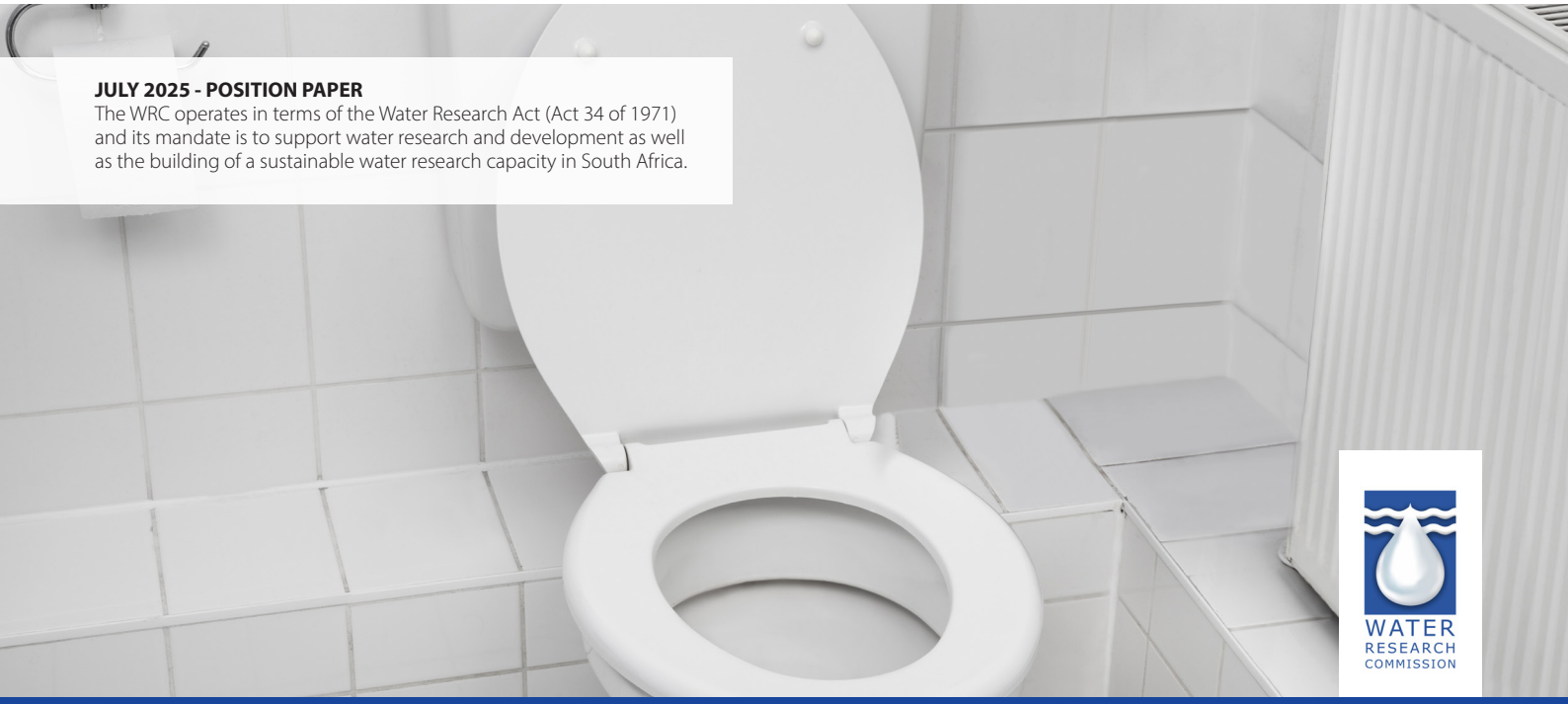

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ENABLING THE ADOPTION OF WATER-EFFICIENT SANITATION SOLUTIONS IN SOUTH AFRICA BY PROPOSING A MODEL SET OF SANITATION SERVICES BYLAWS: THE CONTEXT

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Summary

- The sanitation crisis in South Africa is escalating.
- In order to improve and sustain service delivery, the future of sanitation must transition from centralised waterborne sanitation systems and poorly managed onsite systems to decentralised water-efficient sanitation solutions (WESS).
- This shift is driven by fast-growing cities due to rapid and uncontrolled urbanisation, ageing infrastructure that is not maintained, poor management and performance of conventional wastewater treatment works, water security and climate change causing destruction to bulk infrastructure. Moreover, the provision of poorly designed and a lack of full-service models for onsite sanitation systems render these systems unsafe and contribute to environmental pollution and the spread of infectious diseases that impact public health.
- Shifting to this new norm in sanitation ensures less reliance on water for sanitation, eradication of service delivery backlogs and open defecation, promoting public health and restoration of natural ecological bodies such as wetlands and rivers.
- In order to make this transition, an enabling regulatory framework through model bylaws is essential to aid in the adoption and implementation of innovative WESS.

