and frequent vandalism of water infrastructure. Gender analysis indicated that women were more likely than men to report WASH-related challenges, reflecting their greater domestic engagement and awareness of household water issues. It is noteworthy that twice as many women (n=207) as men (n=90) confirmed consistent water availability, suggesting that women are more informed about water access and reliability. Differences in water treatment behaviour further revealed that female-headed households were more likely to treat their water, thereby reducing vulnerability to waterborne diseases. Conversely, male-headed households showed lower engagement in such practices, potentially due to lesser involvement in daily household health management. Moreover, men were more likely to rely on unimproved water sources, increasing their exposure to health risks. Access to multiple water sources significantly improved women's quality of life by reducing time spent fetching water,

promoting hygiene, enhancing girls' school attendance and creating opportunities for small-scale economic activities. Nevertheless, gender disparities persisted in safety and access, as women faced heightened security and privacy risks when using sanitation facilities, particularly at night. The use of makeshift handwashing devices such as buckets and kettles highlighted infrastructural limitations, inadequate access to potable water and poor hygiene practices. These gaps compromise disease prevention and point to the need for improved sanitation infrastructure in the community. A Principal Components Analysis (PCA) identified four latent dimensions shaping WASH outcomes: (1) Access to Infrastructure, (2) Facility Condition and Privacy, (3) Water Treatment Practices and (4) Handwashing Facilities. Results of logistic regression analysis further indicated that educational level and household size were significant predictors of the respondents' perceptions of acceptable drinking water. Overall, the quantitative findings demonstrate that gender, education and infrastructure collectively influence the equity, safety and sustainability of WASH services in the CDM. Addressing these interrelated factors through inclusive governance and targeted interventions is crucial to achieving sustainable and equitable WASH outcomes in rural informal settlements, particularly at the CDM.

CHAPTER 6:

ANALYSIS OF THE IMPLEMENTATION OF WASH AT RURAL INFORMAL SETTLEMENTS

6.1 INTRODUCTION

Chapter Five focused on the empirical evidence regarding the perceptions of constituencies and challenges in the provision of WASH at rural informal settlements. The empirical evidence showed how rural informal settlement communities face challenges such as poor infrastructure, water contamination and open defecation, which lead to the spread of communicable diseases in the constituencies' households. RO5 as outlined in Chapter One of this thesis, anticipated to analyse the feasibility of the implementation of WASH in the CDM. Challenges in the provision of WASH in rural informal settlements might include, amongst others, inadequate funding, poor infrastructure, high population density, and governance inefficiency which lead to citizens depending on unsafe sanitation practices. The findings from the feasibility study in this chapter forms part of the next chapter in developing a sustainable governance model for WASH within the CDM.

6.2 QUALITATIVE DATA ANALYSIS

Qualitative data was collected through semi-structured interviews with key informants using thematic analysis from relevant participants who shared their experiences and perspectives about WASH in the area. The researcher used convenience sampling, a common method in population research and disaster studies, to explore social and behavioural aspects of rapid-onset stress events in rural informal settlements. The next section outlines the methodological frameworks that highlight the respondents' experiences for this study, related to the factor analysis loadings results, such as infrastructure and access, facility condition and privacy, water treatment practices and handwashing facilities.

6.3 COLLECTION OF QUALITATIVE DATA

The data was collected ethically, and participants were eager to participate in this study. Qualitative data was collected through Participatory Rural Appraisal (PRA) research methodologies, key informants, and semi-structured interviews, and thematic analysis explored the provision of WASH in rural informal settlements at the CDM. Despite the challenges encountered during the collection of qualitative data, the process was successful, and the results are presented. Methodological frameworks were triangulated to eliminate bias and improve the reliability, validity, transferability and continuity of the research outcomes.

6.4 METHODOLOGICAL ANALYSIS FRAMEWORK

The university granted ethical clearance to the researcher to conduct the research in a manner that would not jeopardise the researcher, respondents and the North-West University (NWU), Basic and Social Sciences Research Ethics Committee (BaSSREC–00961–24–A7) (Appendix 1). According to McMeekin, Wu, Germeni, and Briggs (2020:2), the benefits of methodological frameworks are widely recognised, yet there is no formal definition or published guidance on how to develop one. Using methodological frameworks offers many benefits as it enhances consistency, robustness, improves research quality, standardises approaches and maximises the trustworthiness of findings. The Participatory Rural Appraisal (PRA) research methodologies were utilised in this research.

6.4.1 Participatory rural appraisal

Participatory research methodologies are oriented towards various approaches grounded in pluralist ideologies of knowledge-making and social transformation. The methodologies include Participatory Rural Appraisal (PRA), Participatory Research (PR), Participatory Action Research (PAR) and Participatory Learning and Action (PLA). These approaches emphasise stakeholder engagement and foster partnerships between academia and rural informal settlement communities (Chakraborty, Daruwalla, Gupta, Machchhar, Kakad, Adelkar & Osrin, 2020:2; Farzana, Hossain, Rahman, Nahar, Arifeen, Ahmed & Mahfuz, 2024:1; Mulopo, Mbereko & Chimbari, 2020:4; Nyambe, Kataoka, Harada & Yamauchi, 2022:151). The study adopted the PRA as the main methodological framework in Figure 6.1,

perceiving qualitative research paradigms to answer the question “what might be the most beneficial sustainable governance model to promote the provision of WASH services for rural informal settlements in the Capricorn District Municipality in Limpopo Province of South Africa”, based on the core principles of attitude, behaviour and practice. The following PRA techniques used for this research are participatory mapping activities, social mapping, transect walk, informal discussion and photovoice. First, participatory rural appraisal gathered evidence on WASH household sources, the impacts of water contamination, inadequate infrastructure, poverty, and access issues in rural informal settlement communities (Sandham, Chabalala & Spaling, 2019:2).

Second, social mapping was used to understand existing levels of resources and conditions of WASH in the rural informal settlement community (Farzana et al., 2024:2). Third, a transect walk was conducted to observe physical and socioeconomic characteristics that impact WASH provision at the rural community level (Farzana et al., 2024:2). Fourth, informal discussion was carried out to get clarity on the findings collected from various WASH sources in rural informal settlement communities within the CDM (Farzana et al., 2024:2). Fifth, photovoice was utilised as a participatory visual research method to empower women and adolescent girls by using photography to highlight vulnerabilities and well-being challenges in WASH within rural informal settlements (Karuga, Steege, Njoroge, Liani, Wiltgen Georgi, Otiso, Muturi, Okoth, Theobald & Tolhurst, 2022:4). A performative consent model was used for a qualitative study viewing knowledge as knowledge-in-becoming, a constant creation of difference through the researcher’s entanglement with the research phenomenon and the wider world. Performative research challenges traditional methods like PRA and focus groups, revealing rural challenges and perceptions of WASH as a public act that prioritises communication over mental consent.

According to Østern, Jusslin, Nødtvedt Knudsen, Maapalo and Bjørkøy, (2023:272) a performative consent model is learning/be(com)ing/knowning and is always in-becoming. After obtaining informed consent regarding the participatory part, the PRA exercise – social mapping was conducted ex-post facto, making use of selected PRA tools. PRA is a process that allows constituencies to analyse information to develop a community action plan based on their values and priorities, such as WASH. Sandham et al. (2019:3) reported that the PRA process is facilitated by a trained expert using an

eclectic PRA toolbox, but it is community-driven, encouraging members to share their views and experiences, such as WASH. The researcher supported the process during data collection, while the community guides discussions. Furthermore, PRA tools include semi-structured interviews, transect walks, social mapping, trend and change diagrams, seasonal calendars, Venn diagrams, causal linkage diagrams, matrix ranking and scoring.

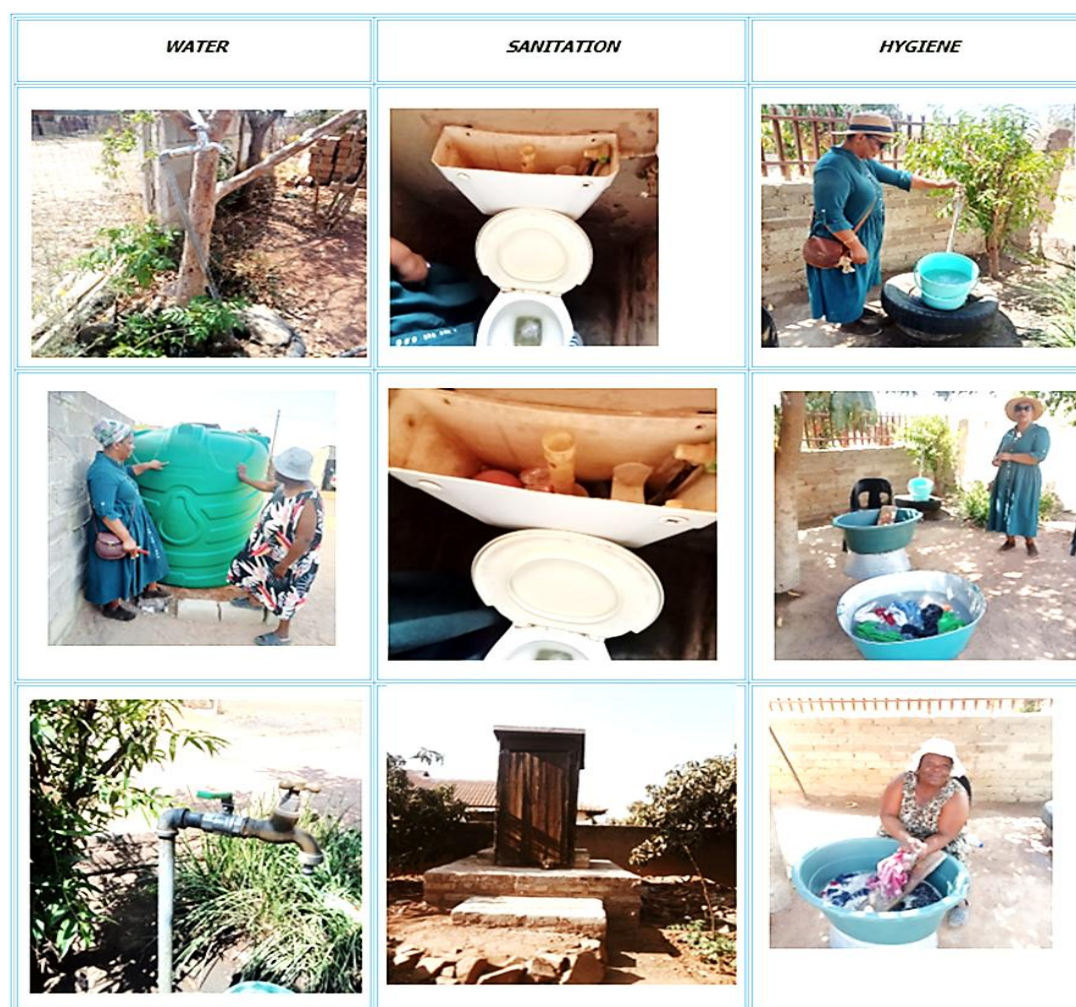


Figure 6.1 PRA methodological framework

Source: Author's own gallery of photos

The intention was to collect evidence about accessing WASH infrastructure sources, the condition and privacy of facilities, water treatment practices and handwashing facilities for their households. Social mapping was done by the research team along with constituencies who were knowledgeable about different resources in their area and the existing WASH situation. Maps were created based on this information. Since

the researcher was conducting a case study involving two local municipalities, a Community Development Worker (CDW) accompanied her, along with other constituencies' members, on a 'transect walk' through their areas. The purpose of this walk was to explore and identify various challenges perceived by constituencies related to WASH in their rural informal settlement communities. De Vos, Preiser and Masterson, (2021:124) asserted that a 'transect walk' is a structured walk by the research team and relevant constituency member/s.

6.4.2 Transect walk

During this walk, participants explored a specific WASH context and conditions by observing, asking questions, and listening to one another. The outcome of this process is a transect map. Transect walks are typically conducted in the early stages of the fieldwork. Figure 6.2 shows the methods and process of conducting a quality transect walk adapted from Joshi, Gauchan and Ayer (2022:16). During the transect walk, participants were engaged in informal discussions, including taking pictures, while looking for problems and the possibility of identifying WASH solutions. The walk revealed the conditions of municipal basic infrastructure, highlighting deterioration and in some informal rural communities, observed a total absence of WASH infrastructure. Observations from the transect walk helped to map the distribution of WASH and issues according to the rural settlement and areas with higher densities of housing which may face greater challenges related to access to the provision of WASH, especially women and adolescent girls. Participants and the researcher assessed the availability and quality of local WASH sources, and observed impacts from pollution and some physical barriers, especially for constituencies utilising wheelchairs. The walk aided in identifying how constituencies are affected by inadequate provision of WASH conditions which lead to health-related risks and the spread of communicable diseases. The lack of functional sanitation infrastructure has a significant impact on the constituency's vulnerability and forces them to adopt unsafe practices.

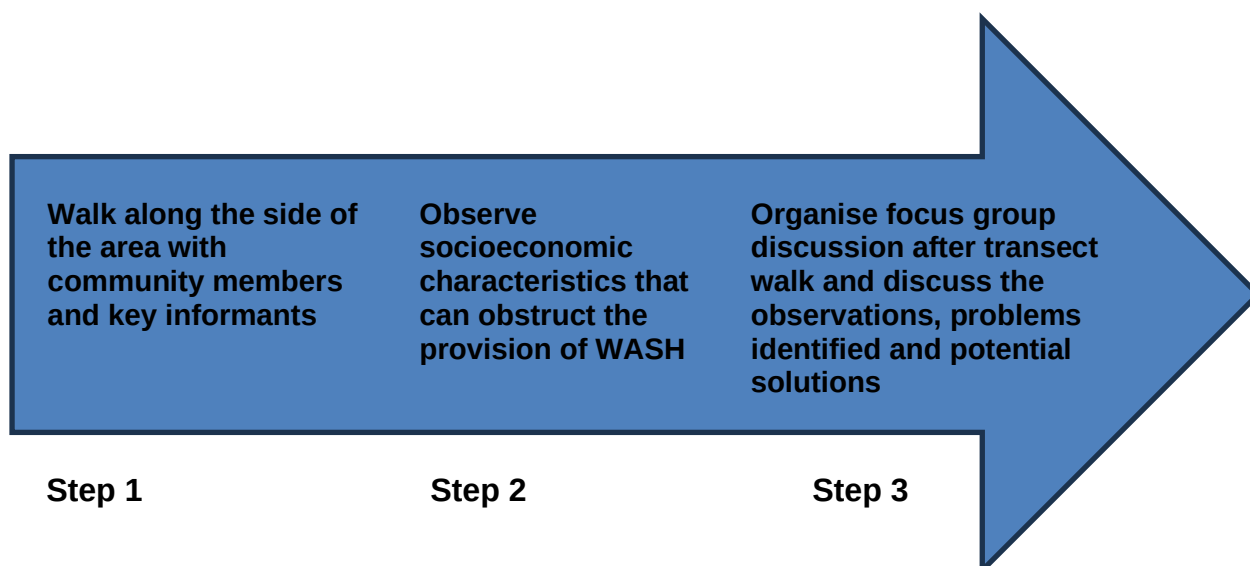


Figure 6.2 Transect walk process

Source: Author's own interpretation

6.4.3 Photovoice

Photovoice is a participatory action research method that encourages individuals to document their experiences through photography (Smith, Carter, Walklet & Hazell, 2024:883). The researcher conducted photovoice research with constituencies in selected municipalities to explore intersections between their social transformation and to gain an in-depth understanding of the daily lived experiences regarding the provision of WASH in rural informal settlements. Photovoice has been applied to a wide range of social sciences in WASH-related topics (Carrard, MacArthur, Leahy, Soeters & Willetts, 2022:1; MacArthur, Carrard, Koh & Willetts, 2022:1; Willetts, MacArthur & Carrard, 2023:1), fostering the transformative potential of participatory photography from WASH assessments (Karuga et al., 2022:1); vulnerability and wellness of children heading households in informal settlements (Palgunadi, Wesnawa & Sudiana, 2024): 'I bring home my used menstrual pad' (Calzo, Carson, Swayne, Felner & Carroll, 2024) and restroom access and health among people experiencing homelessness.

A convenient recruitment method was used in this research, and participants were informed during a non-compulsory Teams meeting about the photovoice methodology. Participatory photographic activities were utilised in collaboration with constituencies to use smartphones for capturing photos that represented their daily lives accessing

WASH provision in their households. Foster, Davis, and Foell (2023:1728), asserted that photography activities where participants act as photographers have evolved little over the past two decades, and the widespread availability of smartphones along with their functionality as digital cameras makes them a perfect fit for the photovoice project. This qualitative data research methodology tool was applicable for this study to analyse the provision of WASH in the informal settlements at selected local municipalities. Participants in photovoice traditionally meet in small groups for training. After taking photographs, they reconvene to share their images and stories. Due to the municipal by-elections held on Wednesday, 19 June 2024, an online photovoice methodology, developed by Tanhan (2020:1029), was followed. Selected constituencies were informed of their voluntary participation in the research project during an online training meeting presented by an independent informant, a colleague of the researcher. The minutes of the training and guidelines were made available electronically to the participants via electronic mail. The invitation to the project read as follows:

- a. Capture or include at least five images of what WASH means to you by taking pictures with your smartphone or accessing your photo albums.
- b. Save the images on a small scale via JPG on your smartphone or computer
- c. Indicate where and when the images were taken, e.g. 254 Zone A Mankweng, Dikolobe Street, 10 July 2024.
- d. Write a paragraph of 100 words on your experience of taking and observing WASH-related images of access to infrastructure, facility condition and privacy, water treatment practices and handwashing facilities.
- e. Upload your photographs and narrative to Dropbox.

At a time convenient for the participants, they took their photographs, as they were permitted to use archived images. These archived photographs could come from a personal photo album, a gallery on a smartphone, or be provided by their parents, friends, or family members. Each participant's identity, linked to their photographs and interpretations, was kept confidential and not shared with others. This collection technique provided several benefits to the participants (Tanhan, 2020), as they had time to share photographs and experiences anonymously, creating a safe space for discussing emotions. During the municipal by-elections, they could use archived

photographs campaigning about the lack of basic services provision, such as WASH, to prioritise their household chores, health and safety. The project was cost-effective, allowing participants to use both archived images and those taken with their smartphones.

The research participants are therefore not only immediate observers but also a group similar to focus groups, which can potentially be most influential in future responses to the development of a sustainable model in WASH at the CDM. The participants were acknowledged as experts who could make decisions regarding the photographs and stories they wanted to share. The findings were structured into four sections: i) access to WASH infrastructure, ii) facility conditions and privacy, iii) water treatment practices and iv) handwashing facilities.

6.4.3.1 Access to WASH infrastructure

This section provides insights on the difficulties participants endured in rural informal settlements households. Under these living conditions even satisfying individual basic human needs become a health hazardous task. Experiences of rural informal constituencies and livelihood conditions further exacerbate this dire situation. *Water access* – poverty and unemployment deters constituencies as the majority depend on long queues at municipal water trucks, illegal water connections are shared in the community and use of Jojo tanks and begging for bucket water daily from nearby households highlights the difficulties in obtaining safe drinking water. Walking long distances to collect water using a wheelbarrow requires physical strength, especially for women and adolescent girls who often bear this household burden. Water is contaminated at times as it is shared with domestic animals, and is visibly dirty with bad smells, posing health risks.

Ntwana and Naidoo (2024:1) encouraged public participation as leadership structures in the informal settlements are often excluded from water supply decisions for their communities, particularly in public participation platforms like ward committees and ward councillors. Some responses regarding *sanitation access*: – there are overflowing communal toilets and some pit latrines are without ventilation, which illustrates the conditions we live in and situations around toilets and we are human beings but we do not have toilets. We don't have access to toilets – we don't have toilets as some toilets inside our houses are not flushing due to inadequate water and

sanitation infrastructures. Household toilets are blocked, broken, dilapidated and we are sharing toilets with members of the households, including women, children and adolescent girls. Some pit latrines are without ventilation are not constructed properly while others are positioned in the wrong direction, their level and measurements are not right, when you enter it, you find it to be unstable, tilting and non-compliant with SANS30500. Photovoice was also a powerful mechanism for depicting a range of health risks and security associated with the use of both shared and individual sanitation facilities in rural informal settlements. Some communal and household toilets pose unhygienic conditions which expose users, especially women and adolescent girls, to infections. The notion of dissemination of findings draws attention to the notion of 'giving participants a voice' during WASH public meetings in the CDM.

6.4.3.2 Facility conditions and privacy

The day-to-day practices involved in accessing WASH documented and analysed by photovoice participants confirms multiple strategies adopted by poor women and adolescent girls in the WASH facility services. Women and adolescent girls are engaged in domestic work such as cleaning, washing, cooking and taking care of the children, and they are constantly in contact with what needs to be clean water and proper sanitation facilities in their households. Informal settlement houses are normally constructed in shacks and privacy for men and women sharing the same room is often difficult to manage with no drinking water and adequate sanitation facilities. Rooms with a small kitchen and not attached to the toilet facilities do not have privacy. Coping during menstruation or a stomach disorder can be very difficult in rural informal settlements, as is fear of rape and sexual harassment when they need to relieve themselves at night or in the early morning. During our transect walk, participants shared their objections about politicians who come to their community around election periods and promise to improve the conditions of WASH but quickly disappear after elections. Service delivery protests in South African municipalities are common due to governance issues. Municipalities must recognise their role in addressing underlying issues and take action to prevent future protests (Ragolane & Malatji, 2024).

6.4.3.3 Water treatment practices

Women and adolescent girls understand the important effect of climate change on the health of people in their rural informal settlement. Climate change can directly affect

their health, food contamination, household drinking water and loss of livelihood. Water treatment practices during climate change involve individuals' level of education and responsible living conditions, governance engagement in policy making to promote environmentally friendly practices like recycling. Societal mitigation plans in the provision of WASH are essential during climate change. Access to water was portrayed as a significant challenge and the severity of climate change can affect women and adolescent health and overall well-being. Workshops with relevant stakeholders in the identification of multiple challenges and adaptation of strategies are relevant for constituencies in the informal settlements.

6.4.3.4 Handwashing facilities

Photovoice studies expose how rural informal settlements often face a severe lack of adequate safe and accessible handwashing facilities due to poor maintenance and water scarcity. Public handwashing facilities are not available or easily located in rural informal settlement communities. Households are without access to handwashing soap and water. Unclean and unsafe, poorly maintained conditions make it unappealing for constituencies to use handwashing facilities. Inadequate policies, weak governance and limited socioeconomic capacity prevent improvements to WASH facilities within informal settlements of the CDM.

6.4.4 Focus group discussion

The researcher employed a performative consent model in the Focus Group Discussion (FGD) to gather information on WASH provision in households across selected municipalities. To this end, two FGDs were conducted with 16 purposively selected participants (eight from each of the two municipalities) drawn from Ward Committees and Community Development Workers who work closely with local government in the Polokwane Local Municipality (PLM) and Lepelle-Nkumpi Local Municipality (LNLM) within the CDM. This model relies on a pre-established cognitive purpose among the selected participants. According to Draz (2022:368), the performative model not only enhances descriptions to reflect reality but also helps to shape it. In the context of FGDs, the language and action of the constituencies can transform societal realities rather than merely describing the WASH provisions in their rural informal settlement households. The key findings from this focus group in rural informal settlements shows that communities face challenges like inadequate WASH

infrastructure, poor service maintenance, lack of community participation and poor security, leading to unsafe water and sanitation practices such as open defecation and disposing baby diapers in plastic bags in public spaces.

6.4.4.1 Credibility of the study

The Focus Group Discussion (FGD) guide and the key informant interview were translated from English to Sepedi, ensuring quality through back-translation and a review by the researcher's native speaker. The tools were subsequently reviewed to clarify ambiguities in the guide prior to data collection. Fourteen research assistants received targeted training on the study's aims, objectives, procedures, and ethical considerations. Each interview lasted approximately 45 minutes to 1 hour, and findings are presented with verbatim quotations. The researcher employed a performative consent model during the focus group interview, emphasising communication rather than merely individual mental consent. To ensure anonymity and confidentiality, participants were referred to by pseudonyms instead of their real names.

6.4.4.2 Validity

The information collected focuses on the perceptions and challenges of accessing WASH provisions in rural informal settlements. Participants shared their experiences, and rapport was established at the beginning of the interviews. All participants voluntarily consented to take part in the study and had the option to decline or express their views freely. Table 6.1 depicts the results of the FGD from selected local municipalities (Polokwane Local Municipality [PLM] and Lepelle-Nkumpi Local Municipality [LNLM]).

Table 6.1 Focus Group discussions

WARD COMMITTEE vs. COMMUNITY DEVELOPMENT WORKERS	
1. Do you understand what is water, sanitation and hygiene (WASH), if your answer is yes, what is it all about? If not, please motivate and give examples of your understanding	
PLM	LNLM
Ngwato: 58-year-old male, "No" "I don't know WASH – but I know there is water and sanitation, as we have the	Kgaladi: 45 old male "No" what are you talking about, I only know it in Sepedi: ' Meetse le kelela ditshila ', we

Department of Water and Sanitation in our Province”.	did not understand it in English until you told us
2. Do ward committees have a role in identifying community members who do not have WASH? If your answer is yes, how do they identify them? If not, what are the reasons and how the situation can be changed?	
PLM	LNLM
Mangwato: 50-year-old female, Yes, “we do have ward committees, and since we are in the informal settlements, lack of WASH is a comprehensive concern to the municipality”.	Puleng: 35-year-old female, Yes, “we do have ward committees, as they are important in local government because they connect councillors with the community. BUT, since we are experiencing a water problem, it is something that is affecting all of us in the community”.
3. As a member of the ward committee, do you believe that the municipality has enough capacity for water storage and can still provide sustainable and effective sanitation services and hygiene in the area? If your answer is yes, please explain why. If your answer is no, what are the reasons for your concern and what actions can be taken to address this situation?	
PLM	LNLM
Leswika: 40-year-old male, “No” “municipality is struggling and do not have enough water capacity. Corruption, broken water taps and illegal connections are worrying us”.	Mamabolo: 35-year-old female, “lamenting about access to drinking water – and how can the municipality have enough storage while we are suffering in our households to have drinking water”.
4. Do you feel that Lepelle Nkumpi Local Municipality or Polokwane Local Municipality has achieved its mandate by providing all the residents within its boundaries with access to WASH services? If yes, how did they manage to accomplish this? If not, what can they do to improve the situation?	
PLM	LNLM
Mpontsheng: 30-year-old male, “No” “Not until 2030 or forever due to political parties. Every election new commandment from new ward councillors”.	Mopedi: 55-year-old female, “Aowa” responded in Sepedi, meaning ‘No’ I will end up getting SASA grant until no access to WASH in my household. I am used to collecting water and erecting my toilet without municipal help. We

	are used to empty promises from the municipality”.

