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Assessing the current access to water and sanitation in informal settlements: a case study of Lerato Park, Northern Cape Province, South Africa

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Access to water and sanitation remains a pressing global challenge, particularly in informal settlements where infrastructural inadequacies, insecure provision modalities, and unreliable supply networks characterise service delivery systems. This paper examines the current access to water and sanitation in the Lerato Park informal settlement located in Kimberley, Northern Cape Province, South Africa. The study employed qualitative methods, including semi-structured questionnaires with residents, key informant interviews with officials from Sol Plaatje Municipality, and direct field observations. Findings reveal that residents rely heavily on illegal water connections and temporary private contractors due to the absence of formal municipal reticulation and bulk infrastructure. Sanitation provision is primarily dependent on shared bucket toilets, which are severely overcrowded, poorly maintained, and pose significant public health, safety, and gender-based vulnerability risks, particularly for women and children. While municipal authorities acknowledge these challenges, responses remain largely reactive, constrained by limited fiscal capacity, insecure land tenure arrangements, and systemic hydrological scarcity in the Northern Cape. The paper concludes that bridging the gap between South Africa's progressive legislative and policy frameworks and the on-the-ground realities of informal settlements requires urgent capital investment in service infrastructure, strengthened participatory planning processes, and the systematic integration of informal settlements into municipal spatial planning and service delivery instruments to ensure equitable, safe, and sustainable access to basic services.

KEYWORDS

informal settlement upgrading, municipal infrastructure planning, participatory planning, sanitation, water

Introduction

Water and sanitation are universally recognised as fundamental human rights and indispensable components of urban livelihood security, human dignity, and socio-economic development (United Nations, 2023). The United Nations' Sustainable Development Goal (SDG) 6 calls for universal, equitable, and safely managed access to water and sanitation by 2030. Despite global progress, service deficits remain spatially uneven, with over 2.2 billion people lacking safely managed drinking water and 3.5 billion without adequate sanitation (WHO and UNICEF, 2023). These deficits are most acute in informal settlements, where rapid

urbanisation, insecure land tenure, and exclusion from statutory planning frameworks perpetuate systemic marginalisation from formal service delivery systems. South Africa's policy and constitutional architecture, anchored in Section 27 of the Constitution (1996), the Water Services Act (1997), and the National Development Plan (NDP) 2030, positions access to water and sanitation as a justiciable right. Yet persistent inequalities continue to shape spatial patterns of access. National data indicate that approximately one million households still lack the minimum water supply standard of 25 litres per person per day, while over 21 million citizens remain without adequate sanitation (Jobbins et al., 2022). Informal settlements, often situated on peri-urban fringes or land with ambiguous tenure status, are systematically excluded from municipal investment pipelines, Integrated Development Plans (IDPs), and long-term infrastructure planning processes (Njila et al., 2021). The Northern Cape Province, South Africa's driest region, provides a stark illustration of these spatialised service inequalities. Kimberley has experienced recurrent service delivery failures, infrastructure breakdowns, and protest action linked to water shortages and sanitation backlogs (GroundUp, 2024). Within this context, Lerato Park informal settlement represents a critical case study, characterised by the absence of formalised reticulation networks, dependency on illegal water connections, and reliance on the bucket system, an undignified and environmentally hazardous sanitation modality (SABC News, 2021). These conditions highlight the persistent disjuncture between South Africa's progressive policy intentions and the lived realities of residents in informal settlements.

Access to water and sanitation in informal settlements

Globally, water and sanitation access in informal settlements is shaped by rapid urbanisation, demographic pressures, climate variability, and institutional capacity constraints. Boretti and Rosa (2019) project that global water demand will exceed sustainable supply in several regions, while Howard (2021) highlights the heightened vulnerability of informal settlements to climate-induced water scarcity, flooding, and infrastructural stress. In many low-income contexts, residents rely on informal vendors, unregulated distribution systems, and unsafe shared sanitation facilities (Andrés et al., 2021). In Bangladesh, approximately 70% of the urban poor lack improved sanitation (WHO and UNICEF, 2023), while in Nigeria, weak governance and corruption have undermined equitable access to potable water (Ifeoluwa, 2023). Across sub-Saharan Africa, chronic underinvestment, institutional fragmentation, and rural–urban migration continue to exacerbate water and sanitation challenges. Thole (2021) notes that one in three Africans lacks safe drinking water, while Abrams et al. (2021) argue that climate variability significantly disrupts service reliability in rural and peri-urban systems. Informal settlements in Kenya, Ghana, and Nigeria demonstrate common patterns: overcrowded communal taps, unsafe shared latrines, and the proliferation of informal intermediaries who inflate costs for poor households (Chumo et al., 2023). Gendered inequalities remain pronounced, with women and children disproportionately exposed to safety hazards and health risks (Angmor, 2020).