Introduction

South Africa, like many developing countries eager to fast-track their efforts to reach the United Nations Sustainable Development Goals (SDGs), particularly Goal 6 on Clean Water and Sanitation, is lagging behind (UNICEF and WHO 2023). Rapid and uncontrolled urbanisation, spawned by the desire for better services, continues to impede basic service delivery. In addition, population growth and the growing number of informal settlements within cities have resulted in significant backlogs in all provinces (STATS SA 2024). The problem is further exacerbated by the unending desire for the 'flush toilet'.

This is not due to a lack of innovative and sustainable technologies entering the market but rather policies, or lack thereof, to facilitate their adoption and implementation. The National Department of Water and Sanitation is on the right track. The National Faecal Sludge Strategy and Draft Revised Compulsory Norms and Standards (Government Gazette, No. 49979) aim to foster innovation and drive implementation of alternative and sustainable sanitation options. However, the

lack of appropriate municipal bylaws stifles their rollout. At the same time, several water service authorities (WSAs) are in the process of developing bylaws to cater for contexts in which sewers and bulk services do not exist; however, these tend to be limited to larger Category C (metropolitan) municipalities. There is thus a serious need for model bylaws which would provide all municipalities with a basis upon which they could amend their existing or develop a separate bylaw catering for such contexts.

This position paper begins by describing work being undertaken at a national level to develop enabling regulations for water-efficient sanitation solutions (WESS). This process is crucial given the infrastructure development and bulk services constraints facing South Africa. However, the critical issue being addressed in this position paper is to identify the challenges facing WSAs, including the regulatory, institutional, financial, and operational contexts which need to be responded to.

National regulations enabling water-efficient sanitation solutions (WESS

Research at a national level is currently underway:

- To investigate existing regulations, standards, and processes from a ***smart*** sanitation solutions perspective.
- To make recommendations regarding an enabling regulatory framework that would allow/fast-track smart, water-efficient sanitation solutions (WESS) to address blocked infrastructure development.
- To consider the key constraint of stressed water resources where supply-demand issues exist or are projected, and where municipal infrastructure is under capacity or dysfunction and thereby unable to support new greenfield- or major brownfield developments.

This work identifies changes in the current regulatory framework that will:

- Prevent irresponsible greenfield development that places an additional burden on existing stressed systems or resources.
- Facilitate responsible greenfield development that enables good practices linked to localised WESS with low generation of faecal sludge.
- Open a pathway to scale up the application of new localised WESS with low generation of faecal sludge, which will hopefully transition to other areas of sanitation, in both greenfield and brownfield areas, which are becoming unsustainable and cost-prohibitive to maintain and manage.

It should be stated, though, that this work must also address the circumstances in which people living in informal settlements find themselves, where they live in water-stressed areas or areas in which no bulk water is available to provide sewered sanitation.

This national approach suggests:

- ***Approach 1 (short-term option, <5 years):*** Rapid adaptation and strengthening of existing DWS regulation by:
  - identifying quick changes to existing regulation (adapt, change, or strengthen), to ensure that efficient water use, and where possible, off-grid services, form part of the sanitation solutions being investigated for new greenfield developments.
- ***Approach 2 (medium-term option, 5-10 years):*** Entrenching water-efficient sanitation solutions in DWS regulation by:
  - Following on Approach 1 – Identify more extensive changes to regulations and guidelines, or develop new ones, requires WESS as part of sanitation solutions for all developments (brownfield & greenfield).
- ***Approach 3 (long-term option, >10 years):*** Entrenching water-efficient sanitation solutions in sectoral regulation by:
  - Following on Approaches 1 & 2 – Change or strengthen DWS and non-DWS regulations, guidelines and standards, or develop new regulatory documentation, e.g., SANS, to facilitate enactment of WESS and WESS-related concepts.
  - DWS is the driver and will require the involvement of various other departments and other government agencies.

Challenges at the WSA level

WSAs face ongoing challenges of service delivery backlogs, particularly in underserved urban, peri-urban, and rural communities. Despite existing non-sewered, decentralised, and off-grid sanitation systems (collectively termed ***water-efficient sanitation solutions***) presenting a sustainable and scalable solution to these challenges, their adoption remains limited at the local level. In South Africa, WSAs, who are responsible for managing sanitation and water infrastructure, encounter significant barriers in implementing innovative sanitation solutions. The section explores the main challenges impeding the adoption of water-efficient sanitation systems (WESS) at the WSA level, with a key focus on regulatory, institutional, financial, operational, and social factors.

