Sustainability Challenges of Providing Essential Services to Informal Settlements in South Africa

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Abstract

Informal settlements are prevalent globally, regardless of socio-economic and political contexts. The study investigates the sustainability of local governments providing water and sanitation services to informal settlements in South Africa, motivated by Maslow's Hierarchy of Needs Theory. The South African Constitution mandates all government bodies to provide proper housing and essential services, including potable water and adequate sanitation, to all citizens, irrespective of their living conditions. This study examines the sustainability of local authorities providing water and sanitation services to informal settlements as a temporary solution until the settlement is formalised. The research hypothesised that such provisions are sustainable with specific central government interventions. The study used a quantitative methodology to collect data through a structured questionnaire administered to municipal employees. Limitations included the small sample size, potential restrictions under the Promotion of Access to Information Act, and the focus on a single municipality. Findings indicate that while municipalities recognise their legal obligations and integrate these services into their strategic planning, significant challenges such as budget constraints, inadequate human resources, and rapid urbanisation persist and necessitate more significant support from provincial and central government. The study recommends a broader investigation involving a larger sample across multiple municipalities nationwide and suggests national government intervention to amend information access laws for more effective research.

Keywords: Informal Settlements, Municipal Challenges, Service Delivery, South Africa, Sustainability Challenges

1. Introduction

Informal settlements are a global phenomenon characterised by unplanned housing with minimal infrastructure and poor service delivery systems. In South Africa, these settlements are particularly prevalent due to historical and socio-economic factors. The apartheid-era policies of racial segregation and job reservation laid the groundwork for their establishment (UN-Habitat, 2015). Even after apartheid ended in 1994, factors such as poverty, high housing costs, and inadequate education and training have perpetuated their existence (Turok, 2012; Govender, Barnes, & Pieper, 2011). Rapid urbanisation and migration, driven by economic growth and regional conflicts, have further exacerbated the issue (Turok, 2013).

Utility services like water and sanitation meet basic human needs. Maslow's 1943 theory of human needs recognises them as physiological needs. Food, shelter, and water are human needs. As shown in (Figure 1.), specific lower-level needs must be met before higher needs. The basic needs are air, water, food, shelter, sleep, clothing, and reproduction. Next comes basic safety and security. Following that are the psychological needs of love/belonging and esteem, which seek prestige and accomplishment. The final stage is self-actualisation, which involves reaching one's full potential and being creative.

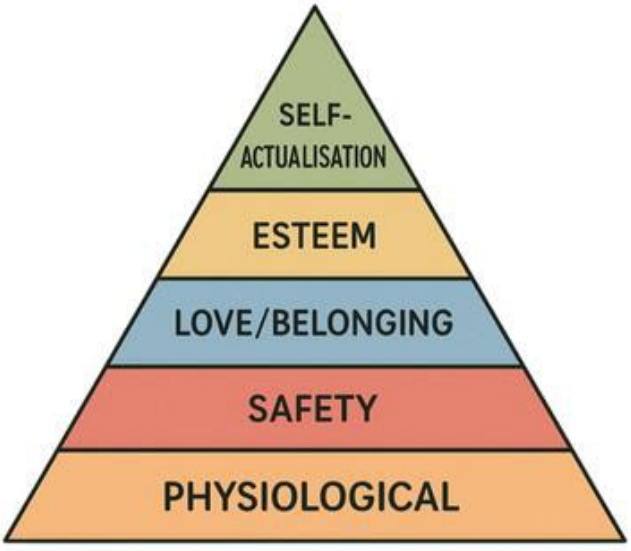

Figure 3: Maslow's Hierarchy of Needs
Adapted from (Maslow, 1948**)**

The South African Constitution mandates the provision of adequate housing and essential services, including potable water and sanitation, to all citizens if it is done financially and environmentally sustainable (Republic of South Africa, 1996). Despite this, local authorities responsible for service delivery face significant challenges such as budget constraints, technical limitations, and corruption (Govender, Barnes, & Pieper, 2011; Turok, 2012). These challenges raise concerns about the sustainability of providing essential services to informal settlements.

This study investigates the long-term sustainability of local authorities providing potable water and adequate sanitation to informal settlements. The research hypothesises that these services are sustainable with special provisions from the central government (UNHabitat, 2015; Turok, 2012). This investigation addresses a critical knowledge gap in the feasibility of service delivery to informal settlements and aims to inform policy and planning strategies (Govender et al., 2011).