5. As a Ward Committee, are you satisfied with the municipality's staff who are responsible for providing WASH services? Do you think they have the necessary expertise and qualifications to carry out their duties effectively? If your answer is yes, do you think they are well-equipped to perform their duties? If not, what do you think is the reason behind this, and how do you suggest improving the current situation?	
PLM	LNLM
Leah: 27-year-old female, “No” :some of our municipal staff members are incompetent with no qualifications. The Department of Water and Sanitation and Human Settlements faces problems because of political corruption, affecting low productivity and lack of necessary skills in WASH and houses”.	Mogoswane: 25-year-old male, “No” “most of the water plants are damaged due to poor planning, high volume or poor operation and maintenance of unqualified staff. Failure to adhere to sewage maintenance, especially in rural informal settlements, can affect their health- waterborne diseases”.
6. Do you think the municipality has sufficient financial resources to achieve the Sustainable Development Goals by providing WASH services in 2030?? If yes, why are they still having challenges? If not, what is the actual problem of not having adequate financial resources	
PLM	LNLM
Dhazu: 44-year-old male, “No.” “No sufficient financial resources, if you tell people to pay municipal rates, they refuse”.	Malebo: 40-year-old female, “No.” “No sufficient financial resources for SDG, while we currently suffering – a dedicated sufficient resources (human and financial) to basic water services provision of WASH is advisable”.

7. Does the municipality regularly maintain its WASH infrastructure? If so, why are there still issues with the provision of basic services? If not, what are the reasons and what can be done to improve the situation?	
PLM	LNLM
Dudu: 38-year-old female, “No.” “WASH infrastructures are dilapidated, not serviced, as there is insufficient budget. Communal tap no water from the municipality, but supplied from community-based boreholes. Theft is prevalent as people see an opportunity to fill their stomachs without considering long-term challenges in the GNU and the municipality”.	Selema: 44-year-old male. “Poverty, poverty, poverty, as they lament during the FGD. Numerous households cannot access water from municipal infrastructures and also cannot afford to install water sources such as JoJo, due to their level of income; some are unemployed. Only a few who are employed can afford JoJo in their households, see Figure 5.4 , as we observe them busy installing JoJo in their house during the transect walk”.
8. Do you think that ward committees are effective in bridging the gap between the ward, councillor, and municipality in terms of the provision of WASH? If your answer is yes, could you please provide some examples and reasons why? If not, what are the best strategies that the municipality can implement to improve and speed up service provision?	
PLM	LNLM
Rorisang: 32-year-old male, “Yes.” “They are always effective in facilitating the provision of WASH services and also encourage participatory government by organising communities concerning ward jurisdiction. They act as the vehicle for promoting local participatory democracy”	Lesego: 29-year-old female, “Yes.” “They provide a platform for engagement on the issues that concern local government and its process and present true views of their constituencies. They should increase the involvement of municipal communities when decisions are made within the local government”.

Source: Researcher’s own compilation.

6.4.4.3 Researcher positionality in the Focus Group Discussion

The researchers' position in the FGDs at the CDM involves engaging the community in participatory efforts and enhancing WASH activities, while also applying an academic

understanding of rural development and challenges related to the indigenous knowledge system. The researcher's previous work has centred on developing and implementing a WASH community-based forum within a more formal service provision framework, aimed at improving conditions for adolescent girls. It was essential to engage with rural informal settlement communities in the CDM to acknowledge the potential for bias regarding the research approach, which may be shaped by a governance perspective that prioritises community participation and municipal integration. This focus overlooked the unique social dynamics and self-driven innovations present in these communities. This current research aimed to understand the real-world context of WASH provision in these settings, extending beyond mere community engagement to encompass the lived experiences of the constituencies involved.

6.4.5 Key informant interviews

The provision of WASH in the rural informal settlements is vital when addressed by relevant key informants. Key Informant Interviews (KIIs) are common in qualitative health research. Originating in ethnographic anthropology, this technique is now widely used in numerous research methodologies for qualitative data collection (Pahwa, Cavanagh & Vanstone, 2023:1251). The KIIs in this research seek to identify the uniqueness of social reality and assess the dependability of responses to the provision of WASH in rural informal settlements at the CDM.

This study employed a mixed-methods research design to gain deep insights into both the measurable patterns and lived experiences that shape socioeconomic reality within the rural informal settlements. Quantitative data provided an overview of WASH service provision and related health risks, while qualitative data offered contextual insights into community perceptions and practices. Integrating these approaches enabled a more comprehensive understanding of how the WASH model is implemented and how it can reduce waterborne diseases as well as improve overall community health and livelihood. To achieve this, the KIIs were conducted with purposefully selected 14 participants who work closely with local government in the Polokwane Local Municipality (PLM) and Lepelle-Nkumpi Local Municipality (LNLM) within the CDM. The researcher utilised a permitted semi-structured interview with selected KIIs participants for robust triangulation. Additionally, pilot data and source triangulation were utilised to refine the interview guide and verify the accuracy of the collected data. The study found that KIIs provide flexibility to explore unforeseen ideas and issues relevant to its purposes

(Trentin, Rubini, Facci, Ragazzoni, Valente & Della Corte, 2024:5). The key informants offer valuable insight and a comparative perspective on the research issues. Additionally, Pahwa *et al.* (2023:1253) emphasised that the qualities of 'good' key informants are crucial for research:

- 1) **Community role:** 'unique access' to, or experience of, the phenomena of the research interests by social position.
- 2) **Knowledge:** ability to 'meaningfully' synthesise their experiences and to offer rich, reflexive insights.
- 3) **Willingness to engage with researchers:** 'relative ease' to be recruited to participate in research.
- 4) **Capacity to communicate:** 'intelligibility' to the researcher.
- 5) **Impartiality:** bias should be 'minimal' and well-known to researchers.

The effect of climate change is severe, and South Africa is a water-scarce country due to increased drought and rainfall variability, making small-scale storage solutions like JoJo tanks crucial for water scarcity, though often insufficient on their own. Matimolane, Selane and Mathivha,(2024:4) indicated that households in rural areas often store water in different containers ranging from small to larger facilities such as the JoJo tanks with a capacity of up to 2500 L. Installation of JoJo tanks (Figure 6.3) is determined by socioeconomic factors such as financial stability, household sizes and the amount of water collected.



Figure 6.3 JoJo tank installation

Source: Author's own photos

6.5 THEMATIC ANALYSIS

Data from the semi-structured and key informant interviews were analysed thematically. Thematic analysis is a method for identifying, analysing and reporting themes within data sets. Thematic analysis was chosen because it organises and describes the data set in rich detail (Naeem, Ozuem, Howell & Ranfagni, 2023:1). The researcher used thematic analysis as “a method for identifying, analysing and reporting within data” (Naeem *et al.*, 2023:2). The themes and subthemes resulted from the revision of the field notes that made up the data (as an inductive approach), some did not necessarily relate to the initial research question and main aims of investigating per se. Consequently, there was not necessarily a relationship between the initial questions and the themes interpreted from the data (Naeem *et al.*, 2023). To identify those themes, focus was on patterns, typologies and expressions used by participants to reflect on what the interviewees answered (Arora & Mishra, 2022:188; Ryan & Bernard, 2003:89). The six phases recommended by Naeem *et al.* (2023:3) were employed to analyse the semi-structured interviews in this research.

Phase (1): Familiarising with data

Firstly, the researcher transcribed all the interviews and notes, which also helped her to familiarise herself with the data. She then put all the notes together, took a picture of them and sent the images to her private electronic mail for backup so that she could access them in case of document misplacement.

Phase (2): Generate initial codes

The researcher generated initial codes, mainly through 'open coding' in NVivo. This process involved breaking down, examining and categorising data into broad categories and then subdividing the broader categories into smaller sub-categories in a continuing revision and refinement of the process (Allsop, Chelladurai, Kimball, Marks & Hendricks, 2022:142; Strauss & Corbin, 1990).

Phase (3): Searching for themes

The third phase involved 'axial coding' (McGauley Jr, 2025; Strauss & Corbin, 1990), to examine how the relationship between those sub-categories formed overarching themes. In this phase, the researcher reviewed the potential themes relevant to WASH, such as access to infrastructure, condition and privacy of facilities, water treatment practices and handwashing facilities. While some codes formed main themes, others formed sub-themes that were discarded in this part of the process (Naeem *et al.*, 2023). Byrne (2022:1396) reported that it is through a critical orientation that the researcher should be able to "inform the construction of systems of meaning and therefore offer interpretations of meaning further to those explicitly communicated by participants". Issues regarding equality in the provision of WASH in rural informal settlements were sometimes omitted, and some others were accepted by some of the participants. Therefore, this research reflected and analysed gender transformation-related issues as invisible forms of power using the TPB to determine whether societal attitudes towards the provision of WASH were associated with the attitude and intention to implement a sustainable governance model of WASH services for rural informal settlements in the CDM.

Phase (4): Reviewing themes

The mapping of the fourth phase of thematic analysis began after a set of candidate themes were devised, and it involved the refinement of those themes. During this

phase, other sub-themes were discarded into the search for consistency within my data (Naeem *et al.*, 2023).

Phase (5): Defining and naming themes

In this phase, a detailed analysis of each theme was made by naming, defining, and refining themes, writing a detailed analysis of each one of them and their sub-themes (Naeem *et al.*, 2023).

Phase (6): Producing the report

This phase comprises writing the analysis, intending to provide a coherent, logical and solid argument concerning the final research aims and the question of this thesis: “What might be the most beneficial sustainable governance model to promote the provision of WASH services for rural informal settlements in the CDM” by *“empirically determining the perceptions and challenges in the execution of sustainable governance principles of WASH by residents at rural informal settlements in the CDM”*.

The following section outlines the five themes that emerged during the analysis of the data. These themes include Municipal Principles (1), Socioeconomic Challenges (2), Community Perceptions (3), Public Policy (4), and Strategies in the Provision of WASH (5), which are normally qualitative from participants at the CDM. This approach enables the researcher to explore pre-identified themes relating to challenges and perceptions while remaining open to insights from participants' lived experiences in the provision of WASH. From a constructive perspective, this study aimed to reflect on *“What might be the most beneficial sustainable governance model to promote the provision of WASH services for rural informal settlements at the CDM in the Limpopo Province of South Africa?”*. The phenomenological lens explored participants' experiences and perceptions of challenges limiting WASH access in rural informal settlement communities.

Table 6.2 Semi-structured interview

SEMI-STRUCTURED INTERVIEW
THEME 1: Municipal principles in the provision of WASH to rural communities.

OBJECTIVE 1: What are the principles, dimensions, and approaches that would underpin a sustainable governance model of WASH within a municipality?

PLM	LNLM
“Politicians, government staff, local leaders motivations and bureaucracy contributes to failure in the provision of WASH and favourism directing funds to groups or individuals to win favour or elevate their own priorities seeking municipal votes.” “Government do not invest more funds to support rural informal settlement communities, they would rather use the money to buy drugs to treat communicable diseases rather than to implement activities that would help communities to prevent WASH related diseases.” “Lack of WASH education within programming contributed to failure.” “Inadequate time frames which do not account for delays and fundings that did not allow for extension.”	“Complicated bureaucracy is often cited as a cause of failure in the provision of WASH, delaying in funding of infrastructure.” “Many households' toilets are out of order – not working, and municipal workers are working 24/7. No intention for plumbers to fix the toilets; rather, they use the toilet while not working, or opt for tenders.” “Poor communication between stakeholders led to failure.” “Sometimes failure is perceived to be caused by implementers purposely withholding information from other stakeholders, making the situation worse.”

THEME 2: Socioeconomic challenges in the provision of WASH to rural communities.

OBJECTIVE 2: What are the socioeconomic characteristics considered by the committee in planning and implementing WASH services at the CDM?

PLM	LNLM
“The committee considers factors such as unemployment, poverty levels, household income, education levels and access to basic infrastructure. In many areas of the CDM, residents live in rural settings with limited access to reliable water sources and sanitation systems. The high rate of youth unemployment and low literacy rates also influence how WASH education and services are delivered and received.”	“In planning for and providing WASH services in the CDM, the committee considers a range of socioeconomic characteristics to deliver equitable and effective services. These include household income levels, which affect affordability and sustainability of services; settlement patterns and density, which influence the layout of infrastructure and logistics; levels of education, particularly in terms of hygiene awareness and water use

	behaviour; employment levels, which have implications for community involvement and capacity to contribute to maintenance; and the presence of vulnerable groups such as the elderly, children, and disabled. Understanding these variables enables the committee to come up with WASH interventions that are both socially inclusive and economically sustainable.”
THEME 3: Community perceptions in the provision of WASH.	
OBJECTIVE 3: What are your perceptions and those of the community that you service concerning the provision of WASH services at the CDM?	
PLM	LNLM
“There is general perception that while the municipality is trying to improve WASH services, progress is slow and inconsistent. Many communities feel that there is unequal distribution of services with urban areas receiving better attention than rural ones. Residents also express frustration over broken water infrastructure, infrequent waste collection and poor maintenance of public toilets. However, there is still hope that with proper planning and community involvement, things can improve.”	“The perception regarding the CDM and the communities served can be summarised by common perceptions observed in the kind of communities served in the Capricorn District Municipality regarding WASH services. Communities have a tendency to be worried about general fluctuation in the provision of water, especially in rural areas, and the inadequacy of sanitation facilities, which may be a health risk. There is satisfaction if the services are improved or if community participation is encouraged during planning and upkeep. Frustration, however, typically results from delayed projects, poor communication by authorities, and openness in resource utilisation. Most residents demand more inclusive, reliable, and sustainable WASH facilities that also address their specific needs and local socioeconomic factors.”
THEME 4: Public Policy in the provision of WASH at the Capricorn District Municipality	

OBJECTIVE 4: What are the impacts of public policies in the planning and implementation of WASH services at the CDM?

PLM	LNLM
“Public policies can have both positive and negative impacts. On the positive side, they provide framework and allocate funding for service delivery. However, poor implementation, limited monitoring and corruption can reduce their effectiveness. Sometimes policies are too centralised and do not reflect the unique needs of individual villages. If policies were more inclusive and community-driven, they would likely have a greater impact.”	“National policies similarly exert significant influence on the planning and delivery of WASH services in the Capricorn District Municipality via the legal and strategic framework that governs service delivery, financing, and accountability. Some of the policies that define roles, responsibilities, and standards for universal access to clean water and sanitation include the National Water Act, Water Services Act, and municipal Integrated Development Plans (IDPs). They help to prioritise underprivileged regions, allocate resources more fairly, and ensure compliance with environmental and health requirements. However, policy implementation gaps, insufficient funding, and poor coordination between governmental levels may hinder progress. Effective policies promote transparency, public participation, and sustainability in WASH service delivery.”

THEME 5: Strategies in the provision of WASH at the Capricorn District Municipality

OBJECTIVE 5: What strategies would you recommend developing a sustainable governance model for WASH services in the CDM?

PLM	LNLM
To build a sustainable governable governance model the following is recommended: “Community participation: involving local leaders, women and youth in planning and monitoring” “Capacity Building: training residents to manage and maintain WASH facilities” “Transparent Budgeting: ensuring the public knows how WASH funds are allocated and spent”	To develop a model of sustainable governance of WASH services in the CDM, some of the most significant strategies that can be recommended include: “Strengthen Community Participation: Engage local communities in decision-making, planning, and monitoring to make services more responsive to their needs and to create local ownership” “Enhance Intergovernmental Coordination: Foster greater coordination between local, provincial, and national

“Decentralised management: giving more power to ward level or village committees to respond to local matters”

“Public-Private-Partnership: collaborating with NGO and private companies to improve infrastructure and education”

“Monitoring and evaluation: regular assessment of service quality and user satisfaction”

departments to align planning, resource allocation, and accountability”

“Develop Local Capacity: Invest in the training of municipal staff and community representatives in water management, technical maintenance, and budgeting to ensure long-term provision of services”

“Institute Transparent Monitoring Systems: Establish clear performance indicators and use digital technology to track progress, identify service gaps, and publicly report outcomes to build trust”

“Ensure Long-Term Funding: Establish diversified funding streams, including public-private partnerships and community-based financing, to reduce reliance on unpredictable government grants”

“Adopt Climate-Resilient Infrastructure: Invest in and design water infrastructure that can adapt to changing climatic conditions, especially in drought or rural areas”

“Promote Education and Behaviour Change: Implement continuous hygiene education campaigns to instil the value of WASH services and encourage responsible usage and maintenance”

Source: Researcher’s own compilation.

6.6 TRIANGULATION

Triangulation is a concept originally used in navigation to identify an unknown position by referencing multiple points. Donkoh and Mensah (2023:7) stated that the term ‘triangulation’ derived from the analogy of a triangle, which refers to the practice of examining a single point from multiple independent sources. Triangulation was borrowed from mathematics, particularly from trigonometry. The study utilised triangulation to corroborate data collected from sources such as questionnaires, interviews, focus groups and document analysis regarding the provision of basic WASH services as well as an appropriate sustainable governance model in rural communities at informal settlements.

Sciberras and Dingli (2023:31) asserted that triangulation is a research method that integrates numerous data sources, theories or research methodologies to ensure that

the data, analysis and findings of research are comprehensive and accurate. Triangulation offers significant benefits. Methodologies often use triangulation to validate qualitative results with quantitative research outcomes (Donkoh & Mensah, 2023:6). This helps to enhance the validity and credibility of the research by comparing different viewpoints, ensuring more comprehensive understanding. Triangulation support identifying biases and uncover new insights for a clear understanding of the research topic: A Sustainable Governance Model of Water, Sanitation, and Hygiene Provision: The case of Capricorn District Municipality in Limpopo Province of South Africa.

Table 6.3 The objectives of Triangulation in quantitative and qualitative research methods

Quantitative vs. Qualitative	
Method	Objective
Triangulation in Quantitative	The aim of <i>Triangulation in Quantitative</i> was to enhance the validity and reliability of the constituencies findings to provide statistical facts or assumptions of WASH in their households. During data collection, the researcher walked from house to house asking questions from the questionnaire while observing WASH issues linked to their socioeconomic characteristics, psychosocial wellbeing and broken infrastructures observed in numerous households.
Triangulation in Qualitative	The aim of <i>Triangulation in Qualitative</i> was to engage in a group(s) to observe constituencies behaviour and intentions of WASH in their households. Qualitative approach enabled the researcher to collect useful data towards the proposed governance model in the provision of WASH at the CDM.

Source: Researcher's own compilation

Arias Valencia (2022:1) and Donkoh and Mensah (2023:8) reported that there are four main types of triangulations such as data triangulation, investigator triangulation, theory triangulation, and methodological triangulation. Furthermore, Arias Valencia (2022:7) informed that methodological triangulation involves combining multiple data collection techniques using quantitative measurements or different qualitative approaches like open interviews or observations. For purposes of this research, the researcher employed both quantitative and qualitative methodologies, along with a combination of primary and secondary sources, to triangulate the research outcomes.

The ideal approach for this research therefore resulted into methodological triangulation.

6.5.1 Methodological triangulation

The study followed the methodological triangulation to reflect on "What might be the most beneficial sustainable governance model to promote the provision of WASH services for rural informal settlements in the Capricorn District Municipality in Limpopo Province of South Africa?" As indicated earlier, challenges were experienced during data collection that impacted the use of methodological triangulation. Strategies to overcome these challenges are elaborated below. Some strengths and weaknesses of methodological triangulation would also be highlighted.

6.5.2 Impacts of the provision of WASH in rural informal settlements in CDM

The questions regarding the quantitative study addressed the effects of household drinking water, sanitation facilities and handwashing facilities. This was appropriate for the mixed methods of data collection because it complemented the qualitative data by asking the respondents to participate in PAR methods such as transect walk, photovoice, focus group and key informant interviews. The researcher collected quantitative data to identify the respondents among the factors involved in the socio-economic differentiation. These factors were: type of household, total income level, employment conditions, source of income, and duration of stay in the area (Arias Valencia, 2022:10). The researcher ensured that each method was rigorous and complete by using four evaluated criteria as suggested by Casey and Murphy (2009): 'truth value', 'applicability', 'consistency', and 'neutrality' to ensure rigour.

The researcher ensured that the qualitative data were credible by having two experienced community development workers and councillors independently to code the data rigorously. The researcher achieved a qualitative study by credibility and truth value using quotations that objectively captured individual experiences, indicating neutrality and objectivity in quantitative research (Guba & Lincoln, 1989). Rigour was assured in the quantitative data collection because the reliability of all measures exceeded the minimum criterion of acceptable internal consistency (.70 Cronbach). The researcher demonstrated construct validity for the adjustment measure by using Chi-squared correlation coefficients, which gave significant correlations in the expected direction ($P < .001$) with measures of positive thoughts and control ($r = .36$ and

-44, respectively). The study discovered numerous elements that impacted the provision and delivery of WASH to rural informal settlement constituencies of the PLM and LNLM in the CDM. Findings of methodological triangulation in the PLM and LNLM were merged and narrowed to form comprehensive results focusing on the access to WASH infrastructure, facility condition and privacy, water treatment practices and handwashing facilities at the CDM.

The findings from various sources, such as the FGDs, interviews, photovoice, and transect walk, demonstrate that although these rural informal settlements had access to WASH infrastructure 'upgrades' such as water taps, toilets, garbage collection and drainage systems, the WASH systems and their components mostly failed. The FGDs allow constituencies to share diverse perspectives through interactive conversations. Interviews provide in-depth insights by allowing flexible follow-up questions. Photovoice adds a visual element that helps to document experiences and co-create knowledge, ensuring a complete understanding. Transect walks give visual data about resource distribution, infrastructure and constituency dynamics, which are important for assessing rural informal settlements and understanding the need for reliable WASH basic services. Together, these methods improve the quality and credibility of the data by integrating spoken, visual and observational perspectives directly from the constituencies involved.

The FGDs and transect walk respondents in this study were very clear about the interconnection of different WASH components and other infrastructure, such as access to appropriate houses and roads affected the provision of trash collection which lead to blocked drainage. During the FGDs and transect walk, some of these WASH failures arose from disconnected approaches, such as constructing RDP houses and toilets without considering roads that need to provide access for them to be emptied or appropriate plumbers for sewer connections. One female respondent from the FGDs suggested that upgrading the areas is preferable to constructing new affordable housing developments because of the lack of space and access to WASH services. This was revealed in Unit F in the PLM, which involved respondent observation in the primary factors such as maladministration and corruption in government, which led to housing and WASH challenges in the rural informal settlement. However, the results from this research suggest that there is a lack of

space in rural informal settlements to upgrade in a way that will evade these failure points in the WASH systems.

The FGDs respondents, coupled with literature, indicated that community meetings are, in some cases, gathered for compliance purposes, especially when there are WASH governmental projects to be implemented (Masia, Nesamvuni, Van Rooyen & van den Berg, 2025:15). The transect walk revealed that meetings are held for IDP purposes and when WASH services affect the Councillor/Ward Committees households, i.e. inadequate drinking water or blocked sewage about which feedback is given to communities in these meetings, about WASH conditions. The FGDs discovered that issue with sanitation arises from unlined toilet facilities, which contaminated underground water. Madikizela, Hoossein, Laubscher, Whittington-Jones, Ahmed, Mutingwende, Ristvej and Tandlich, (2022:3) support the findings, which indicated that it is essential to consider informal settlements and the related secondary effects of their unplanned establishment, such as lack of sanitation and proper management of grey water and stormwater in South Africa. The transect walk discovered that the wastewater treatment plants are overwhelmed and receive more waste than they are designed to handle. Participant PLM5 revealed that the municipality hires unskilled individuals and places loyal supporters in power to divert WASH services and resources to ideal communities.

PLM1 stated during the FGDs that pit latrines without ventilation cause several problems in the rural informal settlements and other forms of toilets should be explored. During the transect walks, participants suggested that flush toilets, which are connected to the sewer system, are efficiently valuable in the PLM and LNLN. Participant LNLN1 revealed in the semi-structured interview that the cost for maintaining a flush toilet was often too high, particularly as it was used by many people in the household, mostly by adolescent girls who operate it more often during their menstrual periods. During the semi-structured interview, participant LMLN5 suggested that behavioural interventions may be more effective than changes in toilet conditions and privacy to reduce waterborne diseases. The implementation of social behaviour change strategies for WASH improvements is vital for constituencies residing in rural informal settlements within the PLM and LNLN. Open defecation is not always viewed as a major concern, as several constituencies have reported that various organisations have come to educate communities about hand hygiene

practices. The data from the questionnaires revealed that communities in rural informal settlements use their indigenous knowledge system, as they are aware that boiling water is another method for treating drinking water. During the transect walk, some members of the communities depended on social media videos for more information. The primary aim of triangulation was thus to ensure completeness of data, using quantitative and qualitative approaches to identify any similarities and differences. Limitations of triangulation in the literature include using incorrect methods and the inability to articulate its use clearly, but there are multiple strategies for overcoming these limitations. It is important to have a research question that is focused, concise and relevant to the research topic (Arias Valencia, 2022:13).