Regulatory challenges

Lack of enabling policy and legal frameworks

One of the primary challenges faced by WSAs in South Africa is the lack of a comprehensive policy framework that supports the adoption of WESS systems. Currently, most national, provincial and local sanitation policies largely favour centralised sanitation systems, which are seen as the standard for urban sanitation provision.

For example, the National Water Act (1998) and the Water Services Act (1997) provide guidelines for water services

provision, but these focus predominantly on centralised sewerage systems. There are no current policies, guidelines, or bylaws for decentralised sanitation alternatives.

Therefore, there is a clear lack of an enabling regulatory framework, and that creates uncertainty among WSAs when attempting to implement alternative sanitation solutions. Without such clear regulatory guidelines, WSAs are hesitant to invest in or approve roll-out of any WESS technologies, fearing the potential of non-compliance with national regulations, such as, for example, the Blue and Green Drop assessments, as led by the National Department of Water and Sanitation.

Limited standards and technology certification

There is an absence of specific standards for the certification and approval of decentralised sanitation technologies, and this poses another significant barrier. South Africa is a signatory to the International Organization for Standardization (ISO) 30500 standard for non-sewered sanitation systems which is in the process of being fully integrated into national legislation. However, WSAs may still face many difficulties in evaluating the performance, safety, and durability of new/alternative sanitation technologies, which leads to delays in the wider adoption of WESS in South Africa.

Some local municipalities have already piloted WESS technologies, but without clear guidelines on maintenance requirements, which are resulting in operational failures. The lack of certification standards significantly contributes to the perception that decentralised sanitation systems are unsustainable and difficult to manage at the local government level.

Institutional challenges

There is a wide variety of institutional challenges faced by WSAs. These include:

- Competency challenges: Many WSAs do not have certified professional engineers with experience and competence in sanitation.
- Weaknesses in planning: Even some of the Category A municipalities have indicated they have critical skills gaps in areas such as strategic and land use planning.
- Unsustainable implementation: Many municipalities have found it easier to spend money sourcing temporary toilets from the private sector rather than finding sustainable solutions.

Financial barriers

Funding and subsidy mechanisms mainly for centralised sanitation systems

Funding for sanitation infrastructure in South Africa is often skewed towards large-scale, centralised sanitation systems such as wastewater treatment plants. In addition, national government subsidies and international donor programmes traditionally support the development of sewered systems, leaving limited financial resources for wider adoption of decentralised sanitation systems. By way of example, the Municipal Infrastructure Grant (MIG) prioritises the extension of existing sewer networks, making it extremely difficult for any WSA to secure MIG funding for civil construction of projects.

This financial barrier discourages WSAs from seriously considering decentralised sanitation systems as viable sanitation provision alternatives. Even when the long-term operational costs of systems are lower, the lack of upfront capital financing options makes it further challenging for municipalities to initiate and sustain such projects. In many cases, WSAs depend solely on external funding sources, such as donor agencies, to pilot systems, but these projects often lack long-term sustainability once the external funding ends.

In addition, many municipalities have tariff charges for sanitation, something which is primarily seen as offsetting the maintenance and capital costs of existing sewered areas. The question of how systems fit into the financial management of municipalities needs to be addressed.

Uncertainty of cost recovery models

Another financial challenge impeding the adoption of systems is the lack of clear cost recovery models. Unlike centralised sewer systems, where water tariffs and service fees can be easily incorporated into existing billing systems, decentralised systems present several complexities in terms of cost recovery. WSAs struggle to establish pricing mechanisms that cover both the capital and operational costs of these systems while ensuring affordability for low-income communities.

For example, decentralised systems often require periodic maintenance and sludge management, but WSAs may not have the financial or technical capacity to provide these services regularly. This results in operational inefficiencies and potential system failures. It could be that municipalities needing to provide for options for particularly the households living in informal settlements could be incentivised through the provision of a ring-fenced amount in their Municipal Infrastructure Grant (MIG)/ Urban Settlements Development Grant (USDG) and other sanitation grants.

Operational and technical challenges

Lack of technical expertise and capacity

The implementation of systems requires specialised technical knowledge, which is often lacking at the WSA level. Municipalities in South Africa typically have limited experience with the design, installation, and maintenance

of decentralised sanitation systems. Centralised systems dominate the existing infrastructure, and WSA personnel are more familiar with traditional sewerage technologies.