The primary aim of the research was to determine whether local authorities can sustainably provide potable water and sanitation to informal settlements in the long term. Specific objectives included assessing the present-day mandate and capacity of local government for service provision (Republic of South Africa, 1996), evaluating the sustainability of current service delivery efforts (Turok, 2012), analysing the strategic planning and policies guiding local government (Turok, 2013), and identifying the financial and labour resources available for these services (Govender et al., 2011).
The research employed a quantitative methodology involving an exploratory survey of municipal employees. Due to accessibility constraints, a non-probability sampling approach was used, recognising that not all members of the research population would be available to provide the requisite data due to work pressures and geographic location (Govender et al., 2011). Data was collected through structured questionnaires and analysed using statistical methods. Limitations include a small sample size and the focus on a single municipality, which may affect the generalizability of the findings (Turok, 2012).

The study revealed significant insights into the sustainability challenges of service delivery in informal settlements. Preliminary findings suggest that informal settlements will persist and upgrading them comprehensively is a long-term goal (Turok, 2013).

These settlements often occupy unsuitable land for housing and infrastructure, complicating service delivery (UN-Habitat, 2015). The findings highlighted the constraints faced by local authorities and the necessity for central government support (Govender et al., 2011). This study contributes to a broader understanding of the dynamics of service delivery and hopes to inform future policy and strategic planning.

2. Literature Review

This influx of people into the cities and towns, which is internationally referred to as urbanisation, resulted in the segregated residential areas set aside for non-whites becoming overcrowded and the limited service infrastructure becoming wholly inadequate. Reed (2013) found that Black South Africans migrated more before the repeal of The Pass Laws Act of 1952 and the end of apartheid. The socio-economic and socio-political environment of informal settlements includes intricate social and survival systems and the practical and communal challenges of housing and infrastructure development (Companie, 2020). Understanding 'spatial injustice''s origins and development is crucial. This construct shows its political and practical effects on South African society, contextualised against the many challenges facing all levels of government (Turok, 2012; Windapo & Goulding, 2013). According to Soja (2009), space justice is fair land distribution and free association. Spatial justice is measured by the distribution of land, wealth, opportunities, and social privileges (Turok, 2012).

Spatial injustice became a significant issue in South African society after the Native Land Act, No. 27 of 1913, took effect on June 19. This legislation, later renamed The Bantu Land Act of 1913 and The Black Land Act, regulated land ownership. The unintended consequence was lawful racial segregation and discrimination in South Africa, limiting Black land ownership to 7% of the total surface area (Cameron & Spies, 1986; Turok, 2012). In informal settlements on the periphery of towns, non-whites like Black, Coloured, and Indian people lived in temporary housing with limited infrastructure and services like potable water and waterborne sanitation.

Bantu homelands, or Bantustans, were created under the 1959 Bantu Self-Government Act to promote separate development. To displace Black South Africans

from urban to rural dumping grounds, this act caused overcrowding and poverty in the homelands (Khunou, 2009; Evans, 2017; Sithole & Mathonsi, 2015). Economic assets, natural resources, and infrastructure needed to be improved in these homelands (Phuhlisani NPC, 2017).

Many Black South Africans lived in poorly serviced townships or informal settlements like Soweto, Tembisa, and Soshanguve due to spatial injustice. These cities' outskirts had terrible living conditions (Cameron & Spies, 1986; Turok, 2012). In the 1960s and 1970s, people moved to cities for better jobs, worsening this situation (Cameron & Spies, 1986; Turok, 2012). Reed (2013) notes that Black internal migration in South Africa was suppressed and censored. South Africa's economy has long relied on cheap labour from neighbouring countries, according to the Economic and Political Weekly (2003).

The African National Congress replaced the four-province structure with a nine-province structure after the first democratic elections in 1994 to better serve an inclusive society (The Constitution of South Africa, 1996). This restructuring made balancing socioeconomic rights, interest group aspirations, and societal development complex (Arndt et al., 2019). The Department of Human Settlements (2009) notes that developing countries with rapid urbanisation and inadequate infrastructure have informal settlements. According to the National Sanitation Policy, one to two million South African households live in informal settlements (Department of Water and Sanitation, 2016). Shacks house 10% of South African households, according to the Housing Development Agency (2014). The Socio-Economic Rights Institute of South Africa (2018) and the Prevention of Illegal Eviction and Unlawful Occupation of Land Act, No. 19 of 1998, emphasise the government's duty to help displaced South Africans find housing. The Housing Act specifies national, provincial, and local government housing development and service provision for people experiencing poverty (Republic of South Africa, 1997). 'Breaking New Ground,' the Comprehensive Plan for Sustainable Human Settlements, and the 1994 White Paper on the New Housing Policy and Strategy for South Africa aim to integrate communities and upgrade informal settlements (Department of Human Settlements, 2010). Misunderstandings about informal settlements and local government. Water and sanitation are essential, but residents rarely mention formal housing (Community

Organisation Resource Centre, 2016). According to the South African Human Rights Commission (2014), improvements to informal settlements and basic services should be integrated.