South Africa embodies a paradox: progressive policy frameworks coexist with persistent service inequities. Despite statutory recognition of water and sanitation as rights, the persistence of apartheid spatial legacies, fiscal constraints, and fragmented

municipal capacity continues to undermine universal access (Masiya et al., 2019). In the Northern Cape, water scarcity, ageing infrastructure, and limited municipal budgets exacerbate these challenges. Lerato Park illustrates the contradictions between policy commitments and operational realities, where households remain dependent on bucket toilets and illegal water connections (SABC News, 2021).

Analytical framework

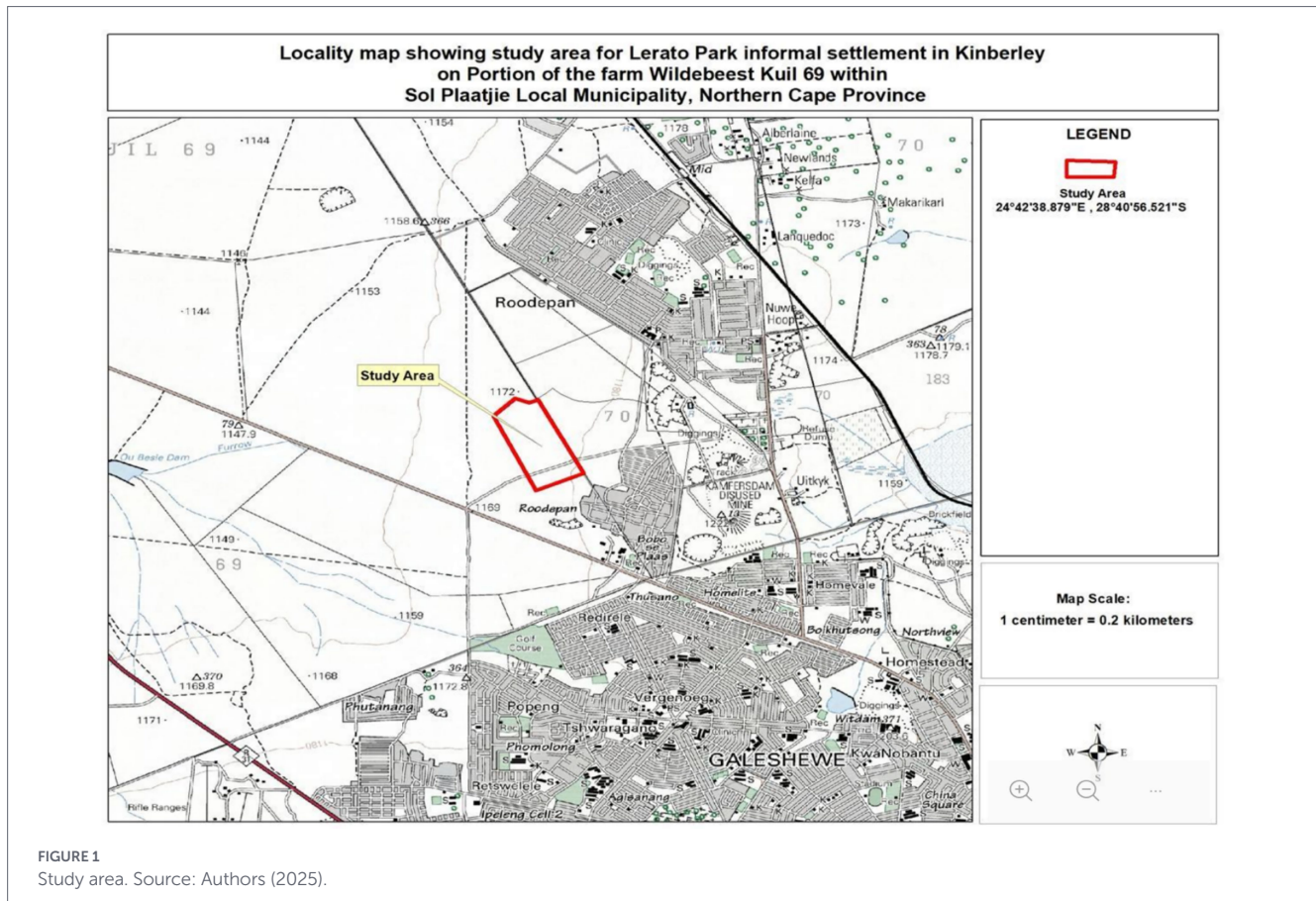
This study is anchored in an integrated analytical framework that combines the Human Rights-Based Approach (HRBA) and the Sustainable Livelihoods Approach (SLA) to interrogate water and sanitation access in informal settlements. The HRBA provides a normative and institutional lens through which access to basic services is framed as a legally enforceable entitlement rather than a discretionary outcome of municipal capacity or political will. Rooted in South Africa's constitutional and legislative architecture, particularly Section 27 of the Constitution (1996) and the Water Services Act (1997), this approach foregrounds principles of universality, equity, accountability, participation, and transparency in infrastructure provision. From an urban governance and planning perspective, the continued reliance on illegal water connections and bucket sanitation systems in Lerato Park signifies a systemic failure to operationalise rights-based planning, reflecting deficiencies in municipal infrastructure investment, spatial inclusion, and regulatory enforcement within informal settlement settings.