The study used FGDs, transect walk, interviews, and photovoices to reflect the purpose of the research to overcome triangulation challenges. Additionally, the literature suggests that each method of data collection should be independently complete. The researcher evaluated the assumptions for multiple regression to ensure that there were no violations and used a correlation matrix to examine relationships among the major study variables and factors involved in the provision of WASH in rural informal settlements. Methodological triangulation can be effectively applied in social sciences research. It identifies the challenges associated with this approach and recommends strategies for overcoming them and provides a rationale for using triangulation and explains how to maintain rigour in research.

6.7 CONCLUSION

This chapter focused on the qualitative dimension of the study, employing Participatory Research (PR), Participatory Action Research (PAR), and Participatory Learning and Action (PLA) as its core methodological frameworks. These participatory approaches underscore the importance of inclusive stakeholder engagement and the creation of collaborative partnerships among policymakers, local authorities, and residents of rural informal settlement communities. Through these approaches, the study sought to ensure that the voices of community members, particularly women and youth, were integral to understanding the realities of WASH in the CDM.

A range of participatory techniques supported the data collection process. Social mapping was used to identify and visualise the distribution of resources and the prevailing WASH conditions within the rural informal settlements. A transect walk

provided direct observation of both the physical environment and socioeconomic factors influencing WASH service delivery. Informal discussions were also conducted to clarify and verify insights emerging from different data sources. In addition, the photovoice technique served as a participatory visual method that empowered women and adolescent girls to use photography as a tool for expressing their experiences, highlighting vulnerabilities, and illustrating well-being challenges linked to WASH provision in their communities.

The qualitative findings focused on several key aspects, including access to WASH infrastructure, the condition and privacy of sanitation facilities, household water treatment practices and the availability of handwashing stations. Data from structured interviews with municipal officials and stakeholders, together with FGDs with community members, were triangulated with quantitative results to ensure the robustness of interpretations of findings. Collectively, these findings revealed significant inadequacies in WASH-related conditions within CDM, underscoring the need for urgent and coordinated intervention to enhance the community's quality of life and livelihood. The above contextual findings, insights and interpretations have profound implications for future policy and practice related to WASH at the CDM.

The next chapter builds upon these insights to propose a Sustainable Governance Model for WASH, grounded in the study's theoretical foundations and informed by the integrated analysis of both qualitative and quantitative data.

CHAPTER 7:

A SUSTAINABLE GOVERNANCE MODEL FOR WASH

7.1 INTRODUCTION

This chapter presents a proposed sustainable governance model to promote the provision of WASH services for rural informal settlements in the Capricorn District Municipality (CDM) in the Limpopo Province of South Africa. The chapter discusses problems related to attaining universal access to improved WASH service infrastructure in rural informal settlements using a proposed sustainable governance model for WASH within the CDM, which includes the Polokwane LM, Lepelle-Nkumpi LM, Molemole LM, and Blouberg LM, responsible for basic services in their jurisdictional areas. The extensive empirical findings presented in the previous confirmed the leading theoretical argument of the study, namely that informal settlements in South Africa are currently experiencing a crisis in accessing WASH infrastructure and facilities. The main research question of the study was therefore not in vain to determine the best feasible sustainable governance model for WASH within the CDM. This chapter summarises the key perspectives on the primary outcomes of the literature study and the empirical investigation, which includes findings related to both the primary and secondary objectives. Together, these findings and the literature review form the foundation for developing the sustainable governance model. The recommendations provided supports the introduction and implementation of this model. The overall purpose of Chapter Seven is to analyse the feasibility of implementing WASH in the CDM (R06).

7.2 A PROPOSED GOVERNANCE MODEL FOR WASH IN CDM

The study's primary aim was to reflect on "what might be the most beneficial sustainable governance model to promote the provision of WASH services for rural informal settlements in the CDM in Limpopo Province of South Africa?" The main objective of the study was to analyse the feasibility of implementing WASH in the CDM. Casella, Bottani, Murino, and Solari (2023:4) asserted that designing a model often formulates a scientific hypothesis. Science represents a complex phenomenon that actively engages social science researchers in the process of generating validated

knowledge. In social sciences, a conceptual model aims to provide a comprehensive understanding of a complex phenomenon and process, helping us better grasp problems and how different variables interact with them (van der Walddt, 2024:2).

A model is a systematic description of a phenomenon for investigation (Mynott & Kager, 2024:2). The model reflects the challenges regarding WASH in the CDM (as discussed in the previous chapter of the thesis) including a lack of access to infrastructure, conditions and privacy of the facilities, water treatment practices and handwashing facilities. Underdeveloped and gender-biased infrastructure is one of the leading causes of the inability of women and adolescent girls, including those who are in vulnerable situations, to access WASH for essential services needed for social mobility and reducing the gender gap (Hlatshwayo, Mashaba, Mathuloe & Yende 2022:12).

The previous chapters described WASH as a complex phenomenon that requires detailed representation in this research. This directs our attention to the fundamental aspect of developing a sustainable governance model for WASH in the informal settlement communities in the Polokwane and Lepelle-Nkumpi Local Municipality in CDM. Before presenting the model, it is imperative to outline the CDM organogram to provide the necessary context for understanding the complex phenomenon of a sustainable governance model for WASH and analysing the feasibility of implementing WASH in the CDM. The district organogram shows the hierarchical relationships between managers and the people who report to them in the provision of WASH. The challenges and limitations associated with drafting the proposed model have been cautiously summarised. Additionally, valuable insights and suggestions have been provided to enhance the development process.

7.2.1 Development of a proposed WASH governance model for CDM

The proposed sustainable governance model of WASH was developed drawing on existing knowledge, literature review, institutional memory, research methodology and empirical findings of this research.

Figure 7.1 below depicts the organogram of the CDM used for the development of a sustainable governance model. The organogram is a key component and forms the essential foundation of the model. For this research, attention is focused on these structures and their effectiveness in ensuring smooth municipal governance. The CDM

is a category C municipality, also known as a district municipality. Zimbalist (2022:259) reported that the district is responsible for providing water and sanitation to the local municipalities (LMs) under its jurisdiction. These include Polokwane LM, Lepelle-Nkumpi LM, Molemole LM, and Blouberg LM. The WASH-related projects in the CDM are implemented by the Department of Water and Sanitation, legitimised by the Constitution, and linked with numerous global targets, such as the SDGs from the World Health Organisation (WHO)/United Nations Children's Fund (UNICEF)/Joint Monitoring Programme (JMP). The district municipality directs WASH projects down to the local municipality through various hierarchical structures such as the project management unit, scientific services, and the relevant implementation, planning, operations and maintenance departments. In the project implementation, the district municipality ensures the following:

- Project technicians oversee the implementation by contractors, both internal and external.
- Quantity survey support for the project is appropriate and complies with standards.
- The satellite head or superintendent operates according to the local municipality and communicates with the ward councillor about WASH projects.
- The artisan team supports the satellite head or superintendent at WASH community meetings.
- Ward councillors organise WASH community meetings.
- WASH meetings are held in specific communities.
- Minutes of the WASH meetings are documented, and the roll call is circulated

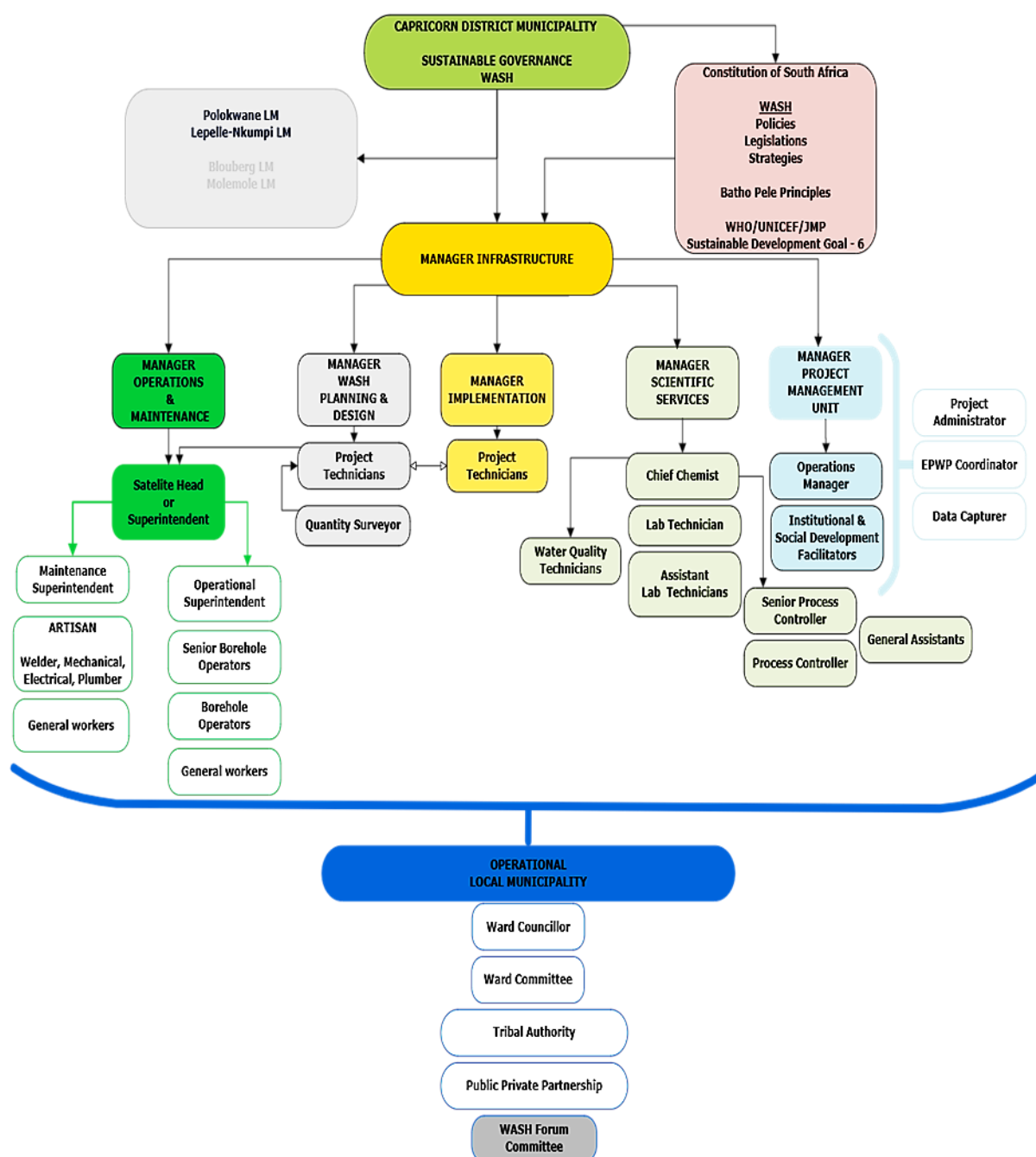


Figure 7.1 Capricorn District Municipality

Source: Author's own interpretation

7.2.1.1 Description of the model

The researcher employed the Delphi technique to develop the proposed sustainable governance WASH model. To achieve this objective, the researcher convened a Delphi panel of WASH system experts, both local and global, to elaborate on the feasibility of developing a sustainable governance model for WASH at the CMD and

to subsequently rate and comment on the importance of its feasibility in rural informal settlement communities. The panel then discussed the Delphi process and its characteristics, panel selection, and the application of the model. The researcher consolidated the WASH panellists' responses into characteristic categories and repeatedly asked them to rate and comment on the draft model through multiple rounds until consensus was reached. Based on the research findings, recommendations for future research practices in the emerging field within the WASH sector are presented.

a) Overview and background

The Delphi Technique is a structured method of group communication that employs a panel of WASH sector systems experts to reach consensus rather than relying on individual opinions. It consists of a facilitated process where questionnaires are answered in multiple rounds to tackle complex problems or explore new ideas (Cuhls, 2023:3). The WASH phenomenon significantly impacts the provision of basic services in rural informal settlements within the CDM. After each round of responses, researchers provide an anonymised summary of the WASH experts' views and reasoning, prompting them to reconsider their initial answers. This process narrows the range of responses, progressively moving towards a consensus on WASH provision. The final mean score from the last round was used to determine the outcomes of the Delphi study based on a proposed sustainable governance model for WASH in the CDM. Figure 7.2 below displays the proposed sustainable governance model for CDM. The Delphi technique and process used to compile the model is first discussed below followed by an explanation of the proposed sustainable governance model for WASH in section 7.3 of this thesis.

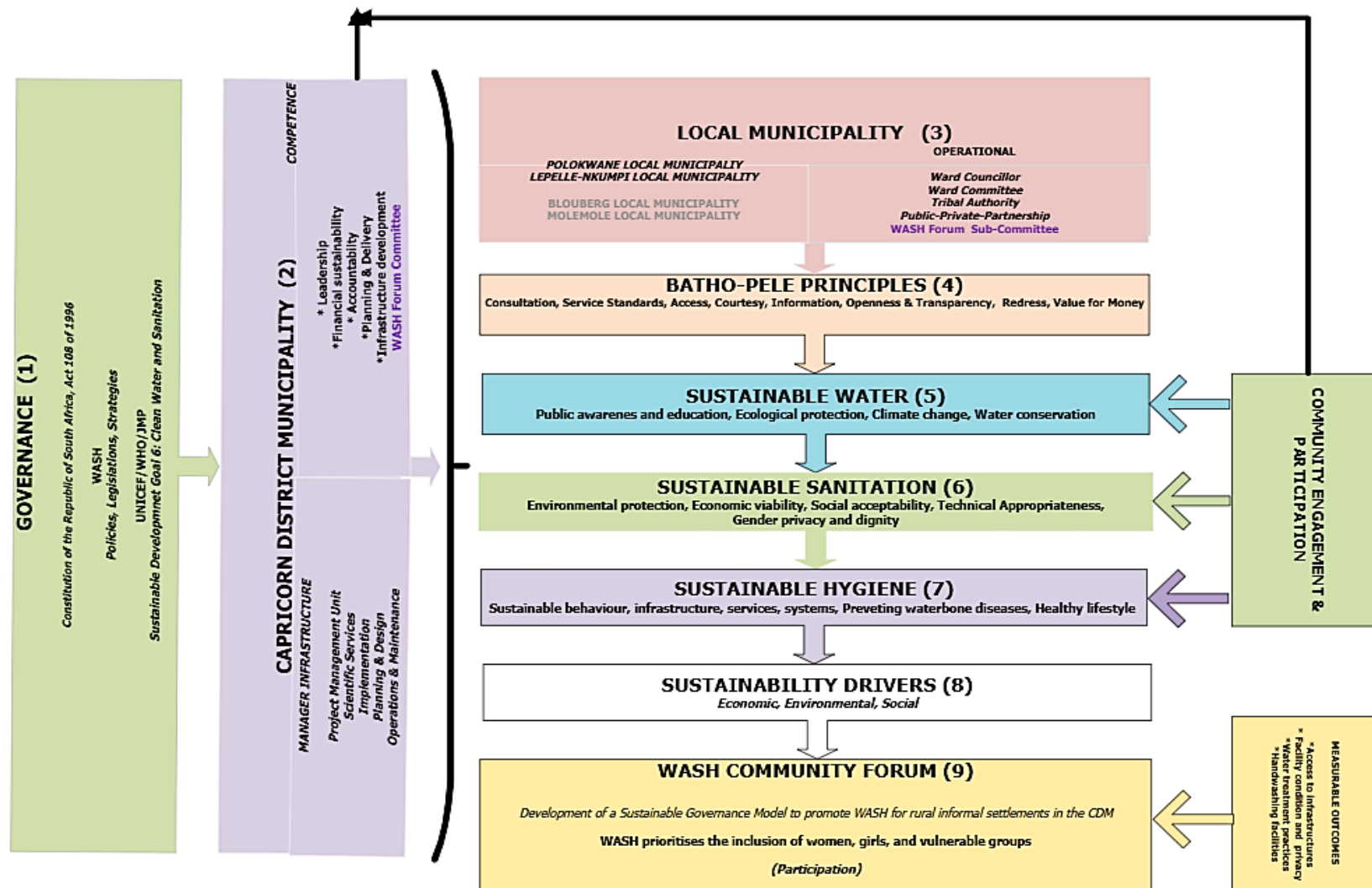


Figure 7.2 Sustainable Governance Model

Source: Author's own interpretation

b) Strengths and limitations of the Delphi Method

The Delphi technique is cost-effective, overcoming time limitations and attaining consensus in areas with a lack of practical evidence. This method identifies gender disparities in accessing, using and maintaining WASH facilities, ultimately guiding the development of equitable and sustainable solutions at the CDM. The Delphi method offers practical advantages over opinion techniques, particularly when face-to-face discussions are not feasible. However, the Delphi Technique is criticised as lacking criteria for determining the size and composition of the panel and defining consensus. Table 7.1 summarises the advantages and disadvantages of the Delphi method, as noted by Williams and Webb (1994:181), Powell (2003:377) and Barkhordari Ahmadi, Esmaeeli, Shariat Moghani, Rahimi and Shariati, (2023:825).

Table 7.1 Comparison of advantages and disadvantages of Delphi Method

SOURCE	ADVANTAGES	DISADVANTAGES
Williams & Webb (1994)	• provides a consensus of expert opinion without the bias that can occur in comparable techniques • encourages honest opinions free from pressures • with each round, the views of the panel can be viewed • high face validity • when consensus is achieved, there is evidence of concurrent validity • logistically, allows for the participation of a broad group of people	• no criteria on the size and composition of the panel. • no evidence of the reliability of the technique. • potential for bias from the Researcher in interpreting the findings. • consensus is poorly defined.
Powell (2003)	• flexible method useful in achieving consensus in areas of uncertainty or lack of empirical evidence • democratic and structured approach that harnesses	• results reflect expert opinion rather than indisputable facts • results will require further validation

	the collective wisdom of participants • useful for shaping communication and seeking agreement with diverse groups.	
Barkhordari Ahmadi, Esmaeeli, Shariat Moghani, Rahimi & Shariati (2023)	• structured communication system • anonymity for unbiased responses • geographical flexibility • neutralising dominant individual influence • time and cost efficiency • repeated resting of answers until consensus is reached • ease of learning and implementation • resistance to individual opinion manipulation	• limited open discussion • requiring commitment in multiple rounds • dependence of study interpretation on responders' expertise • a rather long and tedious process

Source: Researcher's own compilation

Having selected the Delphi model as an appropriate model for a proposed sustainable governance model, it should be evaluated, considering the advantages and disadvantages presented in Table 7.1, as indicated by Williams and Webb (1994:181) and Powell (2003:377), to facilitate an objective evaluation. Walters, Valcourt, Javernick-Will and Linden, (2022:1) asserted that one of the most widely applied techniques in Delphi research is the use of surveys, such as addressing the questions on how to analyse the feasibility of implementing WASH initiatives in the CDM. This approach evaluates how WASH implementation can benefit rural informal settlement communities. The advantages of the Delphi method lie in its flexible approach, which facilitates consensus building among respondents.

c) The Delphi Process

The researcher convened leading WASH experts, including government officials, Non-Governmental Organisations (NGOs), academics, environmental health practitioners,

ward councillors, external stakeholders and the gender forum in a remote multi-round Delphi survey. The Delphi method offers a structured and systematic means to remotely evaluate consensus between WASH experts on a complex and nuanced topic (Walters et al., 2022:2). WASH panel members can remain anonymous, with only the collective consensus being published (Walters et al., 2022:3). To promote consensus within the Delphi survey process, WASH participants are provided with aggregated feedback of responses from all the survey reports and are then asked if they would like to adjust their previous responses based on the compiled feedback. This process is repeated between three and four multi-round surveys until consensus is achieved. The Delphi method has been applied to explore consensus perspectives in many different sectors, as well as in the field of WASH (Walters et al., 2022:1).

The WASH experts received an email that explained the study goals, methods, types of questions, criteria for selection, the number of survey rounds and how long the process would take. The expert panellists were recruited via email, and some during the transect walk at the rural informal settlements in the CDM. The email included a link to a survey. Panellists received informed consent forms via email, which were included in the online survey. The Delphi process was conducted in three rounds. The results from each survey round were analysed to identify areas of engagement on the priority of research questions. Consensus was defined as the percentage of respondents on the format of a typical five-level Likert scale rating a question as: 1. Strongly disagree; 2. Disagree 3. Neither agree nor disagree; 4. Agree; 5. Strongly agree.

For each question, the percent agreement was calculated, and the questions with percent agreement below the median were also considered to have consensus, but non-priorities and were removed from subsequent rounds. Questions falling between the median and upper interquartile range were seen as lacking a clear consensus and were advanced to the second survey round. The second survey round followed the same approach as the first survey round. The results from both were then collated, and questions were ranked based on their consensus scores. The consistency of responses was the stopping criterion of the Delphi rounds. The results of the Delphi process are shaped by the frame of data collection, who the participants were and the analytical process used. The researcher experienced the following challenges when using the Delphi process regarding for WASH provision:

- ✓ Identifying and recruiting suitable WASH experts
- ✓ Formulating research questions
- ✓ The diversity and depth of participants in this study
- ✓ Ensuring broad participation across sectors
- ✓ Validating experts consensus on completion
- ✓ Data capturing

d) Characteristics of the Delphi Method

Barkhordari Ahmadi *et al.* (2023:826) asserted that the Delphi technique has four key features that set it apart from other group decision-making approaches, such as: (1) anonymity; (2) iterative feedback; (3) group response; and (4) expert consultation as discussed below.

- (1) Anonymity** – this feature encourages WASH participants to express their opinions freely and honestly by reducing peer pressure, ensuring more accurate and unbiased responses.
- (2) Iterative feedback** – this technique uses structured feedback rounds, helping WASH panel members understand collective perspectives and refine their responses based on insights from other experts.
- (3) Group response** – WASH participants can modify shared information through several feedback rounds until a strong consensus is reached among the expert panel.
- (4) Expert consultation** – the Delphi method intentionally selects WASH participants with specialised knowledge in a specific field, ensuring high-quality insights. This approach helps generate well-informed, consensus-driven outcomes in research and decision-making such as when analysing the provision of WASH in rural informal settlements of the CDM.

e) Carrying out the Delphi Method

Barkhordari Ahmadi *et al.* (2023:5) described the Delphi method as a structured approach that gathers insights and opinions from a panel of experts to achieve a consensus on a specific topic, i.e. it aims to examine the feasibility of implementing WASH in the CDM from a public administration perspective. The process of implementing the Delphi method can be broadly defined in four key steps: (1) defining the objectives; (2) selection of

experts; (3) elaboration and launching of questionnaires; and (4) using the results as discussed below.

- (1) Defining the objectives** – the first step in a Delphi study is to clearly define the study objectives and scope. It was crucial to determine specific questions or topics that required WASH experts' input and to identify key issues that needed to be addressed, such as analysing the feasibility of the implementation of WASH in the CDM. This foundation step ensures that the study remains focused and relevant throughout the process.
- (2) Selection of experts** – selecting the right WASH experts is essential for the success of the Delphi technique. WASH experts had to have the relevant knowledge, expertise and experience related to the WASH topic being studied. The WASH panel members also had to be diverse to ensure a comprehensive range of perspectives. Typically, a WASH panel of at least 10 to 15 participants is recommended, depending on the study's scope and complexity.
- (3) Elaboration and launching of questionnaires** – this step involved creating questionnaires to gain WASH expert feedback using structured, semi-structured, or open formats based on the study objectives. The Delphi method was therefore selected as a reliable and structured method to achieve this desired outcome. A Delphi survey of three rounds was selected (Scott, Scott, Hawkins, Blackett, Cotton & Lerebours, 2019:5). **Round 1** was designed to enable experts to provide additional qualitative data around the position statement. An open-ended questionnaire was distributed to all WASH experts to respond independently, providing their insights, predictions or suggestions related to the defined objectives of the study. **Round 2** – after collecting the responses from Round 1, the researcher summarised and compiled the WASH experts' ranking of contents in terms of priority statements. The summary was then used to create a more focused and structured questionnaire for the next round. **Round 3** identified levels of consensus and prioritisation. Barkhordari Ahmadi *et al.* (2023:829) stated that the next round is optional and further rounds may be conducted to refine the opinion based on the consensus achieved in Rounds 1 and 2. Figure 6.3 depicts the three-round Delphi survey process.
- (4) Using the results** – after the Delphi process was completed and a consensus had been reached, the WASH results were used for decision-making, forecasting,

policy development or other defined objectives. The anonymity in Delphi studies ensures that the outcomes are unbiased and represent the collective expertise of the WASH participants.