2.1. Mandates for informal settlement water and sanitation

South African law mandates water and sanitation for equality. All communities within the jurisdiction of local government must receive appropriate and sustainable services under Section 152(1)(b) of Chapter 3 of The Constitution of South Africa (Republic of South Africa, 1996). According to the Republic of South Africa, the Local Government Municipal Systems Act, No. 32 of 2000, local communities are prioritised, encouraged to grow, and provided with essential municipal services in a financially and environmentally sustainable manner.

All South Africans, including those in informal settlements, are entitled to essential water and sanitation under the Water Services Act, No. 108 of 1997, with some restrictions. Local governments must also create a Water Services Development Plan to provide water and sanitation to all residential areas through their Integrated Development Plan (Republic of South Africa, 1997).

2.2. Guidelines for informal settlement water and sanitation

According to the Water Services Act, the Minister of Human Settlements, Water, and Sanitation must create and publish water service standards. National Norms and Standards for Domestic Water and Sanitation Services (Department of Water and Sanitation, 2017) address equitable water supply, financial issues, and service backlogs. With provisions for informal settlements, these standards classify water supply as bulk, full, middle, and minimum.

A minimum level of service requires potable water from communal standpipes and adequate sanitation from shared facilities. The Department of Water and Sanitation (2017) states that everyone must have free basic water up to a specific limit before it is tariffed.

2.3. Water and sanitation strategy for informal settlements

Legislation and national and local regulations affect water and sanitation strategy. The Local Government Municipal Systems Act mandates a 5-year Integrated Development Plan for development and governance (Republic of South Africa, 2000). The community helps identify priority needs and adapt to changing circumstances each year.

Spatial Development Framework, Integrated Zoning Scheme, Integrated Human Settlement Plan, and Water Services Development Plan are essential to the Integrated Development Plan. For sustainable service delivery, sector plans guide land use, housing development, and infrastructure planning (Stellenbosch Municipality, 2019). Informal settlements are included in the Spatial Development Framework's planning to provide services and discourage unsuitable development. Stellenbosch Municipality (2019) states that the Integrated Zoning Scheme regulates land use to meet municipal land development goals. Urban development strategies and the Integrated Human Settlement Plan promote sustainable settlements. Considering population growth and infrastructure needs, the Water Services Development Plan addresses water supply and demand (Department of Water and Sanitation, 2020).

2.4. Water and sanitation resources for informal settlements

Budgeting and funding for water and sanitation services are needed to provide equipment, materials, and people. The South African Constitution and Municipal Finance Management Act require municipal budgets to prioritise community needs and justify funding requests: property rates, service charges, government grants, and other sources fund municipalities. Conditions grants are given for housing, infrastructure, and basic services (Van der Westhuizen et al., 2017). Strategic planning, a budget steering committee, and the Integrated Development Plan are needed for resource management (Stellenbosch Municipality, 2019).

Water services and human settlement plans guide resource allocation and service delivery as part of the municipality's Integrated Development Plan. The plan emphasises community involvement, regular reviews, and adjustments to meet

changing needs and ensure sustainable development (Stellenbosch Municipality, 2019).

Informal settlements are prevalent in developing countries like South Africa, experiencing rapid urbanisation. Low infrastructure and poor service delivery characterise these unplanned settlements. The Housing Act and other laws for people experiencing poverty require basic services like water and sanitation. Municipal strategic plans, including Integrated Development Plans, must guide service delivery and resource allocation. Resources, budgeting, and alignment with national standards and community needs are needed to deliver effective services.

3. Research Methodology

This study employed a quantitative research methodology, utilising a structured questionnaire to collect data from officials in a case study municipality. The research design followed a systematic process, including identifying the research topic and problem, conducting an in-depth literature review, and planning a suitable methodology (Terre'Blanche et al., 2006; De Vos et al., 2005). The choice of a quantitative approach was driven by the need to gather numerical data that could be analysed statistically to determine the sustainability of providing water and sanitation services to informal settlements (Creswell, 2014).