Complementing this normative framing, the SLA enables an examination of how households navigate and respond to infrastructural exclusion within constrained socio-spatial environments. Through foregrounding livelihood assets, adaptive strategies, and everyday practices, the SLA captures the lived realities of residents who rely on informal water connections, shared sanitation facilities, and private service providers as survival mechanisms in the absence of formal municipal provision. While these strategies demonstrate resilience and agency, they simultaneously entrench exposure to health, safety, and socio-economic risks, reinforcing cycles of vulnerability. The integration of HRBA and SLA thus enables a multi-scalar urban planning analysis that links institutional and governance failures with household-level adaptation, illuminating how spatial marginalisation, weak service integration, and fragmented planning regimes collectively shape inequitable water and sanitation outcomes in informal settlements such as Lerato Park.

Materials and methods

Study area

The study focuses on Lerato Park informal settlement, located approximately 10 km northwest of the Kimberley Central Business District (CBD), as illustrated in Figure 1 below. The settlement falls under the administrative jurisdiction of the Sol Plaatjie Local Municipality, situated within the eastern quadrant of the Northern Cape Province and governed by the Frances Baard District Municipality in South Africa. Lerato Park represents one of the



largest and most spatially extensive informal settlements in the region, comprising an estimated 3,500 households. It is strategically positioned between Galeshewe and Roodepan on the northwestern periphery of Kimberley. The spatial location of the study area, in terms of its geospatial coordinates, is 24°42'38.879"E and 28°40'56.521" S. Lerato Park informal settlement is situated on unproclaimed municipal land.

Research design

This study adopted a qualitative research design to capture the socio-spatial dynamics of residents in Lerato Park. Data collection utilised semi-structured questionnaires with residents, complemented by informant interviews with Sol Plaatjie Municipality officials. A total sample of 12 participants was included in the study, comprising 10 residents from the Lerato Park informal settlement and 2 municipal officials from the Sol Plaatjie Local Municipality. Participants were selected using non-probability snowball sampling due to the fluid settlement structure and the challenges of accessing households within informal spatial configurations. Field observations and photographic documentation were used to triangulate findings and provide empirical evidence of infrastructural deficits, settlement morphology, and service delivery conditions. A thematic analysis approach enabled the identification of recurring patterns across data, focusing on water accessibility, sanitation practices, coping mechanisms, and municipal responses. Ethical protocols included informed consent, anonymity, and sensitivity to the vulnerabilities inherent in marginalised populations.

Results

This section presents the empirical findings generated through qualitative fieldwork, synthesising insights from household questionnaires, informant interviews, and direct spatial observations. The results reveal persistent infrastructural deficits, fragmented governance responses, and continued exclusion of Lerato Park from formalised service delivery systems. The analysis is organised into three core thematic areas, water access, sanitation provision, and municipal strategies, each reflecting the multi-dimensional service delivery challenges characteristic of rapidly expanding informal settlements in South Africa.

Current state of water access

Residents reported reliance on illegal or improvised water connections extending from nearby formal settlements. As shown in Figure 2 these connections, constructed using hosepipes and informal fittings, demonstrate the absence of formal reticulation infrastructure and the spatial exclusion of Lerato Park from municipal service networks. Such unregulated access poses risks of contamination, infrastructural damage, and unreliable supply.