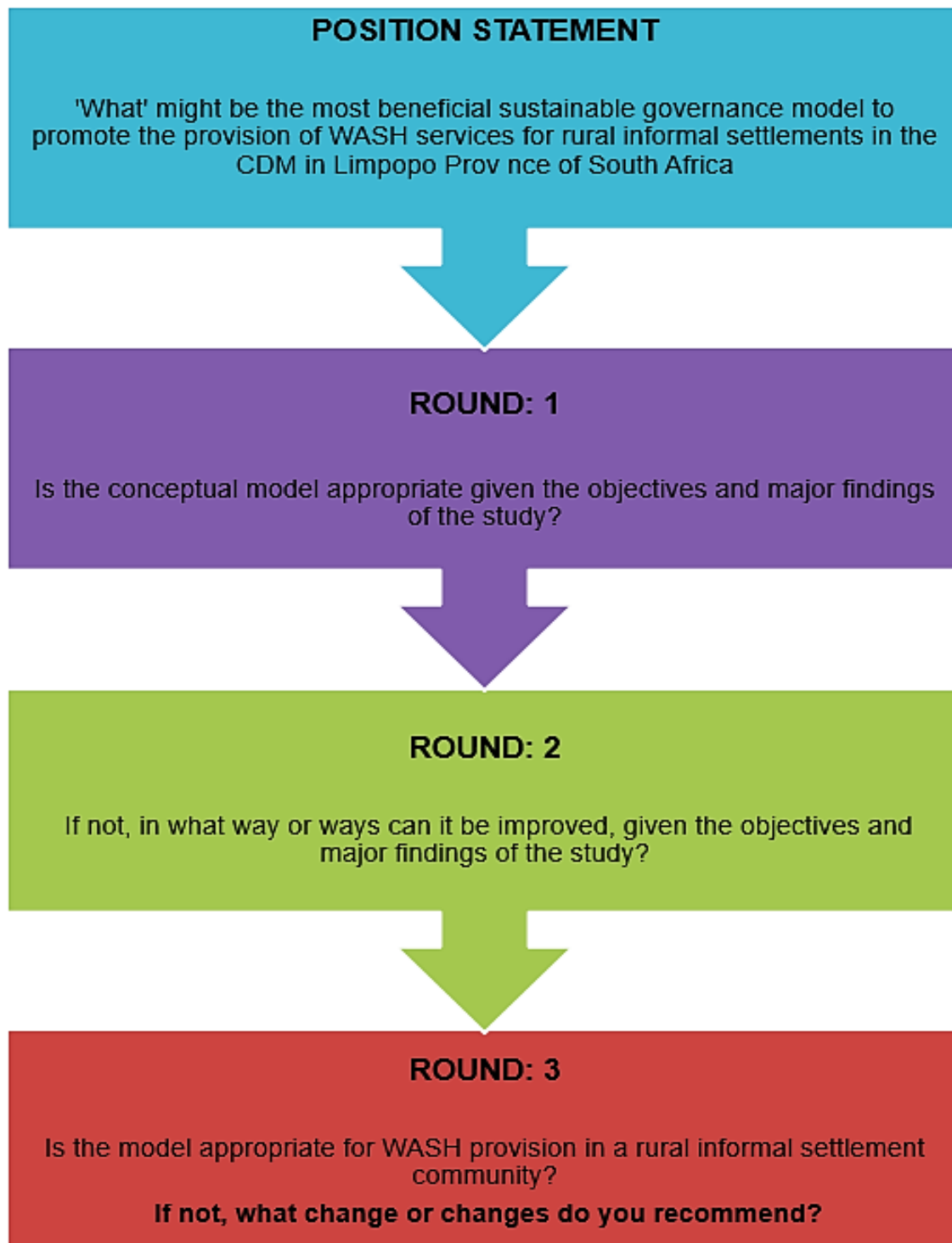


Figure 0.3 The three-round Delphi survey process

Source: Author's own interpretation

f) Application of the Delphi Method

The WASH participants were randomly selected and invited via WhatsApp and several Google mail addresses. They were requested to participate and share opinions on the three rounds of the Delphi survey process, comprising the following actions:

ROUND 1: The first round was to gather wide expert opinion on the governance model of WASH. The first 'open-ended' round presented the participants with four arguments and counterarguments to the position statement 'what might be the most beneficial sustainable governance model to promote the provision of WASH services for rural informal settlements in the CDM in Limpopo Province of South Africa.?'

1) QUESTION: Is the conceptual model appropriate given the objectives and major findings of the study?

RESPONSES: Yes, the conceptual model is appropriate and well-aligned with both the research objectives and findings. The model reflects the multidimensional challenges of WASH governance in CDM, including:

- ✓ Infrastructure access issues (e.g., unreliable communal taps, lack of sanitation systems).
- ✓ Socioeconomic barriers (e.g., poverty, unemployment and low household income).
- ✓ Community perceptions and behavioural factors (e.g., hygiene practices, reliance on informal systems).
- ✓ Institutional challenges (e.g., slow implementation, lack of decentralisation and poor monitoring).

The model integrates both global best practices and locally grounded data, providing a framework that is both academically robust and practically relevant for rural South African contexts.

2) QUESTION: If not, in what way or ways can it be improved, given the objectives and major findings of the study?

RESPONSES: While the model is appropriate, a few refinements could improve its effectiveness:

- ✓ Stronger inclusion of gender and youth roles: The data shows women and youth are central to WASH in rural CDM. The model could highlight their roles in governance, awareness and infrastructure usage more explicitly.

- ✓ Resilience to infrastructure breakdowns: Since many communities report non-functioning water systems, adding a maintenance and emergency response component would be valuable.
- ✓ Policy responsiveness and accountability: The findings mention frustration with poor implementation and centralised decision-making. Adding a precise feedback mechanism from communities to policymakers could enhance governance responsiveness.

3) QUESTION: Is the model appropriate for WASH provision in a rural informal settlement community?

RESPONSES: Yes, the model is highly suitable for rural informal settlements. It reflects local conditions and challenges faced by rural residents in CDM, including:

- ✓ Difficult access to water sources
- ✓ Economic limitations preventing infrastructure upgrade
- ✓ Limited hygiene education in schools and communities
- ✓ Dependence on NGOs and local leaders for practical service delivery
- ✓ Moreover, the participatory data collection approach (e.g., PRA and community input) strengthens the model's relevance for informal and underserved areas.

4) QUESTION: If not, what change, or changes do you recommend?

RESPONSES: To further enhance suitability for rural informal settlements, the following changes are recommended:

- ✓ Decentralised decision-making: The findings suggest that ward-level or village committees are better suited to respond to local WASH issues. This should be a core component of the model.
- ✓ Cultural and linguistic considerations: WASH awareness campaigns should be implemented in local languages with culturally appropriate messaging.
- ✓ Public-private collaboration: Partnering with NGOs and private sector entities (as recommended in the research) can help bridge gaps in infrastructure, training, and innovation.
- ✓ Transparency tools: Include budgeting transparency and community access to service delivery data, which will build trust and accountability.

Maintaining continuous communication with the WASH experts was essential throughout the Delphi process. It was necessary to provide regular updates, reminders and

clarifications to ensure high participation and engagement from the WASH panel members. The researcher played a crucial role in managing the process, gathering responses, and providing feedback to WASH participants in the Delphi method.

g) Panel selection of the Delphi Technique

Adopting a sustainable governance in the provision of basic services in rural informal settlements represents a significant paradigm shift with regard to WASH. While there is an acknowledgement that further sustainable governance is desired, the extent of consensus amongst WASH expert researchers and practitioners around key issues of WASH relevance and insights into how change can best be attained in practices is not known. Based on the results of the Delphi expert's consensus survey, these actions, collectively, are considered to support the attainment of better WASH outcomes and broader impacts from rural development.

The WHO/UNICEF/JMP, linked with Sustainable Development Goal 6: clean water and sanitation, commits member states to achieve sustainable governance in 2030 and beyond. This has triggered a growing call from WASH experts, including government officials, Non-Governmental Organisations (NGOs), academics, environmental health practitioners, ward councillors, private-public partnership and the gender forum, to respond to the needs of all rural informal settlement communities. In selecting the Delphi panel, 10 potential WASH participants were identified by the researcher. Each potential panellist was known by the researcher for their extensive experiences and practical knowledge in providing WASH services for rural informal development. The recruited WASH experts have diverse experiences across the globe, particularly in Africa, where many regions are not on track to meet Sustainable Development Goal 6: Ensure access to water and sanitation for all. Overall, the study panellists have an average of 18 years of experience in the WASH and international development sectors, with a minimum of 7 years of experience required.

7.2.1.2 Summary of the model

Achieving equitable access to the provision of WASH services requires paying attention to the most disadvantaged sections of the population, such as the rural informal settlements. Yet despite all progress made to evaluate the access of the vulnerable (women and adolescent girls) and marginalised groups (rural informal settlements), important knowledge gaps remain with respect to identifying their specific barriers and

needs. In South Africa, there are two mechanisms for measuring SDG 6 goal progress: the Blue Drop assesses drinking water quality, while the Green Drop evaluates the performance of wastewater management systems at the municipal level. Both programmes encounter challenges in understanding how and to what extent the vulnerable and marginalised groups access WASH services. These reports are intended to keep the public and stakeholders informed with credible data and information about the state of WASH in the country. Social accountability for WASH is a critical component of the human rights of rural informal settlement communities.

Despite the existence of detached social accountability mechanisms (SAMS) in informal settlements, informal SAMS rarely form part of strategic approaches to addressing social accountability challenges regarding access to WASH services in the communities. Social accountability means that the government must be accountable to all interest groups and stakeholders in the community (Rulashe & Ijeoma, 2022). Accountability for WASH services is a critical component in rural informal settlements, aimed at achieving SDG 6 goals in the communities. To accelerate outcomes, WASH service providers need to understand the benefits of SAMS and have expertise in monitoring and evaluation to effectively address social accountability challenges in accessing WASH services in the rural informal settlement communities.

Monitoring and Evaluation (M&E) for WASH in South Africa is guided by national policies such as the National Water Act and National Sanitation Policy of 2016 but lacks a central data management system as it depends on the Stats SA General Household Survey (GHS) and localised data from water service providers. M&E have become increasingly important for public institutions, entities and agencies that design and oversee policy programmes and service delivery projects, including the local government sphere (Mdhluli & Jili, 2023:92). For local government to thrive, an M&E system is crucial for continuously assessing the performance of municipal systems and operations. M&E is important for creating a responsive, transparent and accountable municipal council that meets the needs of communities, including the provision of WASH in rural informal settlement communities. Communities are encouraged to participate in the local affairs and keep decision makers, such as the municipalities, accountable for their WASH needs to ensure that constituencies have access to WASH services.

To analyse the feasibility of WASH within SAMS, policies and legislative framework should be evaluated within a performance management system (PMS) in the

municipalities. This will enable the M&E system and ensure community and stakeholder participation is accountable. The PMS should be fully connected to the National Development Plan (NDP, Provincial Growth and Development (PGDS), the Integrated Development Plan (IDP), Local Economic Development (LED) strategies, as well as the municipal budget and global standards such as the SDGs. The PMS aim to enhance accountability and effectiveness by using various tools and metrics to identify areas for improvement and enable informed resources allocated to achieve municipal goals in the provision of WASH services (Mdhluli & Jili, 2023:94).

The performance audits are key components of a PMS, and the M&E system is necessary to improve good governance in municipalities. Good governance in municipalities entails clear roles and responsibilities, effective decision-making, financial management, stakeholder engagement and monitoring and evaluation systems (Gcabashe & Pillay, 2025). By promoting good governance in municipalities, local government can increase its effectiveness, efficiency and accountability in the provision of WASH services to rural informal settlement communities. This, in turn, can support the development of sustainable communities, improve the quality of life in rural informal settlements and attain vision 2030 of the global SDGs. Additionally, some of the key SAMs for the M&E in South African municipalities include oversight bodies responsible for overseeing the performance in local government to ensure accountability, WASH stakeholder engagement, data collection and analysis to better understand the impact of their programs and training and capacity building to develop skills and knowledge required for the provision of WASH services. The researcher used the Delphi method when assessing the provision of WASH services in rural informal settlement communities in the CDM for a better understanding of the M&E mechanism structured to ensure that local government in South African municipalities are accountable, effective and efficient. This is to ensure the community role in accountability and evaluate if stakeholders have the capacity and willingness to implement sustainable, rights-based WASH solutions.

Figure 7.2 depicts the proposed sustainable WASH model, which reveals that good governance is characterised by participatory behaviour and is effective and equitable in promoting the rule of law. Chapter Two provides an overview of the theoretical foundations for developing a sustainable governance model for WASH with specific reference to existing global models and sustainable governance measuring tools within the CDM. Public policy theories and practices indicate that government's decision-making is often hindered by ineffective guidelines that impact societal well-being, affecting both

the choices made and their effective implementation. The inspiration to understand political willingness in public policy formulation arises from the realisation that public administration has frequently prioritised the theoretical aspects of policymaking over an analysis of the actual policymaking process (Manazir, 2025:2).

The complete system of governance for WASH is a three-dimensional system of *elements* which includes principles and mandate, policies and legislation, regulatory framework, institutional arrangements and practices; *levels* from the global, national, provincial, local; and *responsibilities* of government, non-governmental organisations and civil society. There are several political (policy) and legal instruments at the global level with an impact on national governance, mostly related to climate change, management of transboundary water resources and environmental management. The Constitution provides for the establishment of structures that will investigate how municipalities operate. It also reinforces the authority of selected municipalities by defining the powers and functions necessary to fulfil their local government responsibilities. The chapters and sections related to the provision of basic services and infrastructure management in the Constitution include, but are not limited to, the following:

- ✓ Chapter Three – Co-operative governance
- ✓ Chapter Seven – Local government
- ✓ Chapter Ten – Public administration

Additional relevant sections include:

- ✓ Section 139 – Provincial intervention in Local government
- ✓ Section 216 – Treasury control
- ✓ Part B of Schedule 4 and 5 – Local government matters as defined in Sections 155 (6) (a) and (7)

Based on the Local Government: Municipal Structures Act 117 of 1998 (referred to as the Structures Act), local municipalities have the power to appoint councillors to represent them on the district council, under Section 23 of the Structures Act. The following chapters and sections are pertinent to municipal service delivery and infrastructure management:

- ✓ Chapter One – Categories and types of municipalities
- ✓ Chapter Two – Establishment of municipalities
- ✓ Section 65 – Functions and powers of metropolitan councils
- ✓ Part 4 of Chapter Four – Ward committees

The Local Government: Municipal Systems Act 32 of 2000 (referred to as the Systems Act) includes chapters and sections relevant to municipal service delivery and infrastructure management such as:

- ✓ Chapter Three – Municipal functions and powers
- ✓ Chapter Four – Community participation
- ✓ Chapter Five – Integrated development planning
- ✓ Chapter Six – Performance management
- ✓ Chapter Seven – Local public administration and human resources
- ✓ Chapter Eight – Municipal services

The Local Government and Municipal Finance Management Act, 56 of 2003 (referred to as the MMFA) consists of chapters and sections that relate to municipal service delivery and infrastructure management, defining the appropriate division of powers and conditions between district and local municipalities, such as:

- ✓ Chapter One – Objects of the Act
- ✓ Chapter Two – Supervision of Local Government Finance Management
- ✓ Chapter Four – Municipal budgets
- ✓ Chapter Five – Co-operative government
- ✓ Chapter Seven – Responsibilities of Mayors
- ✓ Chapter Eight – Responsibilities of municipal officials
- ✓ Chapter Twelve – Financial reporting and auditing
- ✓ Chapter Fourteen – General treasury matters

Chapter Three of the Local Government Municipal Performance Management Regulations of 2001 (Department of Provincial and Local Government, 2001:1-126) outlines the capital investment framework that municipalities should utilise in their development programme. Additionally, Section 21 of the Spatial Planning and Land Use Management Act 16 of 2013 specifies that the required contents of a municipal spatial development framework must provide for matters contemplated in Section 21 of the Act, and Section 26 of the Local Government Municipal Systems Act and provincial legislation, if any, and the municipality may, for purposes of reaching its constitutional objectives include any matter which it may deem necessary for municipal planning.

The WHO/UNICEF/JMP are the global drivers for Sustainable Development Goal 6 – “Ensure access to water and sanitation for all”, with a target to be achieved by 2030. However, there are numerous WASH policies, legislations, and strategies within the

national government to provide basic services in the country. In South Africa, WASH governance is driven mainly by the Constitution and WASH-related legislation is administered by the Department of Water and Sanitation at its core. The Water Research Commission focused explicitly on the regulatory environment and practices from the perspective of water governance.

Notably, only strong political commitment and good governance, including effective and efficient service delivery, can build resilient water, sanitation and hygiene systems that would be sustainable for livelihoods. Good governance principles are key to developing a sustainable governance model for WASH within the CDM. The CDM municipalities are responsible for offering basic services to its communities, including WASH. Competency of these municipalities is essential for the effective delivery of WASH services. Skilled personnel are crucial, not only for the effective planning, implementation, and management of WASH, but also for fostering participatory behaviour. By promoting inclusive engagement, building community trust and ensuring that local voices are integrated into decision-making processes, they help strengthen governance and enhance service delivery outcomes. Due to a lack of accountability, incompetence can cause many challenges in providing WASH services, potentially impacting financial management, infrastructure upkeep and community well-being. The model shows the selected local municipalities – Polokwane LM and Lepelle-Nkumpi LM, which contain the rural informal settlement communities and which share both executive and legislative authority with the district municipalities in their jurisdiction. In contrast, metropolitan municipalities possess sole executive and legislative authority within their jurisdictions.

The local government should ensure that WASH services are provided to all communities, including rural informal settlement communities, in a financially and environmentally sustainable manner as stated in Section 4 (2) (d) of the Local Government: Municipal Systems Act 32 of 2000. Chapter Four outlines an overview of the socioeconomic characteristics of WASH, along with the section on gender, and effectively establishes the foundation for developing an inclusive and sustainable governance model. The discussion on gender disparities highlights the critical need to address democratic principles which can be further explored through the NPG model. These principles ensure that essential precepts, such as inclusivity and participatory decision-making, are adequately considered in developing a sustainable governance model of WASH in the CDM.

Magagula, Mukonza, Manyaka and Moeti, (2022:2) reported that local municipalities are formed to enhance democracy by providing services that meet the needs and conditions of local communities. The management and delivery of WASH services present significant challenges in South African municipalities, especially in local municipalities, which often struggle the most in providing basic WASH services to communities. These challenges exist despite the South African Constitution recognising both municipal councillors and the institutions, status and functions of traditional leadership. Ramolobe (2023:2) asserted that traditional leaders and municipal council members should collaborate in the following areas:

- ✓ The participation of traditional leaders in the national assembly or the provincial legislature through the national or provincial house of traditional leaders
- ✓ Ward councillors and traditional leaders need to work together at the municipal level.

This collaboration can take place through participation in various structures such as school governing bodies, IDP forums, WASH forums, ward committees and other local participatory organisations. By doing so, they can influence important decisions that affect community engagement and participation. The Batho-Pele principles, as outlined in Chapter Three, are crucial for understanding the research context and provide insights into delivering WASH as a public service in South African local municipalities. The principles serve as tools for transforming public services, addressing past imbalances, providing WASH basic services and fostering socioeconomic development precisely in local government. The PLM and LNLN are closest to communities in providing sustainable basic services and community engagement and participation, such as WASH:

- ✓ Sustainable water is a crucial concern for this model, and it involves communities being aware of its implications. Communities, including rural informal settlements, must be proactive in protecting the environment, ecological protection, water conservation, climate change and conducting public awareness and education.
- ✓ Sustainable sanitation should be economically viable, socially acceptable, technically and institutionally appropriate, and should protect the environment and natural resources.
- ✓ Sustainable hygiene encompasses practices and products that maintain cleanliness while minimising environmental and social impact. It involves

sustainable behaviour, infrastructure services, preventing waterborne diseases and a healthy lifestyle.

The three drivers as key pillars or principles of sustainability, namely economic, environmental and social, serve as the basis for defining and articulating sustainability strategies for the development of a sustainable governance model of WASH in the CDM. The 'good governance' agenda that emerged in the 1990s highlighted the significance of participation and empowerment, which have long been recognised as key social drivers of inclusive, equitable and sustainable development, which focuses on:

- ✓ Economic – ensuring sustainable economic growth and prosperity while reducing negative impacts on the environment and society
- ✓ Environmental – safeguarding and preserving natural resources and ecosystems for current and future generations
- ✓ Social – promoting social wellbeing, equity and justice within communities

The WASH-related responsibilities are primarily shared between the Department of Health (DoH) and the Department of Human Settlements, Water, and Sanitation, while climate change falls under the Department of Environment, Forestry and Fisheries (DEFF). The WASH Community Forum (WASHCF) is designated to actively engage the community in discussions about WASH-related programs at the CDM. This initiative will operate as a sub-committee within the local municipality, using a participatory approach to involve community members effectively. Although the right to WASH is a fundamental right of all constituencies in South Africa, the municipalities and national governments have failed to provide this civil and human right to their constituencies. The policy states that although "toilets are just one element in a range of factors that make up good sanitation," the responsibility for WASH service delivery still mainly falls on local communities (Department of Water Affairs and Forestry [DWAF], 2001:5).

The municipal water management teams is rarely seen by voters, especially in the rural informal settlements, making it difficult to assess their management skills and competency. Managers typically come from outside the community network, which results in minimal communication between residents and the superintendent. Chapter Five analysed the challenges related to providing WASH at the CDM and resulted in beneficial, measurable findings derived from the empirical data. The findings revealed little to no support for access to infrastructure, facility conditions, privacy, water treatment practices, and handwashing facilities. Waiting time for municipal responses to infrastructure

concerns can range from two weeks to several months, and it appears that no formal risk management programs are in place in the rural communities.

Concerns related to the provision of WASH intersect with SDG 6 and the importance of addressing drainage issues, and emphasise the need for sustainability in the sanitation practices in rural informal settlements such as in the CDM. This research highlights the knowledge gap that sheds light on the limitations of standard assessments and underscores the necessity of incorporating feedback from rural communities. While there are contemporary efforts to advance sustainable WASH, integrating narrative elements and qualitative insights, alongside predefined assessment indices, is crucial for capturing a more comprehensive understanding of the situation.

7.2.1.3 Challenges and suggestions for the application of the model

The research suggests that the sustainable governance model for WASH will likely face challenges and may not operate smoothly. In rural communities in South Africa, the provision of basic services such as WASH is influenced by various factors, including socioeconomic characteristics. To improve WASH services in rural communities and informal settlements, it is vital to align political will, capacity, financing, and infrastructure; achieving such alignment is often challenging, however. Additionally, the idea of establishing a WASH Community Forum (WASHCF) might not be practical for municipal personnel, as they may not recognise its importance within the context of the CDM and attaining SDG 6 by 2030 and beyond. Therefore, there is a need to develop a sustainable governance model to promote WASH programs in rural and informal settlements within the CDM in the Limpopo Province.

The inadequate provision of basic WASH services in rural local municipalities in South Africa negatively impacts the livelihoods of households within society. WASH infrastructures have deteriorated due to decades of neglect, and poor maintenance has led to service provision backlogs that municipalities are struggling to address. Municipalities face numerous challenges, including administrative and technical incapacity, inadequate planning, poor financial management and insufficient public participation in their activities. Issues such as staff shortages, lack of technical skills and the inability to implement mentoring and maintenance programs expose the inconsistency and poor functioning of WASH services to rural communities.

WASH policies and principles, particularly the Batho-Pele principles, are fundamental to the municipality. They embody the essence of being a public servant and guide how to serve the public. In that context, the Batho-Pele principles provide the foundation for the provision of basic services such as WASH from the municipality to the communities. Women and adolescent girls are often denied access to WASH for personal and household use, highlighting issues of gender equality and WASH-related policies. Thus, such policies may result in the roles of women, adolescent girls and vulnerable groups within the development of WASHCF diverging from those of municipal personnel, as the establishment could pose a threat to them. Therefore, instead of perceptions, the Delphi Technique model highlights incompetency as an alternative explanation that may contribute to the unsuccessful implementation of a sustainable governance model in the CDM.

7.3 CONCLUSION

Chapter Seven addressed the fifth research objective, which was to analyse the feasibility of implementing WASH in the CDM. A robust and sustainable governance model for WASH incorporates interdependent elements and emphasises a top-down approach from the district municipality and extends to community engagement and participation. Constituencies are placed at the centre of WASH issues, interacting with stakeholders while remaining aware of sustainability considerations. The model enhances community involvement in the provision of basic services of WASH within the CDM. In this regard, a strong WASH Community Forum designed through a participatory process must be inclusive and representative. The forum must operate efficiently and possess the capacity to influence outcomes effectively. Transparency is crucial; thus, the WASH Community Forum should rely on information that is easily accessible to all members.

Moreover, the forum should incorporate a structured dialogue mechanism and promote a bottom-up approach to public service provisioning. The foundation of this model is the decentralisation of the sustainable community WASH forum in the CDM. The underlying principle is that rural and informal settlement communities should be granted greater authority and responsibility in managing their WASH resources. Overall, the proposed sustainable governance model aims to ensure active participation of constituencies in the planning of WASH resources, with the municipality providing the necessary resources to continuously support a participatory-based approach. The next and final chapter concludes the research and presents recommendations as well as identified areas for further or future research.

CHAPTER 8:

CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

A sustainable governance model for WASH is proffered in response to the global challenges of adopting SDG 6, which aims to ensure access to safe and sustainable WASH services for all (RO6 addressed in Chapter Six). In the case of local municipalities in South Africa, communities in rural and informal settlements are also eligible for WASH provision in their households as a fundamental human right. The proposed sustainable governance model for WASH was developed based on the empirical findings in Chapter Five, supplemented by the literature review in Chapters Two, Three and Four. As discussed in previous chapters of this research, WASH is a fundamental need of any community, and equally important are the issues of accessibility and the quality of WASH services received by each community. For rural informal settlement communities, who are less likely to access WASH services compared to urban communities, the research argues that such a disparity regarding the provision of basic services should be regarded as unlawful. To establish sustainable governance, the research proposed a model that ensures inclusive participation in the WASH community forum for the CDM (see previous chapter). The current chapter presents a detailed summary, providing the main aim and arguments of each chapter. Furthermore, it provides a link between each chapter and the relevant research objective, research question and the central theoretical statement (CTS). The conclusions of the study are then presented and lastly, the chapter provides recommendations for successful implementation of the proposed sustainable governance model for WASH in CDM and suggests areas identified for further research.

8.2 REFLECTION ON THE STUDY: RESEARCH QUESTIONS, OBJECTIVES AND CTSs

The main aim of this study, linked to the problem statement, has been to develop a sustainable governance model to promote WASH for rural informal settlements in the CDM (see Figure 7.2: Sustainable Governance Model), considering access to infrastructure, facility conditions and privacy, water treatment practices, and handwashing facilities. The research had the following five (5) objectives aimed at achieving the primary aim:

RO1: To explore the principles, dimensions, and approaches that underpin the sustainable governance of WASH.

RO2: To investigate the theoretical fundamentals of developing a sustainable governance

model for WASH with specific reference to existing global models and sustainable governance measuring tools.

RO3: To examine the socioeconomic and psychosocial behaviours related to the provision of WASH in the Capricorn District Municipality.

RO4: To empirically determine the perceptions and challenges in the execution of sustainable governance principles of WASH by residents at rural informal settlements in the Capricorn District Municipality.

