

## Assessing Integrated Water and Sanitation Solutions for Informal Settlements in Makana Local Municipality, in the Eastern Cape Province in South Africa

**Nomhle Zatelela**

Walter Sisulu University (WSU)

### Abstract

Informal settlements in Makana Local Municipality, Eastern Cape, continue to face severe challenges in accessing safe, reliable water and adequate sanitation. Despite infrastructure upgrades, including ongoing work at the James Kleynhans Water Treatment Works, service interruptions, aging pipelines, and inadequate sanitation systems persist, disproportionately affecting vulnerable communities. This study assesses integrated water and sanitation solutions for settlements such as ENkanini (Joza), with the aim of identifying practical, socially acceptable, and sustainable interventions. A mixed-methods approach is employed, combining household surveys, water quality testing, service chain diagnostics, and participatory mapping, alongside key-informant interviews with municipal officials, service providers, and community representatives. Findings are analysed through service-level benchmarking and multi-criteria decision analysis to evaluate both short-term stabilization measures and long-term infrastructure options. The study contributes by proposing a phased, costed roadmap that aligns with South African water and sanitation policy, addresses current service gaps, and advances progress towards Sustainable Development Goal 6. Ultimately, the research highlights the importance of context-specific, integrated WASH solutions and collaborative governance in improving health, dignity, and resilience in informal settlements.

**Aim:** The study aims to evaluate and propose integrated water and sanitation solutions for informal settlements in Makana Local Municipality, with a focus on identifying practical, socially acceptable, and sustainable interventions that can improve service delivery, protect public health, and enhance community resilience

### Research Objectives:

- Assess current water and sanitation service levels in Makana's informal settlements.
- Identify technical, social, and financial challenges affecting WASH service delivery.
- Evaluate feasible integrated water and sanitation solutions.
- Propose a phased, implementable roadmap for sustainable service improvements.

### Research Questions:

- What are the current water and sanitation service levels in informal settlements of Makana Local Municipality in terms of access, reliability, quality, and affordability?
- What technical, social, and financial challenges hinder sustainable WASH service delivery in these settlements?
- Which integrated water and sanitation solutions are technically feasible, socially acceptable, and financially sustainable for informal settlements in Makana?
- How can a phased, implementable roadmap be designed to improve water and sanitation services while promoting community participation and governance compliance?

**Methodology:** A mixed-methods research design will be applied to capture both the technical and social dimensions of water and sanitation challenges in informal settlements.

**Main Findings / Results:** The study found that informal settlements in Makana Local Municipality face persistent water supply interruptions, with many households depending on communal standpipes and tanker deliveries. Water quality tests showed occasional microbial contamination, especially in household storage containers.

Sanitation services remain inadequate, dominated by poorly maintained pit latrines and communal toilets that pose health, environmental, and safety risks, particularly for women and children.

Governance challenges, which includes weak coordination between municipal actors, limited financial resources, and high non-revenue water that further constrain service delivery.

Nevertheless, the findings highlight potential solutions: short-term stabilization through leak repairs, tanker scheduling, and communal ablution blocks, alongside medium- to long-term upgrades such as condominal sewers and decentralized wastewater treatment. An integrated, phased approach combining technical improvements, community participation, and stronger governance is essential for sustainable service delivery.

**Conclusions Indicate the Contribution Made to Literature:** This study demonstrates that water and sanitation challenges in informal settlements extend beyond technical deficits, encompassing governance failures, financial constraints, and social inequalities. By applying an integrated assessment that combined household-level data, water quality testing, infrastructure audits, and participatory approaches, the research provides a multidimensional understanding of WASH service gaps in Makana Local Municipality.

The findings contribute to the broader literature in three significant ways. First, they provide empirical evidence on the persistence of water insecurity and inadequate sanitation in secondary South African municipalities, which are less studied than major metropolitan areas. Second, the research illustrates the value of a phased, integrated service model that combines short-term stabilization with medium- and long-term infrastructure pathways, bridging global WASH frameworks with local governance realities. Third, by foregrounding issues of safety, gender equity, and community participation, the study advances debates on inclusive service delivery and the co-production of infrastructure in informal settlements.

Overall, the research underscores the importance of context-specific, interdisciplinary approaches to advancing Sustainable Development Goal 6, while offering practical lessons for municipalities navigating the intersection of infrastructure deficits, resource constraints, and community needs.

**Recommendations:**

**1. Short-term (0–12 months):**

- Implement targeted leak detection and repair programs to reduce water losses and improve supply reliability.
- Optimize tanker delivery schedules and establish emergency standpipes or kiosks with safe storage and chlorination.
- Provide communal ablution blocks or container-based sanitation facilities to improve hygiene and reduce health risks.

**2. Medium-term (1–3 years):**

- Upgrade sanitation through settlement-level solutions, such as condominal sewerage or decentralized wastewater treatment systems (DEWATS).
- Expand household-level water access points where feasible, ensuring equitable coverage and gender-sensitive design.
- Strengthen community engagement mechanisms, including participatory monitoring and feedback channels.

**3. Long-term (3–7 years):**

- Fully integrate informal settlements into municipal water and sanitation networks, aligned with infrastructure renewal plans (e.g., James Kleynhans Water Treatment Works)
- Establish clear governance structures with defined roles and responsibilities for municipality, water utility, and community-based organizations.
- Institutionalize routine monitoring of service levels, water quality, and sanitation coverage, with transparent reporting and performance targets.

**4. Cross-cutting Recommendations:**

- Prioritize gender and safety considerations in all interventions.
- Apply phased, integrated approaches that balance technical feasibility, financial sustainability, and social acceptability.
- Leverage existing policy frameworks (e.g., SDG 6, South African water and sanitation regulations) to secure funding, guide planning, and ensure accountability.

**Keywords**

Integrated Water and Sanitation, Informal Settlements, Makana Local Municipality, Water Supply and Sanitation Services, Service Delivery, Sustainable Development Goal 6 (SDG 6), Community Participation, Infrastructure Upgrades, Governance and WASH.