Status of sanitation facilities

Sanitation provision is dominated by communal bucket toilets, frequently shared by more than 20 residents (See Figure 3). These facilities are characterised by inadequate maintenance, poor hygiene, and significant safety concerns, particularly for women



FIGURE 2
Illegal connection of water pipes. Source: Author (2025).



FIGURE 3
Shared bucket toilet facility. Source: Author (2025).

and children. Respondents highlighted irregular servicing cycles, persistent overflows, and pervasive odours, conditions that mirror national critiques of the bucket system's impact on public health and human dignity (Ferronato and Torretta, 2019).

Municipal strategies and interventions

Residents expressed frustration with limited municipal engagement, inadequate communication, and the absence of visible implementation efforts. This highlights long-standing governance gaps wherein informal settlements remain peripheral to municipal planning instruments, including the IDP and Spatial Development Framework (SDF). Municipal officials reported the deployment of mobile water tankers during shortages and service disruptions, along with communication through community notices and digital platforms. However, these measures are short-term and reactive, lacking integration into long-term infrastructure planning. Capacity constraints, fiscal limitations, and land tenure complexities continue to impede proactive service delivery (Masiya et al., 2019). Municipal interventions, although present,

are predominantly reactive, fragmented, and insufficiently aligned with long-term infrastructure planning frameworks. These findings highlight the need for an integrated, pro-poor upgrading approach that addresses both the technical and governance dimensions of basic service provision in informal settlements.

Discussion

The findings illustrate a pronounced mismatch between South Africa's rights-based policy environment and the empirical realities of informal settlements. From an HRBA perspective, the conditions in Lerato Park represent systemic violations of constitutionally enshrined rights to water and sanitation. From an SLA lens, residents' adaptive strategies highlight resilience but also expose structural vulnerabilities and heightened risk. The case aligns with broader global trends, where informal settlements remain excluded from networked infrastructure systems due to planning deficits, governance fragmentation, and resource constraints. The persistence of bucket sanitation and reliance on illegal water connections in Lerato Park highlights the need for transformative interventions rather than stop-gap emergency responses.

A multi-level framework for strengthening water and sanitation access in informal settlements

Drawing from the findings, this section outlines a set of structured, technically informed recommendations aimed at addressing the systemic water and sanitation deficits in Lerato Park. The recommendations are embedded within a Four-Pillar Integrated Upgrading Framework, which reflects contemporary urban planning principles, spatial justice, pro-poor service delivery, incremental settlement upgrading, and participatory governance. The framework ensures a coherent response to the infrastructural, institutional, socio-spatial, and governance challenges identified in the results.

The recommendations in Table 1 of the Pro-Poor Integrated Infrastructure Planning Framework (PIIPF) directly respond to

TABLE 1 Pro-Poor Integrated Infrastructure Planning Framework (PIIPF).

Pillar	Focus area	Actions
Infrastructure provision	Emergency → Medium-term → Long-term infrastructure	<ul style="list-style-type: none"> • Deploy short-term potable water interventions (water tankers, emergency supply stabilisation) • Install communal standpipes with metered distribution to reduce illegal connections. • Progressively upgrade to household-level piped connections through formal reticulation networks • Eradicate the bucket toilet system and introduce improved sanitation technologies (VIPs, ablation blocks, or low-water flush systems).
Governance and institutional capacity	Municipal systems, budgets, policy alignment	<ul style="list-style-type: none"> • Integrate Lerato Park into the IDP, Service Delivery and Budget Implementation Plan (SDBIP), Medium Term Revenue and Expenditure Framework budget (MTREF) to secure long term budget commitments. • Align upgrading interventions with the Upgrading of Informal Settlements Programme (UISP). • Strengthen interdepartmental coordination and establish a dedicated informal settlement support unit.
Community participation	Inclusive governance	<ul style="list-style-type: none"> • Establish community-based water and sanitation committees to support co-management of services. • Implement participatory monitoring and reporting systems to improve accountability. • Incorporate community voices into planning cycles through structured engagement platforms.
Spatial integration	Land, planning, resilience	<ul style="list-style-type: none"> • Prioritise Lerato Park within the Spatial Development Framework (SDF) to address peripheralization. • Implement incremental tenure security interventions to support long-term upgrading. • Integrate climate-resilient water and sanitation solutions suited to the Northern Cape's arid conditions.