RO5: To analyse the feasibility of the implementation of WASH in the Capricorn District Municipality.

RO6: To propose a sustainable governance model for the provision of WASH at the Capricorn District Municipality.

The research questions in section 1.4 of this thesis were derived from the research objectives. Explicitly, the primary research question for the study was: - "What might be the most beneficial sustainable governance model to promote the provision of WASH services for rural informal settlements in the Capricorn District Municipality in Limpopo Province of South Africa?". Hence, the questions below were posed to guide the study:

RQ1: What are the principles, dimensions, and approaches that would underpin a sustainable governance model of WASH within a municipality?

RQ2: What are the theoretical fundamentals of developing a sustainable governance model for WASH with specific reference to existing global models, and sustainable governance measuring tools?

RQ3: What are the socioeconomic and psychosocial behaviours related to the provision of WASH in the Capricorn District Municipality?

RQ4: What are the perceptions and challenges encountered by residents at rural informal settlements in the execution of sustainable governance principles of WASH?

RQ5: How could an analysis regarding the feasibility of the implementation of WASH in the Capricorn District Municipality be utilised to the communities?

RQ6: What constitutes a sustainable governance model that can be proposed for the Capricorn District Municipality to improve the provisioning of WASH?

Considering the importance of the research objectives and questions stated above, the following table summarises the arrangement of the objectives and questions within the various chapters of the thesis:

Table 0.1 Arrangement of RQs, ROs and chapters

Research Questions (RQ)	Research Objectives (RO)	Chapter reference
RQ1: What are the principles, dimensions, and approaches that would underpin a sustainable governance model of WASH within a municipality?	RO1: To explore the principles, dimensions, and approaches that underpin the sustainable governance of WASH.	Chapter 3
RQ2: What are the theoretical fundamentals of developing a sustainable governance model for WASH with specific reference to existing global models, and sustainable governance measuring tools?	RO2: To investigate the theoretical fundamentals of developing a sustainable governance model for WASH with specific reference to existing global models and sustainable governance measuring tools.	Chapter 2
RQ3: What are the socioeconomic and psychosocial behaviours related to the provision of WASH in the CDM?	RO3: To examine the socioeconomic and psychosocial behaviours related to the provision of WASH in the CDM.	Chapter 4
RQ4: What are the perceptions and challenges encountered by residents at rural informal settlements in the execution of sustainable governance principles of WASH?	RO4: To empirically determine the perceptions and challenges in the execution of sustainable governance principles of WASH by residents at rural informal settlements in the CDM.	Chapter 5
RQ5: How could an analysis regarding the feasibility of the implementation of WASH in the CDM be utilised for the communities?	RO5: To analyse the feasibility of the implementation of WASH in the CDM.	Chapter 6

RQ6: What constitutes a sustainable governance model that can be proposed for the CDM to improve the provisioning of WASH?	RO6: To propose a sustainable governance model for the provision of WASH at the CDM.	Chapter 7

Source: Researcher's own compilation

In Table 8.2 below, a summary of the central theoretical statements related to the relevant chapters of this research is presented.

Table 8.2 Central theoretical statements

Central Theoretical Statements (CTS)	Chapter reference
CTS1: The COVID-19 pandemic added to the already complicated socioeconomic position of those living in informal settlements (Gil, Dominguez, Undurraga & Valenzuela, 2021:7).	Chapter 4
CTS2: The scarcity of safe drinking water in rural areas is well accepted as a sign of high occurrence of communicable diseases such as diarrhoea, schistosomiasis, trachoma, and intestinal helminths, which can be attributed evidently to unsafe water, poor sanitation and hygiene (Simelane <i>et al.</i> , 2020:6).	Chapter 2
CTS3: Community participation and knowledge co-production in the creation of novel technologies linked with WASH principles can lead to more sustainable and socially acceptable hand hygiene systems (Sutherland <i>et al.</i> , 2021:1)	Chapter 5
CTS4: Informal settlements are unplanned residential areas with insufficient improved WASH facilities and crucial services, insecure land tenure systems, poor housing quality, and high dwelling density (Dakyaga <i>et al.</i> , 2021:15).	Chapter 3
CTS5: Disparities in access to water services exist between countries, within country boundaries, and in communities, making the SDG universal access to safe water unachievable by 2030 unless appropriately addressed (Tumwebaze <i>et al.</i> , 2022:17)	Chapter 2
CTS6: The availability of WASH is influenced by the interdependence of economic, social, institutional, psychosocial and political concerns influencing the provision of WASH services in sub-Saharan African countries (Ocholla <i>et al.</i> , 2022:8684)	Chapter 6

CTS7: Migration, settlement in hazard-prone areas, age, gender features, educational level, psychosocial factors, marital and work status are all socioeconomic factors that often have a role in a community's vulnerability and resilience to hazards and disasters associated with WASH inadequacies (Hambati, 2022:342).	Chapter 7

Source: Researcher's own compilation

8.3 SUMMARY OF MAIN CHAPTERS

Chapter One: introduces the study by providing background information and highlighting the problem statement, research objectives, research questions and the research methodology, along with the layout of the study. This chapter is also linked to the Central theoretical statements 2, 4 and 5 as follows:

- **CTS2:** The scarcity of safe drinking water in rural areas is well accepted as a sign of high occurrence of communicable diseases such as diarrhoea, schistosomiasis, trachoma, and intestinal helminths, which can be attributed evidently to unsafe water, poor sanitation and hygiene (Simelane, Shongwe, Vermaak & Zwane, 2020:6).
- **CTS4:** Informal settlements are unplanned residential areas with insufficient improved WASH facilities and crucial services, insecure land tenure system, poor housing quality, and high dwelling density (Dakyaga, Ahmed & Sillim, 2021:15).
- **CTS5:** Disparities in access to water services exist between countries, within country boundaries, and in communities, making the SDG universal access to safe water unachievable by 2030 unless appropriately addressed (Tumwebaze, Hrdličková, Labor, Turay, Macarthy, Chmutina, Scott, Kayaga, Koroma & Howard, 2022:17).

In summary, the chapter discussed the provision of the WASH services programme as a cornerstone for the White Paper on Basic Household Sanitation of 2001, the TPB (Theory of Planned Behaviour) and RANAS (Risks, Attitudes, Norms, Abilities, and Self-regulation) in the provision of hygiene education as a crucial public benefit of WASH services to rural informal settlements. A mixed methods research paradigm, involving qualitative and quantitative approaches, were used to conduct the investigation. The research argues that WASH is a fundamental issue in improving the quality of life for constituencies in rural and informal settlements at the CDM (Capricorn District

Municipality). Therefore, Chapter One laid the foundation for the remaining chapters of the study.

Viewed from an analytical perspective, Chapter One frames WASH as a bedrock of sustainable governance, linking the White Paper on Basic Household Sanitation (2001), TPB, and RANAS models to highlight its critical importance to public benefit for informal and rural settlements in the Capricorn District Municipality. However, WASH governance remains constrained by limited access, structural disparities, and behavioural factors. Future research should extend this investigation through comparative municipal case studies and longitudinal assessments of behaviour-change intervention, especially in rural communities, to evaluate sustainability of WASH over time. In order to contextualise the scholarly and practical significance of the presentations in Chapter One, two key policy recommendations emerge:

- (1) First, the integration of behavioural change frameworks involving TPB and RANAS into municipal WASH planning, monitoring and evaluation systems; and
- (2) Second, the formulation of strategies for targeted infrastructure investment in informal settlements, thus ensuring equitable access and appreciable progress toward meeting SDG targets by 2030 and beyond.

Chapter Two: provides an explanation of the theoretical foundations of the research through a comprehensive literature review linked to RQ2, RO2, and CTS 2 and 5 re-stated as follows:

- ✓ **RQ2:** What are the theoretical fundamentals of developing a sustainable governance model for WASH with specific reference to existing global models, and sustainable governance measuring tools?
- ✓ **RO2:** To investigate the theoretical fundamentals of developing a sustainable governance model for WASH with specific reference to existing global models and sustainable governance measuring tools.
- **CTS2:** The scarcity of safe drinking water in rural areas is well accepted as a sign of high occurrence of communicable diseases such as diarrhoea, schistosomiasis, trachoma, and intestinal helminths, which can be attributed evidently to unsafe water, poor sanitation and hygiene.
- **CTS5:** Disparities in access to water services exist between countries, within country boundaries, and in communities, making the SDG universal access to safe water unachievable by 2030 unless appropriately addressed (Tumwebaze,

Hrdličková, Labor, Turay, Macarthy, Chmutina, Scott, Kayaga, Koroma & Howard, 2022:17).

The theoretical basis, including the conceptual framework of WASH and the existing public policy, legislation, and frameworks affecting WASH provision in South Africa, were reviewed. The provision of WASH is viewed as a crucial necessity, recognised as a sustainable development tool globally and locally within social determinants of health, human rights, and the water-energy-food nexus. However, the development of WASH policy and disparities in its provision, especially in rural informal settlements, are hampered by the poorly implemented guidelines in place, which influence the well-being of the communities. To develop a sustainable governance model, the important link between the Delphi Technique Model and the Nominal Group Technique (NGT), in fostering community engagement in the delivery of WASH basic services, was highlighted. The chapter recognises the blending of paradigmatic development in public administration with the delivery of WASH basic services.

In light of the reviews undertaken in Chapter Two, it is important for future research to undertake comparative analyses of governance models across municipalities in the Limpopo province and examine the effectiveness of participatory decision-making tools in shaping equitable delivery of, and access to WASH services. It is equally salient to propose policy directions based on the conceptual discourses and analyses presented in the chapter as these would position Chapter Two as a critical bridge between governance theory and practice. In this regard, the following policy directions are proffered:

- (1) The need to institutionalise participatory methods (e.g., Delphi/NGT) within municipal planning processes in view of its roles in engendering inclusivity in WASH governance; and
- (2) The strengthening of monitoring and accountability safeguards to ensure standardised implementation of WASH guidelines across municipalities and communities.

Chapter Three: discussed the principles of sustainable governance of WASH. The study chapter examined the Batho Pele principles in the context of basic service delivery, such as WASH, as the primary function of any government. The findings of this chapter revealed that access to the provision of WASH is a human right, and hygiene promotion and water provision infrastructure are lifesaving. Therefore, the chapter emphasises the need to align the Batho Pele principles with the WASH community forum to address

issues related to the provision of WASH infrastructure in the community. Chapter Three articulates with RO1, RQ1, and CTS4 re-stated as follows and indicated in Figure 2.1:

- ✓ **RQ1:** What are the principles, dimensions, and approaches that would underpin a sustainable governance model of WASH within a municipality?
- ✓ **RO1:** To explore the principles, dimensions, and approaches that underpin the sustainable governance of WASH.
- **CTS4:** Informal settlements are unplanned residential areas with insufficient improved WASH facilities and crucial services, insecure land tenure system, poor housing quality, and high dwelling density (Dakyaga, Ahmed & Sillim, 2021:15).

Despite its usefulness, limited information exists regarding the potential role of Batho Pele principles in achieving sustainable WASH governance. Therefore, future research should evaluate how Batho Pele-driven participatory mechanisms could influence long-term WASH outcomes and explore comparative applications of citizen-centred governance models in other municipalities in the Limpopo Province. Consequently, pertinent policy recommendations in this regard include:

(1) The need to undertake a formal integration of community WASH forums into municipal governance structures to ensure inclusive decision-making; and (2) The development of monitoring and outcomes-based evaluation frameworks that benchmark WASH delivery against Batho Pele principles, thereby enhancing transparency, service equity and quality in sustainable WASH delivery.

Chapter Four: discussed the psychosocial well-being and the socioeconomic characteristics of rural informal settlement communities linked to the provision of WASH. This serves as the backdrop for the decision-making process, merged with the TPB and the RANAS framework, affecting the psychosocial well-being and the gender transformation approaches of women and adolescent girls in the provision of WASH. Chapter four is linked to addressing RO3, RQ3 and CTS1 as outlined in Figure 3.6.

- ✓ **RQ3:** What are the socioeconomic and psychosocial behaviours related to the provision of WASH in the Capricorn District Municipality?
- ✓ **RO3:** To examine the socioeconomic and psychosocial behaviours related to the provision of WASH in the Capricorn District Municipality.
- **CTS1:** The COVID-19 pandemic added to the already complicated socioeconomic position of those living in informal settlements (Gil, Dominguez, Undurraga & Valenzuela, 2021:7).

The findings in Chapter Four also highlight how WASH access directly shapes constituents' psychosocial outcomes and underscores the gendered dimensions of service provision, especially for women and adolescent girls. Therefore, it would be important in future studies to examine the long-term psychosocial impacts of WASH interventions and evaluate gender-responsive governance models across diverse rural contexts in the province. The findings have a number of policy implications. First, to reduce inequalities and empower women and girls, it is necessary to integrate gender-sensitive approaches into WASH planning and delivery. Second, it is expedient to establish psychosocial support mechanisms within WASH programmes, recognising the broader implications of service access for the well-being of rural community members. These recommendations are helpful to link sustainable governance model to social and behavioural outcomes of rural community constituents.

Chapter Five: explored the perceptions and challenges associated with implementing sustainable governance principles of WASH among residents at rural informal settlements in the CDM (quantitative data). The findings revealed that the provision of WASH services in the CDM varies between rural and informal settlement communities, with rural communities also experiencing the effects of improved service provisions. This variation was linked to malfunctioning infrastructure that affects constituencies in their daily household routines and lifestyles. The research indicated that municipal officials were aware of their obligation to provide WASH services, while constituencies understood that their local municipality was responsible for these services. However, the municipality attributed the issue to a lack of resources and access to WASH provision in certain communities. Empirical data indicates a decline in community participation due to social and behavioural challenges within the communities. There are significant obstacles, including the need for a WASH specialist in the CDM. Chapter five is aligned to RO4, RQ4 and CTS1, respectively, which are re-stated thus:

- ✓ **RQ4:** What are the perceptions and challenges encountered by residents at rural informal settlements in the execution of sustainable governance principles of WASH?
- ✓ **RO4:** To empirically determine the perceptions and challenges in the execution of sustainable governance principles of WASH by residents at rural informal settlements in the Capricorn District Municipality.

- **CTS3:** Community participation and knowledge co-production in the creation of novel technologies linked with WASH principles can lead to more sustainable and socially acceptable hand hygiene systems (Sutherland *et al.*, 2021:1)

While recognising municipal responsibility, behavioural and structural barriers which stifle effective WASH delivery, future research should examine models of community-driven maintenance systems and evaluate the role of specialised WASH expertise in improving governance outcomes. Following the above key findings, practical policy implications emerge, which include the appointment of dedicated WASH specialists within rural municipalities to strengthen technical and governance capacity. Furthermore, there is need for revitalising community participation mechanisms through targeted awareness and behaviour-change programmes at the CDM. These recommendations highlight strategies to ease the practical constraints of WASH delivery at the CDM and underscore the pathways for improving governance efficiency.

Chapter Six: presented the qualitative findings. Five key themes were derived from the data analysis: Municipal Principles, Socioeconomic Challenges, Community Perceptions, Public Policy, and Strategies in the Provision of WASH. These qualitative themes emerged from participants within the Capricorn District Municipality (CDM). The qualitative analysis adopted a constructivist and phenomenological approach to explore participants' lived experiences and perceptions regarding the challenges of ensuring equitable WASH access in rural informal settlements. Findings from multiple data sources, including Focus Group Discussions (FGDs), interviews, Photovoice, and Transect Walks, revealed that, despite infrastructural upgrades such as taps, toilets, drainage, and waste systems, most WASH components were dysfunctional. Each method contributed uniquely: FGDs encouraged collective reflection, interviews provided depth, Photovoice visually captured realities, and Transect Walks contextualised spatial inequalities. Collectively, these triangulated methods strengthened the credibility, richness, and contextual understanding of WASH challenges in the studied communities. Qualitative findings were further triangulated with the quantitative data to develop sustainable governance models to enhance WASH service delivery in the Limpopo Province.

Chapter Seven: presented a model for sustainable governance of WASH in the CDM in accordance with the RO5 and RO6. This objective sought to propose a model that can be beneficial for a sustainable model to promote the provision of WASH services for rural informal settlements in the CDM. Chapters 6 and 7 provide a basis for the achievement

of RO5 and RO6. As for Chapter 6, the proposed model promotes an inclusive WASH Community Forum participation in the determination of access to infrastructure, facility condition and privacy, water treatment practices and handwashing facilities. In layman's terms, the model serves to ensure that the perception and challenges identified in Chapter 5 are resolved. A WASH Community Forum is needed as part of the model to help the CDM and its local municipalities to amicably establish a working committee. There is a strong emphasis on the need for an inclusive top-down approach from the District Municipality, which extends to community engagement and participation in the CDM. Chapter six is linked to attaining RO3, RQ3, and CTS6, respectively.

- ✓ **RQ3:** What are the socioeconomic and psychosocial behaviours related to the provision of WASH in the Capricorn District Municipality?
- ✓ **RO3:** To examine the socioeconomic and psychosocial behaviours related to the provision of WASH in the Capricorn District Municipality.
- **CTS6:** The availability of WASH is influenced by the interdependence of economic, social, institutional, psychosocial and political concerns influencing the provision of WASH services in sub-Saharan African countries (Ocholla *et al.*, 2022:8684).

The sustainable WASH governance model proposed in Chapter Six would ensure coordinated decision-making on the above key service delivery aspects, as the model promises to fill the identified gaps in providing good quality WASH delivery at the CDM. However, future studies are needed to evaluate the practical implementation of this model in the Limpopo Province municipalities, particularly those in under resourced environments, and examine its impact on salient attributes like community satisfaction, service equity, and behavioural outcomes. Policy implications of the findings include the formal establishment of WASH Community Forums within municipal governance structures to institutionalise inclusive decision-making and the integration of the model into municipal planning and budgetary cycles to ensure accountability and sustainability. Such practical and actionable frameworks are necessary to bridge the lacuna between governance theory and WASH service delivery at the CDM.

Chapter Eight: is the final chapter in which the summary or conclusion of the chapters and recommendations of the research are provided. In terms of the recommendations of the research as contained in this chapter, the proposed model is associated with CTS7, which complements RO6 and RQ6, that are re-stated as follows:

- ✓ **RQ6:** What constitutes a sustainable governance model that can be proposed for the Capricorn District Municipality to improve the provisioning of WASH?
- ✓ **RO6:** To propose a sustainable governance model for the provision of WASH at the Capricorn District Municipality.
 - **CTS7:** Migration, settlement in hazard-prone areas, age, gender features, educational level, psychosocial factors, marital and work status are all socioeconomic factors that often have a role in a community's vulnerability and resilience to hazards and disasters associated with WASH inadequacies (Hambati, 2022:342).

Thus, the model and recommendations implicate the need for the implementation of a WASH Community Forum, in which the CDM can promote community participation in the provision of WASH in the rural informal settlements. However, there is an emphasis on the fact that such an initiative not only involves women and adolescent girls, but also creates an inclusive forum that ensures women, adolescent girls, and men are all actively engaged in decision-making and service provision in the community.

Nonetheless, it is necessary to evaluate the long-term effectiveness of such inclusive forums in enhancing WASH outcomes, fostering community cohesion and exploring strategies to apply the model across the various CDM districts. Not only is future research needed to elucidate the impact of such community forums on WASH governance and service delivery, policy recommendations are also required to entrench the integration of community forums into WASH governance structures. These include the institutionalisation of gender- and age-inclusive activities to formalise participation across all community groups, as well as the development of continuous capacity-building programmes for forum members to strengthen their leadership and decision-making capabilities. These strategies would be helpful to achieve sustainable and equitable WASH governance at the CDM.

Table 8.3 gives an overview of the chapter summaries on the study's key findings, future research directions and policy recommendations. This facilitates a cursory view and interpretation of the summaries.

Table 8.3 Key summary findings, contributions and policy recommendations of Chapter One to Seven

Chapter	Key Findings / Contributions	Future Research Directions	Policy Recommendations
Chapter One	Establishes the research problem, questions, objectives, and methodology; Presents WASH governance as critical in rural informal settlements; highlights disparities and health impacts.	Examine governance frameworks across various municipalities; assess impact of localised WASH interventions on health and community well-being.	1. Develop context-specific governance guidelines. 2. Implement capacity-building programmes for municipal officials and community leaders.
Chapter Two	Reviews theoretical foundations, global models, and measuring tools; links participatory approaches to human rights and social determinants of health; emphasises Delphi and NGT for implementation.	Compare governance models across municipalities; evaluate effectiveness of participatory decision-making tools in WASH equity.	1. Institutionalise participatory methods (Delphi/NGT) within municipal planning. 2. Strengthen monitoring, evaluation and accountability mechanisms.
Chapter Three	Analyses Batho Pele principles; asserts WASH as a human right; highlights alignment of principles with community forums for accountability and responsiveness.	Examine citizen-centred governance mechanisms' impact on long-term WASH outcomes; test comparative models in other municipalities in Limpopo.	1. Integrate community WASH forums formally into municipal governance structures. 2. Develop monitoring frameworks which benchmark WASH delivery against Batho Pele principles.

Chapter Four	Links psychosocial well-being and socioeconomic characteristics to WASH provision; highlights gendered implications, especially for women and adolescent girls; applies TPB and RANAS frameworks.	Assess long-term psychosocial effects of WASH interventions; evaluate gender-responsive governance strategies across multiple contexts.	1. Integrate gender-sensitive approaches into WASH planning and delivery. 2. Establish psychosocial support mechanisms within WASH programmes in rural communities.
Chapter Five	Investigates community perceptions and challenges; identifies disparities, infrastructure malfunctions, limited resources, and reduced participation; recognises need for skilled expertise.	Explore community-driven maintenance systems; assess role of WASH specialists in improving governance and service delivery.	1. Appoint dedicated WASH specialists within municipalities. 2. Revitalise community participation mechanisms via targeted awareness and behaviour-change programmes.
Chapter Six	Develops a sustainable governance model combining top-down oversight with bottom-up community engagement through WASH Community Forums; addresses gaps noted in Chapter 5.	Evaluate practical implementation of sustainable governance model; assess its impact on service equity, community satisfaction, and behavioural outcomes.	1. Formally establish WASH Community Forums within municipal governance structures. 2. Integrate sustainable governance model into municipal planning and budgeting cycles.
Chapter Seven	Concludes the study by synthesising findings; reinforces inclusive participation for women, adolescent girls, and men; complements sustainable WASH governance model.	Examine long-term effectiveness of inclusive forums; explore application of strategies across CDM districts.	1. Institutionalise gender- and age-inclusive WASH governance structures. 2. Develop continuous capacity-building programmes for community forum members.

Source: Researcher's own compilation

8.3.1 Contributions to the literature

Despite Dalkey and Helmer's (1963) foundation on the Delphi method and the impressively growing literature on Delphi from groups of experts, there is dearth in this body of literature concerning, more specifically, a sustainable governance model that can be applied by constituencies in the developing world, particularly in sub-Saharan African countries. This study has focused on the development of a sustainable WASH governance model in the CDM, thereby enriching the available literature in such a context and offering a novel use of the Delphi method. As emphasised by Gireesan (2024:305), sustainable governance is an integrated approach that balances environmental and socio-economic factors to ensure long-term well-being. It focuses on creating policies and institutions that promote sustainability and equity, applicable to WASH, as dissemination tools for policymakers. Given the currently unreliable political and socio-economic context in the provision of WASH, the sustainable governance model in the developed world might not deliberately report about the needs of Sub-Saharan African countries. This justifies the need for a sustainable governance model that takes into consideration the Sub-Saharan African context. As in South Africa, the study has shown challenges and perceptions related to the provision of WASH services in the rural informal settlement communities within Limpopo province. This study is therefore in agreement with Okesanya, Eshun, Ukoaka, Manirambona, Olabode, Adesola, Okon, Jamil, Singh, Lucero-Prisno III, and Ali (2024:2) that, despite the emphasis in SDG 6 concerning the need for global access to WASH, Sub-Saharan African countries bear significant risk, having limited to no WASH facilities. Moreover, this study agrees with Bose, Bhattacharya, Kaur, Banerjee, Bhatia, Ray, Batra, Mondal, Ghosh, and Mondal (2024:282), challenging Sub-Saharan Africans to contribute to the creation of new knowledge by developing theories based on Sub-Saharan African context.

8.3.2 Contributions to the body of knowledge of public administration

The study provides some appalling findings and poor progress regarding public administration literature on the challenges of inadequate WASH infrastructures within the NPG. The findings of this study pointed to the fact that constituencies no longer have hope in government, who should be at the forefront of the positioning of public services. Additionally, findings highlighted a shared responsibility among constituencies in terms of a bottom-up approach to WASH community participation to enhance the NPG in rural local municipalities. Although the Constitution approves of and mandates public

participation, municipalities tend to be more corrupt than focused on public participation in the provision of WASH services.

The sustainable governance model aligns with accomplishing implemented public policies and objectives of WASH underscored by the White Paper on Basic Household Sanitation of 2001, which this study recognises as necessary and vital. The fact that vulnerable women and adolescent girls, and certain constituencies are currently discriminated against goes against the essence of sovereignty that is proposed in the New Public Governance (NPG) model. Inadequate provision of WASH serves as a trap, exacerbating the disparities of livelihoods within constituencies, while public policies are often manipulated to enhance municipal outcomes instead of benefiting the individuals they are meant to serve. The focus of public administration research is on public policy. The study further examines the key focus areas impacting WASH public policy and financing in South Africa. The goal is to collaboratively develop visual aids, policy briefs and academic publications to engage audiences across various provinces in the WASH sector. This approach provides valuable insights into how theoretical knowledge can influence policy outcomes in the WASH sector. It is unlikely the targets related to WASH will be achieved by 2030 due to insufficient investment in the WASH sector. Therefore, collaboration between academia and the development sector is essential for consolidating knowledge, research and development practices to drive investment, progress and innovation, especially in rural informal settlement communities.

