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RESEARCH ARTICLE

Water Revenue, Cost Recovery, and Sustainability in South Africa's Public Water Supply System: Policy Failures and Institutional Reform

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ABSTRACT

This article analyses the ongoing difficulties of water income generation and cost recovery in South Africa's public water supply system and their consequences for long-term sustainability. Notwithstanding a thorough legal and policy framework regulating water services, persistent deficiencies in revenue collection, tariff enforcement, and institutional coordination persistently jeopardise the financial sustainability of water infrastructure and service provision. The study employs a qualitative doctrinal and policy-oriented methodology to evaluate constitutional provisions, statutory instruments, national water pricing strategies, and institutional structures across several levels of government. The findings indicate that political opposition to cost-reflective tariffs, ineffective municipal billing and enforcement mechanisms, and disjointed intergovernmental accountability have led to persistent cost under-recovery, postponed infrastructure maintenance, and heightened dependence on fiscally unsustainable state assistance. The article contends that South Africa's water crisis is not merely a result of physical water constraint but is fundamentally based on governance and financial deficiencies. This work enhances current study by redefining water sustainability as a matter of institutional and financial governance that necessitates legal clarity and administrative reform. The paper advocates for specific regulatory modifications, enhanced local financial oversight, and a revised water price structure that harmonises social equality with financial sustainability to ensure the enduring viability of the public water delivery system.

INTRODUCTION

South Africa's public water supply system is experiencing a significant and ongoing crisis characterised by physical decay, governance inefficiencies, and persistent financial instability. Despite the nation's intrinsic water scarcity, the present intensity of water insecurity cannot be exclusively ascribed to environmental limitations. The situation is the result of historically entrenched inequalities stemming from apartheid-era policies that systematically marginalised significant portions of the population from fair access to water, exacerbated by current challenges such as population growth, urbanisation, and climate change (Ruiters and Amadi-Echendu, 2022). The interplay of these elements has imposed considerable pressure on municipal water systems, revealing enduring structural deficiencies in South Africa's water governance architecture. Notwithstanding the enactment of progressive water legislation designed to foster fairness, sustainability, and reparation, execution has been inconsistent and predominantly ineffectual. Chronic underinvestment in bulk and reticulation infrastructure has led to significant service disruptions, elevated non-revenue water levels, and the ongoing exclusion of millions of families from dependable water and sanitation services (Ruiters and Matji, 2016; Cartwright et al., 2024). The disparity between legislative aim and institutional capability exemplifies a pervasive trend of policy failure in the public water sector, where meticulously designed, legal frameworks have failed to yield concrete service results (Ruiters and Amadi-Echendu, 2022; Cartwright et al., 2024).

A significant consequence of this failure is the issue of revenue loss and inadequate cost recovery in municipal water services. Empirical evidence demonstrates that South Africa incurs annual losses ranging from USD 0.617 billion to USD 1.033 billion due to under-pricing, inefficient billing systems, and systemic mismanagement in the assessed municipalities (Ruiters and Amadi-Echendu, 2022). These losses indicate the lack of a financially sustainable water service model that can reconcile operational viability with social responsibilities, especially in low-income and historically marginalised urban communities where access is inconsistent and affordability is disputed (Ruiters and Matji, 2016; Smith and Hanson, 2003).

Revenue shortfalls are intensified by prevalent non-payment for services and inadequate financial governance at the municipal level, leading to insufficient resources for infrastructure maintenance and service delivery enhancement (Sitishe et al., 2023). This establishes a self-perpetuating loop where failing infrastructure results in diminished service quality, hence decreasing users' willingness and capacity to pay, which exacerbates municipal financial difficulty (Evaristo et al., 2023). Current cost-recovery models frequently favour affluent users capable of accommodating tariff hikes, while economically disadvantaged households disproportionately suffer from service disruptions and disconnections, thus perpetuating socio-economic inequality and undermining the constitutional obligation to equitable water access (Smith and Hanson, 2003; Cook et al., 2021). This paper asserts that the crisis confronting South Africa's public water supply system is inherently institutional, stemming from governance failings that hinder effective cost recovery and compromise equal access. The text contends that sustainable water service provision necessitates a reorganisation of current governance and financial management structures to improve accountability, transparency, and local responsiveness (Dithebe et al., 2019; Evaristo et al., 2023). By examining the interconnected dynamics of revenue generation, cost recovery, and service sustainability, this research contributes to the broader scholarship on water governance and public service delivery, while offering critical insights into the challenges confronting South Africa's efforts to realise Sustainable Development Goal 6 on clean water and sanitation (Evaristo et al., 2023).

2. Conceptual and Theoretical Framework

The conceptual and theoretical framework for examining water revenue, cost recovery, and sustainability in South Africa's public water supply system has multiple interconnected elements. This framework encompasses discussions on the characterisation of water as a social versus an economic good, the principles of cost recovery and financial sustainability, governance and institutional capacity within public finance theory, and the necessity to reconceptualise water sustainability as a governance concern.