The research population comprised officials from the municipality's operational units involved in water and sanitation service delivery. Due to the specific nature of the research problem, a purposive sampling method was initially chosen (Watkins, 2016). However, judgment sampling was ultimately used to include all relevant officials, resulting in a sample size of seventeen, with ten completed responses (Neuman, 2006).

The questionnaire, constructed using Likert's technique, included closed-ended questions to ensure ease of analysis and reliability of responses (Likert, 1967). The data collection process was conducted electronically, ensuring anonymity and ethical considerations. An ethical clearance letter accompanied the questionnaire, assuring participants of confidentiality and voluntary participation (Leedy & Ormrod, 2010). The

raw data was then analysed using descriptive and inferential statistical methods, primarily with the Statistical Package for the Social Sciences (SPSS-25), to extract meaningful insights and establish the significance of associations between variables (Neuman, 2006).

This methodology was selected for its robustness in handling quantitative data and suitability for addressing the research problem, providing reliable and valid results supporting the study's objectives (Watkins, 2016; Collis & Hussey, 2009). The research methodology should discuss the approach, and the research design, data collection, and data analysis adapted or adapted. One of the most critical issues to be discussed here is the appropriateness of the selected methodology, which is the most appropriate choice compared to other alternatives. This is the opportunity for the authors to demonstrate their awareness and understanding (appropriate for the level of study) of the research tools commonly used in their field and how this knowledge is used to inform them in constructing a robust methodology to tackle the research problems/questions.

4. Findings and Discussion

The quantitative data for this investigation was collected through a survey conducted in a pre-selected municipality using a questionnaire. The questionnaire included six biographical questions, seven empirical questions with dichotomous responses, and eight six-point Likert-type bi-polar scale statements. Standardised statistical analysis methodologies were employed to extract meaning from the raw data, achieve the research objectives, answer the investigative research questions, and accept or reject the research hypothesis. Of the seventeen questionnaires distributed, ten were correctly completed and deemed usable, resulting in a valid response rate of 58.8% (see Table 4.1). The seven questionnaires that were not returned were likely due to work pressure or respondents being out of the office.

Table 4.5: Case processing summary for the empirical questions in the questionnaire

Cases	No.	%
Valid	10	58.8
Excluded	7	41.2
Total	17	100

Correlation coefficients were calculated between the various questions to determine content and construct validity using Spearman's Correlation Coefficient methodology. The findings, shown in Tables 4.2 and 4.3, indicate that all empirical questions achieved or exceeded the generally accepted threshold of 0.80 for an acceptable level of validity, with coefficients ranging from 0.80 to 0.83.

Table 4.6: Correlation coefficient matrix for questions 7 to 13

	7	**8**	**9**	**10**	**11**	**12**	**13**
7	1.00	0.80	0.83	0.82	0.80	0.82	0.83
8	0.83	1.00	0.82	0.80	0.83	0.82	0.82
9	0.83	0.83	1.00	0.82	0.80	0.83	0.80
10	0.80	0.80	0.83	1.00	0.82	0.82	0.83
11	0.83	0.83	0.80	0.82	1.00	0.80	0.83
12	0.80	0.80	0.83	0.80	0.80	1.00	0.82
13	0.83	0.83	0.82	0.83	0.82	0.83	1.00

Table 4.7: Correlation coefficient matrix for questions 14 to 21

	14	15	16	17	18	19	20	21
14	1.00	0.81	0.80	0.83	0.80	0.80	0.80	0.81
15	0.81	1.00	0.80	0.80	0.83	0.80	0.83	0.80
16	0.80	0.81	1.00	0.80	0.83	0.80	0.80	0.80
17	0.83	0.81	0.83	1.00	0.80	0.83	0.80	0.83
18	0.80	0.80	0.80	0.81	1.00	0.80	0.81	0.80
19	0.81	0.83	0.80	0.80	0.80	1.00	0.80	0.83
20	0.80	0.80	0.81	0.83	0.81	0.80	1.00	0.80
21	0.83	0.81	0.80	0.80	0.80	0.83	0.81	1.00

The reliability of the questionnaire and the data collected was determined using Cronbach's Alpha measure, which was found to be 0.89, indicating high reliability (see Table 4.4).

Table 4.8: Cronbach's Alpha reliability measure for the whole questionnaire

Cronbach's Alpha statistic	**N**
0.89	10

The validity and reliability of the data were further corroborated using the Kaizer-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. The KMO measure was 0.702, exceeding the threshold of 0.70, and Bartlett's test showed a chisquare value of 8.112, indicating a significant relationship between variables (see Table 4.5).