8.4 RECOMMENDATIONS

This section outlines the study's recommendations for implementing a sustainable governance model for WASH in the CDM. These recommendations are intended to enhance the model presented in Chapter Six of this research. For a sustainable governance model of WASH to be effective, the research recommends the following measurable outcomes be monitored and addressed: access to WASH infrastructure, condition and privacy of facilities, water treatment practices and handwashing facilities in the CDM.

8.4.1 Access to WASH infrastructure

One of the main challenges in providing basic services such as WASH, is the ineffective governance system of the municipality's administration. The research recommends that the CDM's local municipalities and communities collaborate to develop a WASH

Community Forum to discuss WASH infrastructure matters with their constituencies. The WASH Community Forum should have a subcommittee in the local municipality and participate in the WASH structures. The CDM and the Limpopo Province must adhere to the global transformation supported by the government for sustainable development of WASH in their constituencies. By implementing the WASH Community Forum, access to WASH infrastructure would be improved for the affected people. The CDM can provide the necessary oversight in the WASH Community Forum, while the local government and community members can organise and manage the WASH structures.

8.4.2 Condition and privacy of facilities

The study found that amongst the problems hindering the WASH development in rural informal settlements in the CDM were the poor condition of facilities and inadequate privacy regarding WASH in rural households. Women and adolescent girls in rural and informal settlements face human rights violations that significantly impact their quality of life. In this regard, the research recommends inclusive WASH Forum Community participation which involves women, adolescent girls and men from rural and informal settlement communities. Such a forum should ensure that all local participation initiatives start at the local level. This includes engaging tribal authorities, ward councillors and ward committees to guarantee that all necessary information is gathered and participation is encouraged in identifying WASH needs within the CDM.

8.4.3 Water treatment practices

The findings of this research indicate that the quality of drinking water at the CDM does not meet the established water treatment standards. Furthermore, the current regulations and standards for water treatment in South Africa have significant gaps when it comes to providing safe drinking water for households. While SANS 241:2015 is an essential guideline for ensuring the safety and quality of drinking water in South Africa, individuals need to be empowered through understanding its requirements, thereby becoming more informed consumers able to advocate for safe and accessible drinking water for everyone. At the local municipal level, the responsibility for water treatment is limited to scientific services or purification plants. Therefore, there is a pressing need to empower local municipalities to provide updated information and brochures regarding the safety of drinking water to communities within the respective areas of jurisdiction. The research calls for the WASH Community Forum to actively participate and gain a better understanding of SANS:241 at the local water treatment plants and practices. These

practices can help communities to improve their living conditions and encourage them to play an active role in how to preserve and treat drinking water within their households.

8.4.4 Handwashing facilities

The district and local municipalities in Limpopo Province, along with public-private partnerships, should work to improve handwashing water infrastructure and provide affordable and manageable soap for households that cannot afford to buy soap regularly or lack the knowledge of this important hygiene practice. The CDM should get involved in the Global Handwashing Partnership and other accredited health organisations in the country to promote handwashing in rural and informal settlement communities, where washing with soap may be considered luxurious due to inadequate infrastructure and low levels of educational. Additionally, enhancing awareness about the risks associated with poor handwashing practices is critical. For researchers focusing on personal behaviours as well as societal and cultural determinants of limited handwashing facilities, qualitative research will be more informative. Finally, all levels of government should prioritise handwashing brochures and programmes based on the observed impediments.

8.5 POSSIBLE AREAS FOR FUTURE RESEARCH

The study focused exclusively on public policy related to the provision of WASH services by local government, viewing the NPG as a guiding framework for public policy. The findings are specific to this context and do not include the private sector. In this regard, the study highlights issues related to the challenges faced by public infrastructure, as supported by the literature. As the NPG model continues to influence public administration practices in local government, the monitoring and evaluation of implemented public policies are crucial. This research, conducted in Capricorn District Municipality, was limited in its ability to examine other rural informal settlement households within South Africa. While the semi-structured interviews and qualitative methodologies provided valuable insight, they may not yield quantifiable results. To effectively study WASH in the rural informal settlement communities of Limpopo, a mixed-method approach that incorporates participatory research methodologies is essential for obtaining a holistic understanding and engaging with community members. The study also identified theoretical gaps in WASH provision, such as the issue of land tenure insecurity and its impact on WASH services. Ultimately, this research aimed to develop a sustainable

governance model for WASH by assessing its provision in rural informal settlement communities.

Future studies on the provision of sustainable governance on WASH should therefore focus on the following areas:

- ✓ Evaluating sustainable governance of WASH, especially regarding the implementation of the WASH Community Forum in other South African municipalities.
- ✓ An analysis of the implementation of the WASH Resources Management Agency, as it is vital at all levels of the South African government.
- ✓ An analysis of the degree to which the private sector and NGOs are assisting in facilitating and/or the provision of and education around WASH and good hygiene, with the view to providing further support in this regard to all role players.
- ✓ An analysis of the degree to which (if any) the formal education system plays a role in teaching children of all ages about good WASH hygiene, especially for those in poor and rural areas.

8.6 FINAL CONCLUSION

In this final chapter, the study was summarised by highlighting the key issues addressed in each chapter and their connection to the research objectives and central theoretical statements. The findings confirmed that a sustainable governance strategy is necessary for more efficient management in the CDM regarding the provision of WASH services to rural and informal settlements. Access to WASH services are fundamental human rights; therefore, it is essential to gather inputs from the community and involve constituencies in assessing how the basic services, such as WASH, are provided in their municipalities. The study revealed that the CDM faces several challenges that affect the provision of and communities' participation in the WASH services at local municipalities. The research recommends a sustainable governance model for WASH be implemented in the CDM, together with WASH Community Forums forming the basis for addressing challenges in the provision of WASH services in the community. For sustainable outcomes, the activities of the WASH Community Forum should work according to time frames with measurable performance indicators.

Efficient and effective provision of WASH services is critical for the survival of constituencies in CDM. While it is possible to survive food deprivation for a few days, without water, life itself would be severely threatened.

“You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make”

JANE GOODALL

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ANNEXURE A: INFORMED CONSENT

FOCUS GROUP INTERVIEW – WARD COMMITTEE

Research title: A Sustainable Governance Model of Water, Sanitation, and Hygiene Provision: The case of Capricorn District Municipality in Limpopo Province of South Africa

Thank you for agreeing to take part in this research project which seeks to unearth the factors that hinder the promotion of the provision of water sanitation and hygiene (WASH) services for rural informal settlements in the Capricorn District Municipality in Limpopo Province of South Africa and strategies that are in place developing a sustainable governance model to address the WASH. Your response to this interview is voluntary and will be treated with strict confidentiality and anonymity. The interview will help to understand the factors that contribute to the provision of WASH and the strategies employed by the municipality to mitigate the backlog faced by the communities, especially the rural informal settlements.

CONSENT FORM AND INTERVIEW GUIDE INTERVIEWEES

SECTION A: CONSENT TO PARTICIPATE IN THE STUDY

I, _____ (name and surname), agree to be interviewed as part of the research for a Doctor of Public Management and Governance, entitled: A Sustainable Governance Model of Water, Sanitation, and Hygiene Provision: The case of Capricorn District Municipality in Limpopo Province of South Africa

I give my consent to participate in the study with the following understanding:

- The purpose of the interview has been explained to me.
- My participation is voluntary.
- My anonymity is ensured. The results obtained from the interviews will be reported as collective; therefore, I will not be identified by name in the study.
- I may withdraw from the study at any given time.
- The information I provide will be used for the purpose of this research study only and will not be made available to any third party.

- I will answer questions honestly, based on my personal expertise, experience and views.

Interviewee:

Name: _____

Signature: _____

Date: _____

Researcher:

Name: _____

Signature: _____

Date: _____

SECTION B: BIOGRAPHICAL INFORMATION – WARD COMMITTEE

(This section will be completed by the researcher upon requesting the information from the participants)

The following personal information is necessary for statistical purposes only as well as to summarise the conclusion of the study properly and to reflect the opinion of a diverse group of people involved in the strategies that are in place in developing a sustainable governance model to address the WASH the Capricorn District Municipality in Limpopo Province.

Please indicate with a cross (X) the following general questions in the appropriate box

	Question 1: Gender	X
1.	Male	
2.	Female	
3.	LGBTIQ+	

	Question 2: Age	X
1.	18 – 29 yrs.	
2.	30 - 49 yrs.	
3.	50 – 64 yrs.	
4.	65 years and above	

	Question 3: Education	X
1.	Degree	
2.	Diploma	
3.	Certificate	
4.	None	

SECTION C: FOCUS GROUP RESEARCH QUESTIONS – WARD COMMITTEE

This section investigates the role of the ward committee in raising community issues, particularly issues relating to WASH. The purpose of these questions is to determine the role of the ward committee in the provision of WASH.

Please provide detailed answers to the questions.

NB: kindly note that the questions may take around ONE hour to complete. Once again, thank you so much for allowing yourself to partake in this study.

1. Do you understand what is water sanitation and hygiene (WASH), if your answer is yes, what is it all about? If not, please motivate and give examples of your understanding.
2. Do ward committees have a role in identifying community members who do not have WASH? If your answer is yes how do they identify them? If not, what are the reasons and how the situation can be changed?
3. As a member of the ward committee, do you believe that the municipality has enough capacity for water storage and can still provide sustainable and effective sanitation services and hygiene in the area? If your answer is yes, please explain why. If your answer is no, what are the reasons for your concern and what actions can be taken to address this situation?
4. Do you feel that Lepelle Nkumpi Local Municipality or Polokwane Local Municipality has achieved its mandate by providing all the residents within its boundaries with access to WASH services? If yes, how did they manage to accomplish this? If not, what can they do to improve the situation?
5. As a Ward Committee, are you satisfied with the municipality's staff who are responsible for providing WASH services? Do you think they have the necessary expertise and qualifications to carry out their duties effectively? If your answer is yes, do you think they are well-equipped to perform their duties? If not, what do you think is the reason behind this, and how do you suggest improving the current situation?
6. Do you think the municipality has sufficient financial resources to achieve the Sustainable Development Goals by providing WASH services in 2030?? If yes, why

are they still having challenges? If not, what is the actual problem of not having adequate financial resources

7. Does the municipality regularly maintain its WASH infrastructure? If so, why are there still issues with the provision of basic services? If not, what are the reasons and what can be done to improve the situation?
8. Do you think that ward committees are effective in bridging the gap between the ward, councillor, and municipality in terms of the provision of WASH? If your answer is yes, could you please provide some examples and reasons why? If not, what are the best strategies that the municipality can implement to improve and speed up service provision?

Thank you for your participation

ANNEXURE B:

TRANSECT WALK INTERVIEW – COMMUNITY MEMBERS

SECTION A: BIOGRAPHICAL INFORMATION – COMMUNITY MEMBERS

(This section will be completed by the researcher upon requesting the information from the participants)

The following personal information is necessary for statistical purposes only as well as to summarise the conclusion of the study properly and to reflect the opinion of a diverse group of people involved in the strategies that are in place in developing a sustainable governance model to address the WASH the Capricorn District Municipality in Limpopo Province.

Please indicate with a cross (X) the following general questions in the appropriate box

	Question 1: Gender	X
1.	Male	
2.	Female	
3.	LGBTIQ+	
	Question 2: Age	X
1.	18 – 29 yrs.	
2.	30 - 49 yrs.	
3.	50 – 64 yrs.	
4.	65 years and above	
	Question 3: Education	X
1.	Degree	
2.	Diploma	
3.	Certificate	
4.	None	

SECTION B: TRANSECT WALK QUESTIONS

This section investigates community issues relating to the provision of WASH. The purpose of these questions is to determine the role of community participation in the provision of WASH.

Please provide detailed answers to the questions.

NB: kindly note that the questions may take around ONE hour to complete. Once again, thank you so much for allowing yourself to partake in this study.

1. Where do you live currently (informal settlement, backroom, or renting)? Please elaborate on the living conditions that you currently live under.
2. How many are you in the household that you currently live in?
3. Are you working? If yes, is it a contract or a permanent job

MAIN DRINKING WATER SOURCE

4. What is the main source of drinking water for members of your household?
5. What is the main source of water used by members of your household for other purposes, such as cooking and hand washing?
6. Who usually goes to fetch water for your household?
7. How many trips did that person make in the last week?
8. Is water always available from your main water source?
9. How many hours per day is water supplied on average?
10. Has there been any time in the last week/month when you have not been able to store sufficient water to meet your needs?
11. Does your household store drinking water in small containers? Can you please show me?
12. What do you usually do to the water to make it safer to drink?

SANITATION FACILITY

13. What kind of toilet facility do members of your household usually use?
14. Do you share this facility with others who are not members of your household?
15. Where is this toilet facility located?
16. Has your (pit latrine or septic tank) ever been emptied?
17. How many households in total use this toilet facility, including your own household?

18. Do all household members usually use the sanitation facility?
19. Do you share this facility only with members of other households that you know or is the facility open to the use of the general public?
20. Does the design of your toilet prevent other people seeing and hearing what you are doing when you use it?
21. Do you or other household members face any risks when using the toilet?
22. How does your household usually dispose of garbage?
23. How do you dispose of household water used for cooking, laundry and bathing?

HANDWASHING FACILITY OBSERVATION

24. Can you please show me where members of your household most often wash their hands?
25. Do you have soap or detergent in your household for washing hands?
26. What type of soap do you normally use

Thank you for your participation

ANNEXURE C1: QUESTIONNAIRE — ENGLISH

DEMOGRAPHICS

	Question 1: Gender	X
1.	Male	
2.	Female	
3.	LGBTIQ+	
	Question 2: Age	X
1.	18 – 29 yrs.	
2.	30 - 49 yrs.	
3.	50 – 64 yrs.	
4.	65 years and above	
	Question 3: Education	X
1.	Degree	
2.	Diploma	
3.	Certificate	
4.	None	
	Question 4: Employment category	X
1.	Employed	
2.	Unemployed	
3.	Student	
4.	Full-time housewife	
5.	Pensioner	
6.	Seasonal worker	

7.	Unable to work	
8.	Chose not to work	
9.	Labourer (Piece job labourer)	
10.	Domestic worker	
11.	Teacher	
12.	Civil servant	

SOCIO-ECONOMIC DIFFERENTIATION

	Question 5: How many people are working in the household?	X
1.	No Schooling	
2.	Creche/Pre-school	
3.	Primary school	
4.	Secondary school	
5.	Tertiary education	
	Question 6: Total income level	X
1.	None	
2.	R100-R500	
3.	R501-R1000	
4.	R1001-R3000	
5.	R3001-R5000	
6.	Over R5000	
	Question 7: What are the main income sources of your family?	X
1.	Wage/salary	
2.	Farming	

3.	Husbandry	
4.	Wood and wood products	
5.	Tourism	
6.	Trading	
7.	Rental income	
8.	Assistance of relatives	
9.	Pensions	
10.	Poverty funds (State which one.....)	
11.	Other governmental aids/assistance (i.e. unemployment wage)	
12.	Kind aid from the government (coal etc)	
13.	Aids/assistance from NGOs	
14.	Allowances for elderly	
15.	Other (please specify)	
	Question 8: Household size	X
1.	1-3	
2.	4-6	
3.	7-10	
4.	10 – above	
	Question 9: How long have you lived in this area?	X
1.	Less than a year	
2.	1-5 years	
3.	6-15 years	
4.	Over 15 years	

CORE QUESTIONS FOR HOUSEHOLD WASH INDICATORS

Question 10: HOUSEHOLD DRINKING WATER LEVELS					X
1.	Improved or unimproved; surface water	W1	SAFELY MANAGED	Drinking water from an improved water source that is located on-premises, available when needed and free from faecal and priority chemical contamination	
2.	Basic and limited services	W2 W4	BASIC	Drinking water from an improved source, provided collection time is not more than 30 minutes for a round trip, including queuing	
3.	Safely managed services 3a – accessibility 3b – availability 3c – quality	W3	LIMITED	Drinking water from an improved source for which collection time exceeds 30 minutes for a round trip, including queuing	
4.	Safely managed services 4a – accessibility 4b – availability 4c – quality	W4	UNIMPROVED	Drinking water from an unprotected dug well or unprotected spring.	
5.	Safely managed services 5a – accessibility 5b – availability 5c – quality	W5	SURFACE WATER	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal.	
Question 11: HOUSEHOLD SANITATION LEVELS					X
1.	Improved or unimproved; open defecation	S1	SAFELY MANAGED	Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite	

2.	Basic and limited services	S2 S3	BASIC	Use of improved facilities that are not shared with other households	
3.	Safely managed services 3a – emptying of on-site facilities 3b – treatment and disposal of excreta from on-site facilities 3c – treatment of wastewater	S3	LIMITED	Use of improved facilities shared between two or more households	
4.	Safely managed services 4a – emptying of on-site facilities 4b – treatment and disposal of excreta from on-site facilities 4c – treatment of wastewater	S4	UNIMPROVED	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines	
5.	Safely managed services	S5	OPEN DEFECACTION	Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches or other open spaces, or with solid waste	
Question 12: HOUSEHOLD HYGIENE LEVELS					X
1.	Facility or no facility	H1	BASIC	Availability of a handwashing facility on premises with soap and water	
2.	Basic and limited handwashing facility	H2	LIMITED	Availability of handwashing facility on premises without soap and water	
3.	Basic and limited handwashing facility	H3	NO FACILITY	No handwashing facility on premises	

CORE QUESTIONS FOR DRINKING WATER

Question 13: MAIN DRINKING WATER SOURCE			X
		What is the <u>main</u> source of drinking water for members of your household?	
		Piped water	
	W6	Piped into dwelling	
	W7	Piped into compound, yard or plot	
	W8	Piped to neighbour	
	W9	Public tap / standpipe	
	W10	Borehole or tubewell	
		Dug well	
	W11	Protected well	
	W12	Unprotected well	
		Water from spring	
	W13	Protected spring	
	W14	Unprotected spring	
	W15	Rainwater collection	
		Delivered water	
	W16	Tanker-truck	
	W17	Cart with small tank / drum	
	W18	Water kiosk	
		Packaged water	
	W19	Bottled water	
	W20	Sachet water	
	W21	Surface water (river, stream, dam, lake, pond, canal, irrigation channel)	
	W22	Other (specify)	

Question 14: MAIN DRINKING WATER SOURCE		X
.	What is the <u>main</u> source of water used by members of your household for other purposes, such as cooking and hand washing?	
	Piped water	
W23	Piped into dwelling	
W24	Piped into compound, yard or plot	
W25	Piped to neighbour	
W26	Public tap / standpipe	
W27	Borehole or tubewell	
	Dug well	
W28	Protected well	
W29	Unprotected well	
	Water from spring	
W30	Protected spring	
W31	Unprotected spring	
W32	Rainwater collection	
	Delivered water	
W33	Tanker-truck	
W17	Cart with small tank / drum	
W34	Water kiosk	
	Packaged water	
W35	Bottled water	
W36	Sachet water	
W37	Surface water (river, stream, dam, lake, pond, canal, irrigation channel)	
W38	Other (specify)	
Question 15: LOCATION OF DRINKING WATER SOURCE		X
	Where is that water collected from?	
W39	In own dwelling	
W40	In own yard / plot	
W41	Elsewhere	

	Question 16: TIME TO COLLECT DRINKING WATER		X
		How long does it take to go there, get water, and come back?	
	W42	Members do not collect	
	W43	Number of minutes	
	W44	Don't know	
	Question 17: AVAILABILITY OF DRINKING WATER		X
		In the last month, has there been any time when your household did not have sufficient quantities of drinking water when needed?	
	W45	Yes, at least once	
	W46	No, always sufficient	
	W47	Don't know	

WATER ACCESSIBILITY

	Question 18: USE OF MULTIPLE WATER SOURCES		X
		Do <u>members</u> of your household regularly use any other drinking water sources?	
		Piped water	
	W48	Piped into dwelling	
	W49	Piped into compound, yard or plot	
	W50	Piped to neighbour	
	W51	Public tap / standpipe	
	W52	Borehole or tubewell	
		Dug well	
	W53	Protected well	
	W54	Unprotected well	
		Water from spring	
	W55	Protected spring	
	W56	Unprotected spring	
	W57	Rainwater collection	
	W58	Tanker-truck	

	W59	Cart with small tank / drum	
	W60	Water kiosk	
		Packaged water	
	W61	Bottled water	
	W62	Sachet water	
	W63	Surface water (river, stream, dam, lake, pond, canal, irrigation channel)	
	W64	Other (specify)	
Question 19: RESPONSIBILITY FOR WATER COLLECTION			X
		Who usually goes to this source to fetch water for your household? Select the individual primarily responsible for water collection	
	W65	Adult woman (>15 years)	
	W66	Adult man (>15 years)	
	W67	Girl (<15 years)	
	W69	Boy (<15 years)	
Question 20: BURDEN OF WATER COLLECTION			X
		How many trips did that person make in the last week?	
	W70	Number of times	
	W71	Don't know	
Question 21: TYPE OF PIPED NETWORK			X
		What type of piped supply does your household use?	
	W72	Large piped network managed by a utility	
	W73	Small piped network managed by the community	
		Small piped network managed by the households	

WATER AVAILABILITY

Question 22: AVAILABILITY OF WATER SUPPLY			
		Is water always available from your main water source?	
	W74	Yes, water is always available	
	W75	No, water is available most of the time	
	W76	No, water is available some of the time	
	W77	No, water is rarely available	
	W78	Don't know	
Question 23: REASON WATER UNAVAILABLE			X
	W79	What was the (main) reason you were unable to access sufficient quantities of water when needed? Select one	
	W80	Water is not available from source	
	W81	Water is too expensive	
	W82	Source is not accessible	
	W83	Other (specify)	
Question 24: CONTINUITY OF WATER SUPPLY			X
How many hours per day is water supplied on average? Does your household store drinking water in small containers?			
	W84	Unavailable when needed? Can you please show me?	
	W85	24 hours per day	
	W86	18-24 hours per day	
	W87	12-17 hours per day	
	W88	6-11 hours per day	
	W89	<6 hours per day	
	W90	Don't know	
Question 25: DISCONTINUITY OF WATER SUPPLY			X
In the past month, for how many days was water from this source?			
	W91	Number of days	
	W92	Don't know	

Question 26: LARGE WATER STORAGE TANKS-17 hours per day			
(a) Does your household have a large storage tank?			
W93	Yes		
W94	No		
Question 27: LARGE WATER STORAGE TANKS			X
(b) How many litres does the storage tank hold?			
W95	Number of litres		
W96	Don't know		
Question 28: LARGE WATER STORAGE TANKS			X
(c) How many times has the storage tank been filled in the last week/month?			
W97	Number of times		
W98	Don't know		
Question 29: LARGE WATER STORAGE TANKS			X
(d) Has there been any time in the last week/month when you have not been able to store sufficient water to meet your needs?			
W99	Yes, at least once		
W100	No		
W101	Don't know		
Question 30: SMALL WATER STORAGE CONTAINERS			X
Does your household store drinking water in small containers? Please show me. <i>Observe whether the containers are covered or uncovered</i>			
W102	Water not stored in small containers		
W103	Water stored in covered containers		
W104	Water stored in uncovered containers		
W105	Unable to observe		
Question 31: WET AND DRY SEASON SOURCES			X
What is your <i>main source</i> of drinking water in the wet season and the dry season?			
	Piped water		
W106	Piped into dwelling		
W107	Piped into compound, yard or plot		

	W108	Piped to neighbour	
	W109	Public tap/standpipe	
	W110	Borehole or tubewell	
		Dug well	
	W111	Protected well	
	W112	Unprotected well	
		Water from spring	
	W113	Protected spring	
	W114	Unprotected spring	
	W115	Rainwater collection	
	W116	Tanker-truck	
	W117	Cart with small tank/drum	
	W118	Water kiosk	
		Packaged water	
	W119	Bottled water	
	W120	Sachet water	
	W121	Surface water (river, stream, dam, lake, pond, canal, irrigation channel)	
	W122	Other (specify)	

WATER QUALITY/SAFETY

	Question 33: HOUSEHOLD WATER TREATMENT		X
		Have you or any other household members done anything to this water to make it safer to drink?	
	W123	Yes	
	W124	No	
	W125	Don't know	
	Question 34: HOUSEHOLD WATER TREATMENT		X
		What do you usually do to the water to make it safer to drink?	
		Anything else?	
	W126	Boil	
	W127	Add bleach/chlorine	

W128	Strain it through a cloth	
W129	Use water filter (ceramic, sand, composite, reverse osmosis, etc	
W130	Solar disinfection	
W131	Let it stand and settle	
W132	Other (specify)	
W133	Don't know	

WATER ACCEPTABILITY

Question 35: ACCEPTABILITY OF DRINKING WATER			X
		Is the water supplied from your main source usually acceptable? If unacceptable, select the main reason.	
W134	Yes, acceptable		
W135	No, unacceptable taste		
W136	No, unacceptable colour		
W137	No, unacceptable smell		
W138	No, contains materials		
W139	No, other (specify)		
W140	Don't know		

CORE QUESTIONS FOR SANITATION

Question 36: SANITATION FACILITY			X
		What kind of toilet facility do members of your household usually use? <i>If 'Flush' or 'Pour flush', probe: Where does it flush to</i>	
		Flush / pour flush	
S6	Flush to piped sewer system		
S7	Flush to septic tank		
S8	Flush to pit latrine		
S9	Flush to open drain		
S10	Flush to don't know where		
		Dry pit latrines	

	S11	Pit latrine with slab	
	S12	Pit latrine without slab / Open pit	
		Composting toilets	
	S13	Twin pit with slab	
	S14	Twin pit without slab	
	S15	Other composting toile	
	S16	Bucket	
	S17	Container based sanitation	
	S18	Hanging toilet / hanging latrine	
	S19	No facility / Bush / Field	
	S20	Other (specify)	
	Question 37: SHARED SANITATION		X
		Do you share this facility with others who are not members of your household?	
	S21	Yes	
	S22	No	
	Question 38: LOCATION OF SANITATION FACILITY		X
.		Where is this toilet facility located?	
	S23	In own dwelling	
	S24	In own yard / plot	
	S25	Elsewhere	
	Question 39: EMPTYING OF ON-SITE SANITATION FACILITIES		X
		Has your (pit latrine or septic tank) ever been emptied?	
	S26	Yes emptied	
	S27	Never emptied	
	S28	Don't know	

Question 40: DISPOSAL OF EXCRETA FROM ONSITE SANITATION FACILITIES			x
.		The last time it was emptied, where were the contents emptied to? <i>Was it removed by a service provider?</i>	
		Removed by service provider	
	S29	<i>to a treatment plant</i>	
	S30	<i>buried in a covered pit</i>	
	S31	<i>to don't know where</i>	
		Emptied by household	
	S32	buried in a covered pit	
	S33	to uncovered pit, open ground, water body or elsewhere	
	S34	Other (specify)	
	S35	Don't know	

SANITATION ACCESSIBILITY

Question 41: NUMBER OF HOUSEHOLDS SHARING FACILITIES			X
		How many households in total use this toilet facility, including your own household?	
	S36	Number of households	
	S37	Don't know	
Question 42: USE OF FACILITY BY INDIVIDUAL HOUSEHOLD MEMBERS			X
		Do all household members usually use the sanitation facility?	
	S38	Yes	
	S39	No	
Question 43: FACILITY ACCESSIBLE TO INDIVIDUAL HOUSEHOLD MEMBERS			X
		Is everyone in the household able to access and use the toilet always of the day and night?	
	S40	Yes	
		No	
Question 44: REASONS FACILITY NOT ACCESSIBLE TO HOUSEHOLD MEMBERS			X
		What was the (main) reason that household members were unable to use the toilet at all times of the day or night?	