the systemic service delivery gaps identified in the study by providing a coherent, multi-dimensional framework for improving water and sanitation access in Lerato Park. The Infrastructure Provision pillar addresses the immediate risks posed by illegal water connections and unsafe bucket sanitation while outlining a phased transition toward formalised reticulation and dignified sanitation infrastructure. The Governance and Institutional Capacity pillar tackles the municipality's limited engagement and reactive service delivery, stressing the need for policy alignment, budget allocation, and strengthened institutional coordination; embedding Lerato Park within statutory planning instruments such as the IDP, MTREF, and UISP shifts the settlement from peripheral neglect to formal municipal prioritisation. The Community Participation pillar responds to communication breakdowns and marginalised resident involvement by institutionalising participatory structures that support co-production of services, enhance transparency, and ensure that interventions reflect community needs. The Spatial Integration pillar addresses the structural exclusion of Lerato Park by advocating for its integration within the SDF and the adoption of climate-resilient planning approaches, thereby enhancing long-term spatial inclusion and reducing vulnerability. Collectively, these four pillars establish an evidence framework capable of advancing equitable, safe, and sustainable access to water and sanitation for the residents of Lerato Park and other areas experiencing similar challenges.

While the study advocates for the expansion of water and sanitation infrastructure in Lerato Park, the long-term sustainability of such interventions is contingent on the municipality's ability to balance equitable access with feasible cost-recovery mechanisms. Evidence from informal settlement upgrading programmes suggests that full cost recovery from low-income households is neither realistic nor desirable in the short term; however, graduated, pro-poor tariff structures can support partial recovery while safeguarding affordability. Given the high levels of unemployment and income precarity in Lerato Park, any formalisation of services should be accompanied by lifeline water allocations, indigent support policies, and cross-subsidisation mechanisms, consistent

with South Africa's Free Basic Water policy and municipal indigent registers.

From a municipal finance and infrastructure planning perspective, a hybrid financing model is most appropriate for settlements such as Lerato Park. Capital expenditure for bulk and reticulation infrastructure should be funded primarily through national and provincial grants, including the Municipal Infrastructure Grant (MIG) and Urban Settlements Development Grant (USDG), particularly where land tenure constraints limit immediate revenue generation. Operational sustainability can be enhanced through incremental cost recovery once tenure security and service reliability are improved, supported by community-based billing systems, prepaid metering for communal standpipes, and progressive formalisation of household connections. Integrating these financial considerations into the upgrading process ensures that service provision is not only technically viable but also fiscally sustainable and socially equitable.

Conclusion

This research critically assessed the state of water and sanitation access in Lerato Park informal settlement and revealed persistent infrastructural deficits, spatial marginalisation, and governance inefficiencies that destabilise residents' rights to basic services. Despite South Africa's progressive legislative and policy environment, the realities in Lerato Park demonstrate a widening implementation gap driven by inadequate reticulation infrastructure, reliance on unsafe coping mechanisms such as illegal water connections and bucket sanitation, and reactive municipal interventions constrained by fiscal, institutional, and land tenure complexities. Through the application of the Human Rights-Based Approach and the Sustainable Livelihoods Approach, the analysis highlights that current conditions not only compromise public health and dignity but also reinforce systemic inequalities and vulnerability. Addressing these challenges requires a shift toward integrated, pro-poor urban planning that embeds informal settlements within formal spatial, infrastructural, and governance frameworks. The

research Four-Pillar Integrated Upgrading Framework, centred on infrastructure provision, institutional capacity, community participation, and spatial integration, provides a strategic pathway for transforming Lerato Park into a resilient, serviced, and spatially included settlement. Advancing this agenda will demand sustained political will, targeted investment, and meaningful community engagement to ensure that universal, safe, and equitable access to water and sanitation is realised for all residents.

Future research

Future studies should extend this research by undertaking comparative, multi-settlement analyses across different climatic, institutional, and tenure contexts to assess how variations in land status, municipal capacity, and hydrological conditions influence water and sanitation outcomes in informal settlements. Longitudinal studies are also needed to examine the impacts of incremental upgrading interventions over time, particularly in relation to service reliability, public health outcomes, and changes in household livelihood strategies following infrastructure formalisation.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the Ethics and Plagiarism Committee (FEPC) of the Faculty of Engineering and the Built Environment at the University of Johannesburg. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

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