This skills gap is further exacerbated by the lack of capacity-building programmes focused on alternative sanitation provision. Higher education training programmes for engineers, technicians, and maintenance personnel are still primarily centred on conventional wastewater treatment systems. Without adequate technical expertise, WSAs are hesitant to consider decentralised systems, often fearing operational challenges and system failures leading to non-compliance. The Sector Education and Training Authorities (SETAs), such as the Local Government SETA (LGSETA) and Energy and Water SETA (EWSETA)) could assist with specific training programmes aimed at building a cohort of specialists in the design of systems.

Maintenance and monitoring difficulties

Decentralised systems often require more frequent monitoring and maintenance compared to centralised systems, particularly in terms of on-site waste treatment and disposal. However, WSAs frequently lack the resources and personnel needed to conduct regular maintenance. In some cases, decentralised systems are installed without clear plans for long-term monitoring, leading to issues such as groundwater contamination or improper sludge disposal.

DWS has recently acknowledged the need for a better monitoring framework and system, but there is a current capacity constraint which are making it difficult for WSAs to manage decentralised sanitation systems effectively. This challenge is particularly pronounced in rural and peri-urban areas, where access to maintenance services is often limited.

Social and perception challenges

Public perception and acceptance

Public resistance to decentralised sanitation systems is another significant challenge. Many South Africans still view centralised sewer systems as the gold standard for sanitation. This perception is deeply rooted in the historical development of urban infrastructure, where sewered systems were seen as a symbol of modernity and progress. As a result, WESS is often perceived as inferior or as a temporary solution for low-income communities.

Nationally, efforts to shift public attitudes toward decentralised sanitation have been limited, and WSAs face an uphill battle in gaining community acceptance for such technologies. Several pilot projects in eThekwini Municipality: , for example, have shown that community engagement and education are crucial for changing perceptions, but these efforts require additional resources that many municipalities just do not have.

Equity and service delivery

A final challenge is ensuring equitable access to sanitation services. In many cases, decentralised systems are introduced in informal settlements or rural areas, where residents have limited access to formal services. However, the decentralised approach can sometimes reinforce existing inequalities if these systems are seen as a 'second-tier' solution for poorer communities. WSAs must ensure that WESS systems provide reliable, high-quality services to avoid perpetuating social inequalities.

Overall, there is a lack of policy frameworks guiding water-efficient sanitation solutions, particularly those applicable where there are no existing bulk water systems serving communities who have already built their housing in informal settlements. There is, however, work being done to change this as is indicated in the first section above.

A framework for developing model bylaws for water-efficient sanitation solutions (WESS)

Purpose

This framework is designed as a guideline to assist municipalities (metropolitan, district and local) with approval, adoption, and regulation of off-grid, decentralised and non-sewered sanitation systems (collectively termed water efficient sanitation solutions or WESS) that facilitate full treatment of the input for safe reuse or disposal on site. Establishing a comprehensive framework for model bylaws (norms and standards) is essential to guide municipalities in implementing these solutions effectively.

Such bylaws should provide clarity on legal requirements, technical specifications, operation and maintenance procedures, sanitation tariffs, community engagement, emergency procedures and address risks leading to the delivery of safely managed sanitation services, improved public health, environmental protection, and ultimately better socio-economic conditions. This bylaw does not pertain to faecal sludge management or faecal sludge treatment plants.

The framework for the model set of bylaws will comprise of the following components:

- Contextualisation
- Legislation related to water-efficient sanitation
- Developing bylaws and policy
- Definitions
- Institutional and regulatory framework for WESS implementation
- Technical specifications for WESS
- Framework for WESS management and operation
- Licensing and regulations
- Monitoring and evaluation
- Tariffing and revenue
- Penalties and consequence management
- User responsibilities
- Emergencies

Conclusion

The adoption of non-sewered, decentralised, and off-grid sanitation systems in South Africa faces numerous challenges at the WSA level. Regulatory gaps, financial constraints, technical capacity deficits, and social perceptions all contribute to the slow uptake of these systems. Overcoming these barriers will require concerted efforts from policymakers, WSAs, and the private sector. By developing enabling frameworks, improving financing mechanisms, and investing in capacity building, South Africa can advance toward more sustainable and equitable sanitation solutions for all its citizens.

It is anticipated that fleshing out the proposed model bylaws through WSA engagement will provide the mechanism for the rollout of WESS in a sustainable and cost-effective manner that will ultimately reduce service delivery backlogs and improve access to safely managed sanitation services nationally.

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