	S41	Limited mobility prevents members from using the toilet	
	S42	Distance/barriers prevent members from reaching the toilet	
	S43	Toilet is not always available to all household members	
	S44	Toilet is not always safe for all household members to use	
	S45	Other (specify)	
Question 45: DISPOSAL OF CHILD STOOLS			X
		The last time [name of child] passed stools, what was done to dispose of the stools?	
	S46	Child used toilet/latrine	
	S47	Put/rinsed into toilet or latrine	
	S48	Put/rinsed into drain or ditch	
	S49	Thrown into garbage (solid waste)	
	S50	Buried	
	S51	Left in the open	
	S52	Used as manure	
	S53	Other (specify)	
	S54	Don't know	

SANITATION ACCEPTABILITY

Question 46: SHARING FACILITIES WITH THE GENERAL PUBLIC			X
		Do you share this facility only with members of other households that you know or is the facility open to the use of the general public?	
	S55	Shared with known households (not public)	
	S56	Shared with general public	
Question 47: PRIVACY WHILE USING THE FACILITY			X
		Does the design of your toilet prevent other people seeing and hearing what you are doing when you use it?	
	S57	Yes	
	S58	No	

Question 48: SAFETY WHILE USING THE FACILITY			X
		Do you or other household members face any risks when using the toilet?	
	S59	No risks faced	
	S60	Yes, risk to health	
	S61	Yes, risk of harassment	
	S62	Yes, other (specify	
Question 49: CONTAINMENT OF WASTES			X
		Does your sanitation facility leak or overflow wastes at any time of year? <i>Probe for problems during the rainy season or floods</i>	
	S63	No, never	
	S64	Yes, sometimes	
	S65	Yes, frequently	
	S66	Don't know	
Question 50: DISCHARGE OF WASTES FROM SEPTIC TANKS			X
		Where does your septic tank discharge to?	
	S67	To a leach field, soak pit	
	S68	To a sewer	
	S69	To an open drain	
	S70	To open ground or watercourse	
	S71	Other (specify)	
	S72	Don't know	

EMPTYING SANITATION

Question 51: EMPTYING OF ON-SITE FACILITIES			X
		How many years ago was your pit latrine/septic tank built? <i>Record responses in number of years</i>	
	S73	Number of years	
	S74	Don't know	

Question 52: EMPTYING OF ON-SITE FACILITIES			X
		How many years ago was your pit latrine/septic tank last emptied? <i>Record responses in number of years</i>	
	S75	Number of years	
	S76	Don't know	

Question 53: EMPTYING OF ON-SITE FACILITIES			X
		The last time your pit latrine/septic tank was emptied, who emptied it? <i>Record name of service provider and phone number if available</i>	
	S77	Name of service provider _____	
	S78	Phone number of service provider _____	
	S79	Don't know	

SOLID WASTE DISPOSAL

Question 54: SOLID WASTE DISPOSAL			X
		How does your household usually dispose of garbage? <i>Record name of service provider and phone number if available</i>	
	S80	Collected by formal service provider	

S81	Collected by informal service provider	
S82	Disposed of in designated waste disposal area	
S83	Disposed of within household yard or plot	
S84	Buried or burned	
S85	Disposed of elsewhere	
S86	Don't know	

LIQUID WASTE DISPOSAL

Question 55: LIQUID WASTE DISPOSAL			X
		How do you dispose of household water used for cooking, laundry and bathing?	
	S87	Sink/drain connected to sewer	
	S88	Sink/drain connected to septic tank	
	S89	Sink/drain connected to pit	
	S90	Sink/drain connected to soak pit	
	S91	Sink/drain connected to open drain or open ground	
	S92	Disposed directly to open ground or water body	
	S93	N/A (cooking, laundry and bathing is done away from the household)	
	S94	Don't know	

CORE QUESTIONS FOR HYGIENE

	Question 56: HANDWASHING FACILITY OBSERVATION		X
		Can you please show me where members of your household most often wash their hands?	
		Fixed facility observed (sink/tap	
	H4	In dwelling	
	H5	In yard/plot	
		Mobile object observed	
	H6	(bucket/jug/kettle)	
	H7	No handwashing place in dwelling/yard/plot	
	H8	No permission to see	
	H9	Other reason (specify)	
	Question 57: WATER OBSERVATION		X
		Observe availability of water at the place for handwashing. <i>Verify by checking the tap/pump, basin, bucket, water container or similar objects for presence of water</i>	
	H10	Water is available	
	H11	Water is NOT available	
	Question 58: SOAP OBSERVATION		X
		Observe availability of soap or detergent at the place for handwashing	
	H12	Soap or detergent available	
	H13	Soap or detergent NOT available	

HANDWASHING

	Question 59: HANDWASHING FACILITY REPORTED		X
		Where do you and other members of your household most often wash your hands?	
	H14	Fixed facility reported (sink/tap)	
	H15	In dwelling	
	H16	In yard/plot	
	H17	Mobile object reported (bucket/jug/kettle)	

	H18	No handwashing place in dwelling/yard/plot	
	H19	Other (specify)	
	Question 60: SOAP OR DETERGENT REPORTED		X
		Do you have soap or detergent in your household for washing hands? <i>Can you please show it to me?</i>	
	H20	Yes, shown	
	H21	No, not shown	
	H22	Other (specify)	
	Question 61: SOAP OR DETERGENT REPORTED		X
		Record the type of soap observed <i>Record all that apply</i>	
	H23	Bar or Liquid soap	
	H24	Detergent (Powder / Liquid / Paste)	
	H25	Ash / Mud / Sand	

ANNEXURE C2: QUESTIONNAIRE – SEPEDI

DIPALOPALO TŠA BATHO

	Potšišo ya 1: Bong	X
1.	Monna	
2.	Mosadi	
	Potšišo ya 2: Mengwaga	X
1.	18 – 29 ya mengwaga	
2.	30 – 49 ya mengwaga	
3.	50 – 64 ya mengwaga	
4.	65 years goba go feta	
	Potšišo ya 3: Tša thuto	X
1.	Degree	
2.	Diploma	
3.	Certificate	
4.	Ga go selo	
	Potšišo ya 4: Legoro la mešomo	X
1.	Wa šoma	
2.	Ga o šome	
3.	Moithuti	
4.	Mosadi wa lapa wa nako ka moka	
5.	Moamogedi wa phenšene	
6.	Mošomi wa go šoma ka sehla/ dihla tša go fapana	
7.	O palelwa ke go šoma	

8.	O kgethile go se šome	
9.	Mošomedi wa mošomi (o kaba o sa šome nako ye e tletšego)	
10.	Mošomi wa ka gae	
11.	Morutiši	
12.	Mohlankedi wa mmušo	

PHAPANO YA EKONOMI YA LEAGO

	Potšišo ya 5: ke batho ba ba kae bao ba šomago ka lapeng?	X
1.	Ga se o tsene sekolo	
2.	Sekolo sa pele ga sekolo	
3.	Sekolo sa tlasana	
4.	Sekolo sa sekondari	
5.	Sekolo sa maemo a godimo	
	Potšišo ya 6: Palokamoka ya tšhelete yeo e tsenago	X
1.	Ga gona tšhelete yeo e hwetšagalago	
2.	R100-R500	
3.	R501-R1000	
4.	R1001-R3000	
5.	R3001-R5000	
6.	Go feta R5000	
	Potšišo ya 7: ke methopo efe ya megolo ya letseno ya lapa la gago?	X
1.	Mogolo	
2.	Tša temo	
3.	Bolemerui	

4.	Ditšweletšwa tša kota le kota	
5.	Tša boeti	
6.	Kgwebo	
7.	Letseno la khiro	
8.	Thušo gotšwa go ba leloko	
9.	Diphenšene	
10.	Ditšhelete tša bodidi (hlalosa gore ke tše di feng.....)	
11.	Thušo enngwe ya mmušo (mohlala: tšhelete ya hlokego ya mešomo)	
12.	Dithušo tša botho gotšwa mmušong (malahla goba tse dingwe)	
13.	Thušo go tšwa go mekgatlo ye e sego ya mmušo	
14.	Dikabo tša batšofadi	
	Potšišo ya 8: Nomoro ya badudi ka gae	X
1.	1-3	
2.	4-6	
3.	7-10	
4.	10 – go feta	
	Potšišo ya 9: O na le nako e kaakang o dula tikologong ye?	X
1.	Ka tlase ga ngwaga	
2.	1-5 ya mengwaga	
3.	6-15 ya mengwaga	
4.	Go feta mengwaga ye 15	

DIPOTŠIŠO TŠA MOTHEO TŠA DITŠUPETŠO TŠA GO HLATSWA KA MALAPENG

Potšišo ya 10: MAEMO A GO NWA MEETSE KA GAE					X
1.	E kaonafaditšwe goba e sa kaonafatšwago; meetse a godimo ga mabu	W1	E LAOLWA KA POLOKEGO	Meetse a go nwa go tšwa mothopong wa meetse wo o kaonafetšego wo o lego mo lefelong le o dulago go lona. Mothopo wo o hwetšagalago ge go nyakega le wo o se nago mantle le tšhilafatšo ya dikhemikhale tše di tlogo pele.	
2.	Ditirelo tša motheo le tše di lekanyeditšwego	W2 W4	YA MOTHEO	Go nwa meetse go tšwa mothopong wo o kaonafetšego, go fela nako ya go kgoboketša e sa fete metsotso ye 30 ya leeto la go ya le go boa, go akaretšwa le go bea methaladi..	
3.	Ditirelo tše di laolwago ka polokego 3a – phihlelelo 3b – go hwetšagala 3c – boleng	W3	YE LEKANYEDITŠWEGO	Go nwa meetse go tšwa mothopong wo o kaonafetšego woo nako ya go kgoboketša e fetago metsotso ye 30 bakeng sa leeto go ya le go boa, go akaretšwa le go bea methaladi.	
4.	Ditirelo tše di laolwago ke polokego 4a – phihlelelo 4b – go hwetšagala 4c – boleng	W4	E SA KAONAFATŠWAGO	Go nwa meetse a tšwago sedibeng seo se epilwego se se sa šireletšwa goba sedibeng seo se sa šireletšwago.	
5.	Ditirelo tše di lalolwago ke polokego 5a – phihlelelo 5b – go hwetšagala 5c – boleng	W5	MEETSE A GODIMO GA MABU	Go nwa meetse thwii go tšwa nokeng, letamong, letsheng, moela, mokero goba mokero wa nošetšo.	

Potšišo ya 11: MAEMO A TLHWEKIŠO YA MALAPA					X
1.	E kaonafaditšwe goba e sa kaonafatšwago; go ntšha mantle mo go bulegilego	S1	E LAOLWA KE POLOKEGO	Tšhomišo ya dinolofatši tše di kaonafetšego tše di sa abelanwago le malapa a mangwe, le moo mantle a lahlwago ka polokegi lefelong leo goba a tšwago le go alafša ka ntle ga lefelo.	
2.	Ditirelo tša motheo le tše di lekanyeditšwego	S2 S3	YA MOTHEO	Tšhomišo ya dinolofatši tše di kaonafetšego tše di sa abelanwago le malapa a mangwe.	
3.	Ditirelo tše di laolwago ke polokego 3a – go tšhollwa ga didirišwa tša lefelong leo 3b – kalafo le go lahlwa ga mantle go tšwa mafelong a lefelong leo 3c – tlhokomelo ya meetse a ditšhila	S3	LEKANYEDITŠWE	Tšhomišo ya dinolofatši tše di kaonafetšego tše di abelwanago magareng ga malapa a mabedi goba go feta.	
4.	Ditirelo tše di laolwago ka polokego 4a – go tšhollwa ga didirišwa tša lefelong leo. 4b – kalafo le go lahlwa ga mantle mafelong a lefelong leo 4c – tlhokomelo ya meetse a ditšhila	S4	E SA KAONAFATŠWAGO	Tšhomišo ya dintlwana tša boithomelo tša go bewa ntle le letlapa goba sefala, dintlwana tša boithomelo tša go fegwa goba dintlwana tša boithomelo tša kgamele.	

5.	Ditirelo tše di laolwago ka polokego 5a – go tšhollwa ga didirišwa tša lefelong leo. 5b – kalafo le go lahlwa ga mantle mafelong a lefelong leo 5c – tlhokomelo ya meetse a ditšhila.	S5	GO NTŠHA MANTLE MO GO BULEGILEGO	Go lahlwa ga mantle a batho mašemong, dithokgweng, dihlašaneng, meetseng a bulegilego, mabopong goba mefelong a mangwe a bulegilego, goba ntle le ditlakala tše di tiilego.	
Potšišp ya 12: MAEMO A BOHLWEKI BJA KA MALAPENG					X
1.	Lefelo goba ga gona lefelo	H1	YA MOTHEO	go hwetšagala ga lefelo la go hlapa diatla meagong yeo e nago le sesepa le meetse.	
2.	Lefelo la motheo le le le lekanyeditšwego la go hlapa diatla	H2	LEKANYEDITŠWEGO	Go hwetšagala ga lefelo la go hlapa diatla meagong efela go sena sesepa le meetse.	
3.	Lefelo la motheo le le le lekanyeditšwego la go hlapa diatla.	H3	GA GONA LEFELO	Ga gona lefelo la go hlapa diatla mo lefelong	

DIPOTŠIŠO TŠA MOTHEO TŠA MEETSE A GO NWA

Potšišo ya 13: MOTHOPPO O MOGOLO WA MEETSE A GO NWA			X
	Ke mothopo ofe wo mogolo wa meetse a go nwa ga maloko ka lapeng la gago?		
		Meetse a diphaephe	
	W6	Meetse ka diphaephe tša goba ka ntlong	
	W7	Meetse ka diphaephe tša goba ka lapeng goba ka jarateng	
	W8	Meetse ka diphaephe gotšwa go moagišane	
	W9	Pompo ya setšhaba	
	W10	Meetse a go borwa goba meetse a go borwa a tlišwa ka phaephe	
		Sediba sa go epšwa	
	W11	Sediba seo se šireleditšwego	
	W12	Sediba seo se sa šireletšwago	

		Meetse gotšwa godimo ga mabu	
	W13	Meetse gotšwa nokeng/letsha leo le šireleditšwego	
	W14	Meetse gotšwa nokeng/ letsha leo le sa šireletšwago	
	W15	Kgoboketšo ya meetse a pula	
		Meetse a go tlišwa setšhabeng	
	W16	Lori ya go rwala meetse ena le tankana	
	W17	Kolonyana/ karikana ya goba le tankana e nnyane	
	W18	Meetse a go rekišwa	
		Meetse a phuthetšwego	
	W19	Meetse a mabotlelo	
	W20	Meetse a goba ka gare ga mokotlana	
	W21	Meetse a godimo ga mabu (noka, molapo, letamo, letša, kanale)	
	W22	O mongwe (ofe hlaloso)	
	Potšišo ya 14: MOTHOPPO O MOGOLO WA GONWA MEETSE		X
.		Ke mothopo ofe wo mogolo wa meetse ao a šomišwago ke badudi ba lapa la gago ka merero e mengwe, go swana le go apea ke go hlapa diatla?	
		Meetse a diphaephe	
	W23	Meetse ka diphaephe tša goba ka ntlong	
	W24	Meetse ka diphaephe tša goba ka lapeng goba ka jarateng	
	W25	Meetse ka diphaephe gotšwa go moagišane	
	W26	Pompo ya setšhaba	
	W27	Meetse a go borwa	
		Sediba sa go epšwa	
	W28	Sediba seo se šireleditšwego	
	W29	Sediba seo se sa šireletšwago	
		Meetse gotšwa godimo ga mabu	
	W30	Meetse gotšwa nokeng/ letsha leo le šireleditšwego	
	W31	Meetse gotšwa nokeng/ letsha leo le sa šireletšwago	
	W32	Kgoboketšo ya meetse a pula	

		Meetse a go tlišwa	
	W33	Lori ya meetse ya goba le tankana	
	W17	Karikana ya meetse ya goba le tankana	
	W34	Meetse a go rekwa lefelong la kgauswi leo le rekišang meetse	
		Meetse ao a phuthetšwego	
	W35	Meetse a mabotlelo	
	W36	Meetse a goba ka gare ga mokotlana	
	W37	Meetse a godimo ga mabu (noka, molapo, letamo, letša, kanale)	
	W38	enngwe (efa hlaloso)	
	Potšišo ya 15: LEFELO LA MOTHOPPO WA MEETSE A GO NWA		X
.		Meetse ao a kgoboketšwa kae?	
	W39	Ka bodulong bja gago	
	W40	Ka jarateng ya gago	
	W41	Lefelong le lengwe	
	Potšišo ya 16: NAKO YA GO KGOBOKETŠA MEETSE		X
		Go tšea nako e kaakang go fihla moo, go hwetša meetse le go boela morago?	
	W42	Maloko ga a kgoboketše	
	W43	Palo ya metsotso	
	W44	Ga o tsebe	
	Potšišo ya 17: NAKO YA GO KGOBOKETŠA MEETSE A GO NWA		X
.		Go tšea nako e kaakang go fihla moo, go hwetša meetse le go boela morago?	
	W48	Maloko ga a kgoboketše	
	W49	Palo ya metsotso	
	W50	Ga o tsebe	
	Potšišo ya 18: GO HWETŠAGALA GA MEETSE A GO NWA		X
.		Kgweding ya go feta, na go bile le nako yeo ka yona lapa la gago le bego le sena palo ye e lekanego ya meetse a go nwa ge a nyakega?	
	W48	Ee, bonnyane gatee	
	W49	Aowa, ka mehla go lekane	
	W50	Ga o tsebe	

PHIHLELELO YA MEETSE

Potšišo ya 19: TŠHOMIŠO YA METHOPO YE MENTŠHI YA MEETSE			X
		Na badudi ba lapa la gago ba diriša methopo le ge ele efe e mengwe ya meetse a go nwa ka mehla?	
		Meetse a di phaephe	
	W51	Meetse ka phaephe tša goba gona ka ntlong	
	W52	Meetse ka phaephe gotšwa ka lapeng goba ka jarateng	
	W53	Meetse ka phaephe gotšwa go moagišane	
	W54	Pompo ya bohle	
	W55	Meetse a go borwa	
		Sediba sa go epšwa	
	W56	Sediba sa go šireletšwa	
	W57	Sediba sa go se šireletšwe	
		Water from spring	
	W58	Meetse gotšwa nokeng/ letsha leo le šireleditšwego	
	W59	Meetse gotšwa nokeng/ letsha leo le sa šireletšwago	
	W60	Kgoboketšo ya meetse a pula	
	W61	Lori ya go ba le tankana	
	W62	Karikana ya goba le tankana e nnnnyane	
	W63	Meetse a go rekišwa lefelong la kgauswi le mo o dulang	
		Meetse ao a phuthetšwego	
	W64	Meetse a mabotlelo	
	W65	Meetse a go lokelwa ka gare ga mokotlana	
	W66	Meetse a godimo ga mabu (noka, letamo)	
	W67	Enngwe (hlalosa)	

	Potšišo ya 20: MAIKARABELO A KGOBOKETŠO YA MEETSE		X
.		Ke mang yo gantšhi a yago mothopong wo go lata meetse aka gae? <i>Kgetha motho yo maikarabelo a gagwe kudu ele go kgoboketša meetse</i>	
	W68	Mosadi yo mogolo(>15 ya mengwaga)	
	W69	Monna yo mogolo (>15 ya mengwaga)	
	W70	Mosetsana (<15 ya mengwaga)	
		mošemane (<15 ya mengwaga)	
	Potšišo ya 21: MORWALO WA KGOBOKETŠO YA MEETSE		X
		Ke maeto a make ao motho a a dirilego mo bekeng ya go feta?	
	W71	Palo ya maeto a itšego	
	W72	Ga o tsebe	
	Potšišo ya 22: MOHUTA WA NETWEKE YA DIPHAPE		X
		Ke mohuta ofe wa kabo ya diphaepe yeo lapa la gago le o šomišago?	
	W73	Phaephe e kgolo yeo e laolwago go tliša meetse	
	W74	Phaephe e nnyane yeo e lwaolwago ke setšhaba	
		Phaephe ennyane yeo e laolwago ka gae	
	Potšišo ya 23: GO HWETŠAGALA GA KABO YA MEETSE		X
		Na meetse a hwetšagala ka mehla go tšwa mothopong wa gago wo mogolo wa meetse?	
	W75	Ee, meetse a dula a hwetšagala	
	W76	Aowa, meetse a hwetšagala bontšhi bja nako	
	W77	Aowa, meetse a hwetšagala ka dinako tše dingwe	
	W78	Aowa, meetse a hwetšagala ka sewelo	
	W79	Ga o tsebe	
	Potšišo ya 24: LEBAKA LA HLOKEGO YA MEETSE		X
	W80	Ke lebaka lefe le legolo leo ka lona o bego o sa kgone go hwetša meetse a lekanego ge a be a nyakega? Kgetha karabo e tee.	
	W81	Meetse ga a hwetšagale go tšwa methopong	
	W82	Meetse a bitša kudu	
	W83	Mothopo ga o hwetšagale	

	W84	E nngwe karabo (efa hlaloso)	
	Potšišo ya 25: TŠWELOPELE YA KABO YA MEETSE		X
	W85	Diiri tše 24 ka letšatši	
	W56	Diiri tše 18 go fihla go tše 24 ka letšatši	
	W87	Diiri tše 12 go fihla go tše 17 ka letšatši	
	W88	Diiri tše 6 go fihla go tše 11 ka letšatši	
	W89	Diiri tša ka tlase ga 6 ka letšatši	
	W90	Ga o tsebe	
	Potšišo ya 26: KGAOTŠO YA KABO YA MEETSE		X
.		Kgweding e fitilego, ke matšatši a makae ao meetse a tšwago mothopong a bego a sa hwetšagale ge a nyakega?	
	W91	Palo ya matšatši	
	W92	Ga o tsebe	
	Potšišo ya 27: DITANKA TŠE KGOLO TŠA POLOKELO YA MEETSE		X
.	(a)	Na lapa la gago le na le tanka ye kgolo ya polokelo?	
	W93	Ee	
	W94	Aowa	
	Potšišo ya 28: DITANKA TŠE KGOLO TŠA POLOKELO YA MEETSE		X
.	(b)	Tanka ya polokelo e swara dilitara tše kae?	
	Potšišo ya 29: DITANKA TŠE KGOLO TŠA POLOKELO YA MEETSE		X
.	(c)	Tanka ya polokelo e tladišwe ga kae mo bekeng goba kgweding ya mafelelo?	
	W97	Palo ya dinako/ makga	
	W98	Ga o tsebe	
	Potšišo ya 30: DITANKA TŠE KGOLO TŠA POLOKELO YA MEETSE		X
.	(d)	Na go bile le nako efe goba efe kgweding goba bekeng ya go feta yeo o sa kgonego go boloka meetse a lekanego go fihlelela dinyakwa tša gago?	
	W99	Ee, bonnyane ga tee	
	W100	Aowa	
	W101	Ga o tsebe	

	Potšišo ya 31: DITŠHELO TŠE NNYANE TŠA MEETSE		X
		Na lapa la gago le boloka meetse a go nwa ka gare ga ditšhelo tše nnyane? Na oka mpontšha tšona? <i>Ela hloko ge eba ditšhelo di khupeditšwe goba aowa</i>	
	W102	Meetse ga se a bolokwa ka gare ga ditšhelo tše nnyane	
	W103	Meetse a bolokilwe ka gare ga ditšhelo tšeo di khupeditšwego	
	W104	Meetse a bolokilwe ka gare ga ditšhelo tše di sa khupetšwago	
	W105	Ga o kgone go lebelela	
	W95	Palo ya dilitara	
	W96	Ga o tsebe	
	Potšišo ya 32: METHOPO YA SEHLA SA GO KOLOBA LE SA GO OMA		X
		Ke mothopo ofe wo mogolo wa meetse a go nwa ka sehla sa monola le sehla ka komelelo.	
		Meetse a diphaephe	
	W106	Meetse ka diphaephe tša goba gona ka ntlong	
	W107	Meetse ka diphaephe tša goba ka lapeng goba ka jarateng	
	W108	Meetse ka phaephe gotšwa go moagišane	
	W109	Pompo ya setšhaba	
	W110	Meetse a go borwa	
		Sediba sa go epša	
	W111	Sediba sa go šireletšwa	
	W112	Sediba sa go se šireletšwe	
		Meetse a go tšwa godimo ga mabu	
	W113	Meetse a gotšwa nokeng/letsha leo le šireleditšwego	
	W114	Meetse a gotšwa nokeng/ letsha leo le sa šireletšwago	
	W115	Kgoboketšo ya meetse a pula	
	W116	Lori ya goba le tanka ya meetse	
	W117	Karikana ya goba le tankana	
	Potšišo ya 33: TLHOKOMELO YA MEETSE A KA GAE		X
		Na wena goba leloko le lengwe ka lapa, le dirile selo se sengwe ka meetse gore a bolokege go nwa?	