Table 4.9: KMO and Bartlett's test for sphericity for all questions in the questionnaire

Kaizer-Meyer-Olkin measure of sampling adequacy	0.702
Bartlett's test of sphericity: Approximate Chi-square	8.112
df	4
Significance level	0.05

The data from Tables 4.6 to 4.8 collectively underscores the comprehensive and informed nature of the survey responses. With all respondents having visited informal settlements within the past year and most visits being work-related, the findings are based on well-informed perspectives. This enhances the credibility of the survey results and provides a solid foundation for the subsequent analysis and conclusions regarding water and sanitation services in informal settlements. The detailed breakdown of visits by settlement and purpose also highlights the thoroughness of the investigation, ensuring that the data reflects a wide range of conditions and issues across the municipality.

Table 4.10: The Mann Whitney U test and Wilcoxon W tests of the association between the biographical variable and the knowledge and experience variable entrenched in part B of the questionnaire

Total N	10
Mann Whitney U test	21.3140
Wilcoxon W	101.500
Test statistic	21.3140
Standard error	11.124
Standardised test statistic	- 0.391
Assumptotic significance (2-test summary)	0.137

Table 4.11: The Mann Whitney U test and Wilcoxon W tests of the association between the biographical variable and the sustainability variable entrenched in part C of the questionnaire

Total N	**10**
Mann Whitney U test	19.413
Wilcoxon W	107.450
Test statistic	19.413
Standard error	10.024
Standardised test statistic	-0.297
Assumptotic significance (2-test summary)	0.193

Table 4.12: Hypothesis test summary for the empirical findings obtained from the questions in Part B and C of the questionnaire

Null hypothesis	Independent samples Mann Whitney U test	Sig.	Decision
Are municipalities mandated (obligated) (Q7) to provide water/sanitation, and how many have been upgraded (Q20) or eradicated (Q21)	Independent samples Mann Whitney U test	0.491	Retain the null hypothesis
Is the provision of water/sanitation part of the municipality's strategic planning (Q8), and how many have access to water/sanitation (Q14+15)	Independent samples Mann Whitney U test	0.182	Reject the null hypothesis

Null hypothesis	Independent samples Mann Whitney U test	Sig.	Decision
Is there budgetary provision for providing water/sanitation to informal settlements (Q11a+b), and are they growing too fast for the municipality to cope (Q18)?	Independent samples Mann Whitney U test	0.412	Retain the null hypothesis
Does the provision of water/sanitation equate to the rate of growth of informal settlements (Q13), and are some settlements too isolated or not on municipal land (Q16+17)	Independent samples Mann Whitney U test	0.634	Retain the null hypothesis
Does the municipality have a formal policy (Q9) and procedure (Q10), and are some settlements in environmentally and ecologically sensitive areas (Q19)	Independent samples Mann Whitney U test	0.725	Retain the null hypothesis
Does the municipality have adequate human resources (Q12), and do all settlements have access to water (Q14) and sanitation (Q15)	Independent samples Mann Whitney U test	0.862	Retain the null hypothesis

The findings indicate that municipalities are mandated by law and public policy to provide water and sanitation services to informal settlements. However, rapid urbanisation, resource constraints, and geographical isolation of settlements challenge the sustainability of this mandate. The investigation suggests that while strategic planning includes these services, the provision often needs to be improved due to budgetary and human resource limitations. These constraints underscore the need for greater involvement and support from provincial and central governments to address the challenges effectively. The statistical methods confirmed the data's reliability and validity, ensuring the findings and conclusions were scientifically defensible.

5. Conclusion and Further Research

This study, grounded in Maslow's Hierarchy of Needs Theory, aimed to assess the sustainability of local governments in providing water and sanitation services to informal settlements. The research highlighted the critical role of municipalities in

ensuring these essential services as fundamental human rights. Despite understanding their legal obligations and incorporating these services into strategic planning, municipalities face significant challenges, including insufficient budgetary provisions, inadequate human resources, and the rapid growth of informal settlements, which hinder effective service delivery.

The findings indicate that municipalities need help meeting the increasing service demand due to resource constraints and rapid urbanisation. Despite robust strategic planning, resource inadequacy exacerbates these challenges, emphasising the need for enhanced resource allocation and improved strategic planning. The involvement of higher levels of government is crucial to addressing these systemic issues.

Future research should expand this investigation across multiple municipalities to enhance reliability and generalizability and explore legislative and policy interventions at national and provincial levels. This approach will provide a broader understanding of how higher-level policies can support local governments in fulfilling their service delivery mandates and explore innovative and sustainable models for delivering water and sanitation services to informal settlements.

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