	W124	Ee	
	W124	Aowa	
	W125	Ga o tsebe	
	W118	Meetse a go rekwas lifelong la kgauswi le mo dulang	
		Meetse a phuthetswego	
	W119	Meetse a mabotelo	
	W120	Meetse a goba gona ka gare ga mokotlana	
	W121	Meetse a godimo ga mabu (noka, molapo, letamo. Letsha, kanale kanale ya nošetšo)	
	W122	E nngwe (hlalosa)	

BOLENG BJA MEETSE/ POLOKEGO

	Potšišo ya 34: TLHOKOMELO YA MEETSE A KA GAE		X
.		Gantšhi o dira eng ka meetse gore a bolokege go nwa? Se sengwe?	
	W126	bediša	
	W127	Otšhela bleach goba chlorine	
	W128	Go sefa meetse ka lešela	
	W129	Tšhomišo ya difiltara tša meetse (ceramic, santa, motswako, reverse osmosis, etc	
	W130	Go bolaya ditwatši ka letšatši	
	W131	O a emela a ema gore ditšhila di kgaogane le meetse go hlweka	
	W132	O mongwe mohuta (o hlalose)	
	W133	Ga o tsebe	

GO AMOGELEGA GA MEETSE

	Potšišo ya 35: GO AMOGELEGA GA MEETSE A GO NWA		X
.		Na meetse ao a fiwago go tšwa mothopong o mogolo gantšhi a a amogelega? Ge eba go sa amogelege, kgetha lebaka le legolo.	
	W134	Ee, a amogelega	

W135	Aowa, a na le tatso ya go se amogelege	
W136	Aowa, a na le mmala wa go se amogelege	
W137	Aowa, a na le monkgo wa go se amogelege	
W138	Aowa, a na le didirišwa	
W139	Aowa, o mongwe(o hlalose)	
W140	Ga o tsebe	

DIPOTŠIŠO TŠA MOTHEO TŠA TLHWEKIŠO

Potšišo ya 36: SEDIRIŠWA SA TLHWEKIŠO		X
	Ke mohuta ofe wa ntlwana ya boithomelo yeo gantšhi badudi ba lapa la gago ba o šomišago?	
	<i>Ge eba 'Flush' goba 'Pour flush', lekodiša: e lahlela kae</i>	
	Flush / pour flush	
S6	Go lahlelwa ka diphaepheng tša go kopana le tšhepedišo ya sewage	
S7	Ka tankeng ya go swara ditšhila tša ntlwana ya boithomelo	
S8	Ka ntlwaneng ya boithomelo ya molete	
S9	Go lahlelwa ka phaephe lefelong la go bulega	
S10	Go lefelo la go se tsejwe	
	Dintlwana tša boithomelo tša molete wo o omilwego	
S11	Dintlwana tša boithomelo tša molete ka leswika	
S12	Dintlwana tša boithomelo tša molete tšeo di senago molete wo o bulegilego	
	Dintlwana tša go dira manyora	
S13	Melete e mebedi ka leswika	
S14	Melete e mebedi ya go hloka leswila	
S15	Ntlwana enngwe ya go dira manyora	
S16	pakete	
S17	Tlhokomelo ye e theilwego godimo ga setšhelo	
S18	Ntlwana ya boithomelo ye e fegilwego	
S19	Ga gona ntlwana goba sedirišwa/ sethokgwa/ tšhemo	

	S20	enngwe(e fa hlaloso)	
	Potšišo ya 37: TLHOKOMELO YE E ABELANWAGO		X
		Na o abelana lefelo le le ba bangwe bao e sego maloko goba badudi ba lapa la gago?	
	S21	Ee	
	S22	aowa	
	Potšišo ya 38: LEFELO LA LEFELO LA TLHWEKIŠO		X
.		Lefelo la ntlwana ya boithomelo le kae?	
	S23	Ka bodulong bja gago	
	S24	Ka jarateng ya gago	
	S25	Lefelong le lengwe	
	Potšišo ya 39: GO TŠHOLLWA GA DINOLOFATŠI TŠA TLHWEKIŠO TŠA LEFELO LEO		X
		Na molete wa gago wa ntlwana ya boithomelo goba tanka ya gona, e kile ya tšhollwa?	
	S26	Ee, e kile ya tšhollwa	
	S27	Aowa, ga se ya tšhollwa	
	S28	Ga o tsebe	
	Potšišo ya 40: GO LAHLWA GA MANTLE GO TŠWA MAFELONG A TLHWEKIŠO A LEFELONG LEO		X
		La mafelelo ge ebe e tšhollwa, diteng di tshollotšwe kae? <i>Na a ile a tlošwa ke moabi wa ditirelo?</i>	
		E tlošitšwe ke moabi wa ditirelo	
	S29	<i>Go sebjala sa go hwekiša</i>	
	S30	<i>E epetšwe ka moleteng wo o khupeditšwego</i>	
	S31	<i>ga o tsebe gore kae</i>	
		E tšhollotšwe ke ba lapa	
	S32	e epetšwe ka moleteng wo o khupeditšwego	
	S33	go molete wo o sa khupetšwago, lefase leo le bulegilego, mmele wa meetse goba lefelo tsoko	

S34	Enngwe karabo (efa hlaloso)	
S35	Ga o tsebe	

PHIHLELELO YA TLHWEKIŠO

	Potšišo ya 41: PALOMOKA YA MALAPA AO A ABELANAGO DINOLOFATŠI		X
		Ke malapa a makae ka palomoka ao a šomišago lefelo le la ntlwana ya boithomelo, go akaretša le lapa la gago?	
	S36	Palo ya malapa	
	S37	Ga o tsebe	
	Potšišo ya 42: TŠOMIŠO YA LEFELO KE BADUDI BA LAPA LE TEE		X
		Na badudi ka moka ba lapa la gago gantšhi ba šomiša lefelo la tlhwekišo?	
	S38	Ee	
	S39	Aowa	
	Potšišo ya 43: LEFELO LEO LE FIHLELELWAGO KE BADUDI BA LAPA LE LE TEE		X
		Na batho ka moka ka lapeng la gago ba kgona go fihlelela le go šomiša ntlwana ya boithomelo ka mehla. E kaba bošego goba mosegare?	
	S40	Ee	
		Aowa	
	Potšišo ya 44: MABAKA A GORE SENOLOFATŠI SE SA FIHLELELWA KE BADUDI BA MALAPA		X
		Ke lebaka lefe le legolo leo ka lona maloko a lapa a bego a sa kgone go šomiša ntlwana ya boithomelo ka dinako tšohle tša mosegare le bošego?	
	S41	Go sepelasepela mo go lekanyeditšwego go thibela badudi go šomiša ntlwana ya boithomelo	
	S42	Sekgala/ mapheko a thibela badudi go fihla ntlwaneng ya boithomelo	
	S43	Ga se ka mehla ntlwana ya boithomelo e hwetšagala go badudi ka moka ba lapa	
	S44	Ga se ka mehla ntlwana ya boithomelo e bolokegile gore badudi ba lapa ba e šomiše	
	S45	Enngwe (e fa hlaloso)	

	Potšišo ya 45: GO LAHLA GA MANTLE A BANA		X
		La mafelelo [leina la ngwana] a ntšha mantle, ke eng seo se dirilwego go lahla mantle?	
	S46	Ngwana o šomišitše ntlwana ya boithomelo	
	S47	A lahletšwe ka ntlwaneng ya boithomelo	
	S48	E loketšwe ka gare ga mokero	
	S49	A lahletšwe ka gare ga ditlakala (ditlakala tše ditiilego)	
	S50	A epetšwe	
	S51	A tlogetšwe ka ntle	
	S52	A šomišitšwe jwalo ka manyora	
	S53	Enngwe karabo (efa hlaloso)	
	S54	Ga o tsebe	

GO AMOGELEGA GA TLHWEKIŠO

	Potšišo ua 46: GO ABELANA DINOLOFATŠI LE SETŠHABA KA KAKARETŠO		X
		Na o abelana lefelo le fela le badudi ba malapa a mangwe ao a tsebago goba lefelo le le buletšwe tšhomišo ya setšhaba ka kakaretšo?	
	S55	E abelanwa le lapa leo le tsebjago (eseng setšhaba)	
	S56	E abelwana le setšhaba ka kakaretšo	
	Potšišo ya 47: HWETŠAGALO YA SEPHIRI GE O DIRIŠA NTLWANA YA BOITHOMELO		X
		Na tlhamo le moago wa ntlwana ya gago ya boithomelo o thibela batho ba bangwe go bona le go kwa seo o se dirago ge o e šomiša?	
	S57	Ee	
	S58	aowa	
	Potšišo ya 48: POLOKEGO GE O ŠOMIŠA NTLWANA YA BOITHOMELO		X
		Na wena goba maloko a mangwe a lapa le lebane le dikotsi le ge ele dife ge le šomiša ntlwana ya boithomelo?	
	S59	Ga go na dikotsi tšeo go lebanwego le tšona	
	S60	Ee, kotsi go bophelo bjo bobotse	
	S61	Ee, kotsi ya go tlaišwa	
	S62	Ee, enngwe (efa hlaloso)	

	Potšišo ya 49: GO THIBELWA GA DITLAKALA		X
		Na lefelo la gago la tlhwekišo le dutla goba le tšhologa ditlakala ka nako efe goba efe ya ngwaga? <i>E sekametše go mathata nakong ya sehla sa pula goba mafula</i>	
	S63	Aowa, le ka mohla	
	S64	Ee, ka nako tše dingwe	
	S65	Ee, kgafetšakgafetša	
	S66	Ga o tsebe	
	Potšišo ya 50: GO TŠHOLLWA GA DITLAKALA GO TŠWA DITANKENG TŠA GO SWARA MANTLE		X
		Tanka ya gago ya mantle e tšhollela kae?	
	S67	Go molete wo o kolobilego, tšhemo	
	S68	Go molete goba lefelo la go swara mantle e kopane le ntlwana ya boithomelo	
	S69	Go phaephe ya go bulega	
	S70	Go lefase leo le bulegilego goba moela wa meetse	
	S71	enngwe (efa hlaloso)	
	S72	Ga o tsebe	

GO TŠHOLLA TLHWEKIŠO

	Potšišo ya 51: GO TŠHOLLA DINOLOFATŠI TŠA LEFELONG LEO		X
		Ke mengwaga ye mekae ye e fitilego molete wa gago wa ntlwana ya boithomelo goba tanka ya gona e agilwego? <i>Ngwala dikarabo ka palo ya mengwaga</i>	
	S73	Palo ya mengwaga	
	S74	Ga o tsebe	
	Potšišo ya 52: GO TŠHOLLA DINOLOFATŠI TŠA LEFELONG LEO		X
		Ke mengwaga ye mekae ye e fitilego molete wa ntlwana ya boithomelo ya gago goba yona tanta e tšhollotšwego? <i>Ngwala dikarabo ka palo ya mengwaga</i>	
	S75	Palo ya mengwaga	
	S76	Ga o tsebe	

Potšišo ya53: GO TŠHOLLA DINOLOFATŠI TŠA LEFELONG LEO			X
		La mafelelo ge tanka ya molete wa ntlwana ya boithomelo ya gago e be e tšhollotšwe, ke mang yo a e tšholotšego? <i>Ngwala leina la moabi wa tirelo le nomoro ya mogala ge ele gona</i>	
	S77	Leina la moabi wa tirelo _____	
	S78	Nomoro ya mogala ya moabi wa tirelo _____	
	S79	Ga o tsebe	

GO LAHLA GA DITLAKALA TŠE DITIIELEGO

Potšišo ya 54: GO LAHLA GA DITLAKALA TŠE DITIIELEGO			X
		Gantšhi lapa la gago le lahla bjang ditlakala? <i>Ngwala leina la moabi wa tirelo le nomoro ya mogala ge ele gona</i>	
	S80	A kgobokeditše ke moabi wa tirelo wa semmušo	
	S81	A kgobokeditše ke moabi wa tirelo yeo e sego wa semmušo	
	S82	A lahlilwe lefelong leo le kgethilwelo la go lahla ditlakala	
	S83	A lahletšwe ka gare ga jarata ya lapa	
	S84	A epetšwe goba e fišitšwe	
	S85	A lahlilwe felotsoko	
	S86	Ga o tsebe	

GO LAHLWA GA DITLAKALA TŠA GO ELA

Potšišo ya 55: GO LAHLWA GA DITLAKALA TŠA GO ELA			X
		O lahla jwang meetse a ka gae ao a šomišwago go apea, go hlatswa diaparo le go hlapa?	
	S87	Go lahlwa ka phaephe yeo e kopantšhitšwego le molete wa ditlakala tša ditšhila	
	S88	Go lahlwa ka phaephe yeo e kopantšhitšwego le tanka ya mantle	
	S89	Go lahlwa ka phaephe yeo e kopantšhitšwego le ntlwana ya boithomelo	
	S90	Go lahlwa ka phaephe yeo e kopantšhitšwego le tanka ya bobedi yeo e dumelelago meetse go feta (soak pit)	
	S91	Go lahlwa ka phaephe ya go kopantšhwa le lefase leo le bulegilego	

	S92	Go lahlelwa lefelong leo le bulegilego goba moela wa meetse	
	S93	N/A (go apha, go hlatswa diaparo le go hlapa ga go dirwe ka lapeng goba ka gae)	
	S94	Ga o tsebe	
Potšišo ya 56: TLOKOMELO YA LEFELO LA GO HLAPA DIATLA X			
		Na o ka mpontšha fao badudi ba lapa la gago gantšhi ba hlapago diatla gona?	
		Sedirišwa se se sa fetogego se a lebellwa (pompo/ ka gare ga sekotelo sa go agwa)	
	H4	ka ntlong	
	H5	Ka jarateng	
		Go lebella ga dilo tša go šomiša mohlagase	
	H6	(pakete/komiki/ketlele)	
	H7	Ga gona lefelo la go hlapa diatla ka ntlong goba ka jarateng	
	H8	Ga gona tumelelo ya go bona	
	H9	Lebaka le lengwe (e fa hlaloso)	
Potšišo ya 58: GO LEBELELA SESEPA			X
		Lebelela le go ela hloko hwetšagalo ya sesepa goba sehlatswa lefelong la go hlapa diatla	
	H12	Sesepe goba sehlatswa se a hwetšagala	
	H13	Sesepe goba sehlatswa ga se hwetšagale	

GO HLAPA DIATLA

Potšišo ya 59: LEFELO LA GO HLAPA DIATLA LE LE BEGILWENG			X
		Ke kae fao wena le maloko a mangwe a lapa la gago gantšhi le hlapang diatla?	
	H14	Lefelo le le sa fetogego le begilwe (sink/ pompo)	
	H15	Ka ntlong	
	H16	Ka jarateng	
	H17	Selo sa go kga meetse (pakete/komiki/ketlele)	
	H18	Ga gona lefelo la go hlapa diatla ka ntlong goba ka jarateng	
	H19	Enngwe karabo (efa hlaloso)	

	Potšišo ya 60: SESEPE GOBA SEHLATSWA SE BEGILWENG		X
		Na ona le sesepe goba sehlatswa ka lapeng la gago sa go hlapa diatla? <i>Na oka mpontšha yona ka kgopelo?</i>	
	H20	Ee, e bontšhitšwe	
	H21	Aowa, ga se ya bontšhwa	
	H22	Enngwe (efa hlaloso)	
	Potšišo ya 61: SESEPE GOBA SEHATSWA SE BEGILWENG		X
		Ngwala mohuta wa sesepe seo se lebelletšwego <i>Ngwala kabo yeo ka moka</i>	
	H23	Sesepe sa meetse goba sa go tia	
	H24	Sehlatswa (lerole / seela / kgorametša)	
	H25	Molora/ leraga / santa	

ANNEXURE D: SEMI-STRUCTURED QUESTIONS

SEMI-STRUCTURED QUESTIONS – MUNICIPAL OFFICIALS

Research title: A Sustainable Governance Model of Water, Sanitation, and Hygiene Provision: The case of Capricorn District Municipality in Limpopo Province of South Africa

Thank you for agreeing to take part in this research project which seeks to unearth the factors that hinder the promotion of the provision of water sanitation and hygiene (WASH) services for rural informal settlements in the Capricorn District Municipality in Limpopo Province of South Africa and strategies that are in place developing a sustainable governance model to address the WASH. Your response to this interview is voluntary and will be treated with strict confidentiality and anonymity. The interview will help to understand the factors that contribute to the provision of WASH and the strategies employed by the municipality to mitigate the backlog faced by the communities, especially the rural informal settlements.

CONSENT FORM AND INTERVIEW GUIDE INTERVIEWEES

SECTION A: CONSENT TO PARTICIPATE IN THE STUDY

I, _____ (name and surname), agree to be interviewed as part of the research for a Doctor of Public Management and Governance, entitled: A Sustainable Governance Model of Water, Sanitation, and Hygiene Provision: The case of Capricorn District Municipality in Limpopo Province of South Africa

I give my consent to participate in the study with the following understanding:

- The purpose of the interview has been explained to me.
- My participation is voluntary.
- My anonymity is ensured. The results obtained from the interviews will be reported as collective; therefore, I will not be identified by name in the study.
- I may withdraw from the study at any given time.

- The information I provide will be used for the purpose of this research study only and will not be made available to any third party.
- I will answer questions honestly, based on my personal expertise, experience and views.

Interviewee:

Name: _____

Signature: _____

Date: _____

Researcher:

Name: _____

Signature: _____

Date: _____

SECTION B: THEMES AND QUESTIONS

Personal background and experiences

9. Tell me about yourself, your educational background, your present job, and your work experience. (Enquire about his or her educational background and the length of time he or she has worked for this organisation.)
10. Share your experiences coming to work at your current company.
11. As a Senior Official, what are your major responsibilities to guarantee that the department's requirements are implemented?

Theme 1: Municipal principles in the provision of WASH to rural communities.

1. What are the principles, dimensions, and approaches that would underpin a sustainable governance model of WASH within a municipality?

Theme 2: Socioeconomic challenges in the provision of WASH to rural communities.

2. What are the socioeconomic characteristics considered by the committee in planning and implementing WASH services at the Capricorn District Municipality?

Theme 3: Community perceptions in the provision of WASH.

3. What are your perceptions and those of the community that you serve concerning the provision of WASH services at the Capricorn District Municipality?

Theme 4: Public Policy in the provision of WASH at the Capricorn District Municipality

4. What are the impacts of public policies in the planning and implementation of WASH services at the Capricorn District Municipality?

Theme 5: Strategies in the provision of WASH at the Capricorn District Municipality

5. What strategies would you recommend for developing a sustainable governance model for WASH services in the Capricorn District Municipality?

Thank you for your participation

ANNEXURE E: GATE KEEPER'S LETTER

CAPRICORN DISTRICT MUNICIPALITY: CDM



803 Diamond Hill Street

Suiderberg

Pretoria

0085

Cell no: 0823927119

Email: Hlogonolofatso@gmail.com

The Gatekeeper/Municipal Manager
Cc: The Speaker of Council
Capricorn District Municipality
PO Box 4100, POLOKWANE, 0700
41 Biccard Street, POLOKWANE, 0700

RE: PERMISSION TO CONDUCT RESEARCH WITHIN THE CAPRICORN DISTRICT MUNICIPALITY (CDM)

Dear Mr Ramakuntwane Selepe

My name is Raesibe Anna Mothapo, I am currently employed by the Tshwane University of Technology as an Administrator. I am kindly seeking for your approval to conduct research within the CDM. The research is part of the dissertation in fulfilment of the doctoral degree in public management and governance which I am currently enrolled for at the North-West University.

The research topic is entitled: ***A Sustainable Governance Model of Water, Sanitation, and Hygiene Provision: The case of Capricorn District Municipality in Limpopo Province of South Africa.***

This study is aimed at exploring the causes of the housing backlog in the Gauteng Province. Primarily, the study seeks to promote the provision of water sanitation and hygiene (WASH) services for rural informal settlements in the Capricorn District Municipality in Limpopo Province of South Africa

The participants for the study will be officials who are responsible for the provision of water sanitation and hygiene (WASH) in the local municipality and ward Councillors such as the Lepelle Nkumpi Local Municipality and Polokwane Local Municipality.

In conducting this study, the following research ethics will be considered:

- The participation in the study will be voluntary.
- The confidentiality and anonymity of participants will be maintained.
- Permission to record interviewees will be sought before the interview process will commence.

- Research participants will be treated with respect.

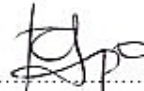
Permission is hereby requested to please interview the above identified participants for purposes of this research. Completion of the semi-structured interviews would be as brief as possible, and anonymity of participatory results and confidentiality are guaranteed.

If there are any further enquiries, please contact myself, as researcher at the above-mentioned contact details, or my supervisor, Prof Melvin Diedericks at 018-299 1629 or Melvin.diedericks@nwu.ac.za

Kind regards



.....
Prof. M Diedericks
Study Supervisor



.....
Ms Raesibe Anna Mothapo
Doctoral Researcher

I (Municipal Manager) hereby grant/does not grant permission to Ms. Raesibe Anna Mothapo to conduct her research using identified ward councillors and human settlement officials, as a unit of analysis for her Doctor of Public Administration Degree study.

Date:

Signature:

**ANNEXURE F: GATE KEEPER'S LETTER CAPRICORN DISTRICT
MUNICIPALITY: CDM**



**CAPRICORN
DISTRICT MUNICIPALITY**

41 Biccard Street
P O Box 4100
POLOKWANE
0700

Tel: (015) 294 1000
Fax: (015) 291 4297
Web: www.cdm.gov.za
E-mail: info@cdm.org.za

Reference No: 10/1/10/2

Enquiries: Joey Mamaregane

Anna Raesibe Mothapo
803 Diamond Hill Street
Duiderberg
Pretoria
0085

Madam

**Re: PERMISSION TO CONDUCT RESEARCH "A SUSTAINABLE GOVERNANCE
MODEL OF WATER, SANITATION AND HYGIENE PROVISION"**

1. Your letter bears reference.
2. Please be informed that your request as stated above has been approved.
3. Please ensure that all ethical protocols are followed in conducting your research.
4. For the purpose of contact with the municipality please liaise with the Operations Manager Human Resources Development (Baldwin Raganya). Please contact him at the (015) 294 1009 and via email raganyab@cdm.org.za. Please do not hesitate to contact my office should you have any challenges in this regards.

We wish you well in your studies. Please do send us a copy of your study after completion.

Kind regards

**RAMAKUNTWANE SELEPE
MUNICIPAL MANAGER**

08/03/2024
DATE

Ra Soma le Setshaba



Anti-Fraudline 0800 20 80 83

ANNEXURE G: NWU ETHICS CLEARANCE CERTIFICATE



Private Bag X1290, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222

Fax: 018 299-4910

Web: <http://www.nwu.ac.za>

Basic and Social Sciences Research Ethics
Committee (BaSSREC)

Faculty of Humanities Ethics Office for Research,
Training and Support

Tel: 018 285 2457

Email: Erhabor.Idemudia@nwu.ac.za

Senate Committee for Research Ethics

Tel: 016 103 4446

Email: Feziwe.Mselehi@nwu.ac.za

31 May 2024

ETHICS APPROVAL LETTER OF STUDY

Based on approval by the Basic and Social Sciences Research Ethics Committee (BaSSREC) on 31/05/2024, the Basic and Social Sciences Research Ethics Committee hereby approves your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-SERC) 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: Sustainable Governance Model of Water, Sanitation, and Hygiene Provision: The case of Capricorn District Municipality in Limpopo Province of South Africa.

Study Leader/Supervisor (Principal Investigator)/Researcher: Prof. M. Diedericks

Student/Research Team: R.A. Mothapo (26771233)

Ethics number:

N	W	U	-	0	0	9	6	1	-	2	4	-	A	7

Institution Study Number Year Status
Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation.

Application Type: Single Study

Commencement date: 31/05/2024

Risk: Low risk

Expiry date: 31/05/2025

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:

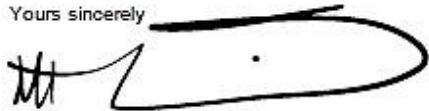
While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:

- The study leader/supervisor (principal investigator)/researcher must report in the prescribed format to the BaSSREC:
 - 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 BaSSREC, 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 BaSSREC 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 BaSSREC 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.
- BaSSREC can be contacted for further information or any report templates via [BaSSREC-Admin@nwu.ac.za](mailto:Admin@nwu.ac.za).

The BaSSREC 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 BaSSREC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely



Prof. E. Idemudia

Chairperson NWU Basic and Social Sciences Research Ethics Committee

ANNEXURE H: CERTIFICATE OF LANGUAGE EDITING



Ingrid Delle Jacobson

Editor, proof-reader, copy-writer, linguist
(Academic and developmental editing specialist)
Formatting, design, DTP, layout artist

dragon@netpoint.co.za

+27 072 835 6714

Contact for rate card and services

This certifies that I have edited the research report detailed below.

Title: **A Sustainable Governance Model of Water, Sanitation and Hygiene
Provision: The case of Capricorn District Municipality in Limpopo Province of
South Africa**

By Raesibe Anna Mothapo (Student number 26771233)

Warm regards,

A handwritten signature in black ink, appearing to read 'Ingrid'.

Ingrid Delle Jacobson

26 November 2025