2.1 Water as a Societal Asset vs a Commercial Commodity

The contrast between perceiving water as a social benefit and as an economic good is essential in influencing policy goals and management techniques in South Africa. Water as a social good underscores its significance in advancing fundamental human rights and guaranteeing fair access for all individuals, especially marginalised populations (Ruiters & Matji, 2016). This viewpoint corresponds with the principles enshrined in South Africa's post-apartheid legislation, which seeks to ensure universal access to water services as a fundamental human right (Sinanovic et al., 2005). Conversely, perceiving water as an economic commodity emphasises its market value, defining its distribution through price systems and the laws of supply and demand. The contradictory characteristics of water highlight intrinsic conflicts in governance. Utilising market-based strategies for water pricing can promote conservation and responsible usage, yet may marginalise low-income individuals who cannot afford the costs (Smith & Hanson, 2003). Critics contend that this commodification frequently prioritises commercial incentives over equitable service provision, hence increasing existing inequities across various socio-economic groups (Cartwright et al., 2024; Kerandi, 1969). In South Africa, these divergent ideologies affect water management policy, resulting in inefficiencies and allegations of unfairness, particularly as a substantial segment of the population lacks dependable access to water services (Ruiters & Matji, 2016; Matlala, 2025).

2.2 Financial Sustainability and Cost Recovery in Public Services

The financial sustainability of the public water delivery sector is closely linked to efficient cost recovery procedures. The notion asserts that all users must share the expenses of water services, encompassing operating costs, infrastructural investments, and environmental sustainability efforts (Evaristo et al., 2023). Implementing effective cost recovery measures poses numerous issues in South Africa, where municipalities frequently contend with elevated levels of non-revenue water (NRW) resulting from leakage, theft, and inefficient billing systems (Evaristo et al., 2023; Amusa & Mathane, 2007). Studies demonstrate that municipalities may incur significant income losses, up to billions yearly, due to the undervaluation or mismanagement of water services (Ruiters & Matji, 2016; Sinanovic et al., 2005). Effective cost recovery requires a compromise between affordability for low-income users and the sustainability of water utilities (Ackom et al., 2025). Properly designed user tariffs, especially lifeline rates for essential consumption, can significantly contribute to attaining this equilibrium (Sitishe et al., 2023). Furthermore, reevaluating the scope and efficiencies of public-private partnerships (PPPs) may yield creative funding sources to improve financial sustainability (Ruiters & Matji, 2016).

2.3 Governance, Institutional Capacity, and Public Finance Theory

The governance environment, which includes institutional capabilities, legal frameworks, and financial management systems, is essential for efficient water revenue generation and cost recovery. Theoretical frameworks concerning public finance underscore the critical need of effective governance in guaranteeing the efficient and transparent operation of public utilities (Kerandi, 1969). Inadequate institutional frameworks and inefficient governance structures have historically hindered South Africa's water management, resulting in deficiencies in financial performance and service delivery (Motadi, 2025; Fagbemi & Bello, 2019). New Public Management (NPM) has been implemented in certain regions of Africa as a reform strategy designed to improve public sector efficiency via market-oriented methodologies (Munzhedzi, 2020). The complex interaction between politics and administration frequently obstructs these reforms, resulting in systemic corruption and inefficiencies (Motadi, 2025). The implementation of public finance theory underscores the necessity for a comprehensive framework that amalgamates fiscal responsibility, accountability, and participatory governance to improve water management in South Africa (Matlala, 2025; Samuel et al., 2025). Enhancing institutional capacities, particularly by empowering local governments with economic autonomy and accountability, may improve service delivery and accountability in the water sector (Ruiters, 2013; Olowu, 2012).

2.4 Redefining Water Sustainability as a Governance Concern

Ultimately, addressing water sustainability extends beyond environmental concerns; it is primarily a matter of governance. The notion of water sustainability entails comprehending how political structures and market dynamics can foster an atmosphere conducive to equitable and efficient management of water resources (Institute, 2010). Sustainable water practices cannot be institutionally segregated; they are intricately connected to the governance strategies that regulate public investments, regulatory adherence, and stakeholder involvement. Robust governance frameworks that integrate participatory decision-making procedures strengthen communities, ensuring that local perspectives are essential in policy development (O'Connell & Schot, 2024). Moreover, integrating sustainable water management with overarching developmental goals such as climate resilience and social equity necessitates a systemic governance approach that acknowledges cross-sectoral interconnections (Evaristo et al., 2023; Ruiters & Matji, 2016). As South Africa shifts towards a governance paradigm emphasising openness and stakeholder involvement, reimagining water sustainability through a governance perspective is essential for ensuring the long-term viability of public water services (Kerandi, 1969). The relationship between water as a social and economic asset, cost recovery principles, and governance structures creates a complex environment for South Africa's public water supply system. Effectively addressing these interconnected aspects necessitates a comprehensive approach that acknowledges the complexities and intersections of finance, governance, and social equality in water resource management.

3. Constitutional and Legal Framework Regulating Water Services in South Africa

Comprehending the constitutional and legislative framework regulating water services in South Africa is essential for analysing the relationship between water income, cost recovery, and sustainability within the public water supply system. This framework includes the constitutional right to water access, the distribution of water service responsibilities, the legal instruments regulating water management, the statutory obligations related to tariffs and cost recovery, and the intrinsic conflicts between ensuring equitable access and sustaining fiscal viability.

3.1 The Constitutional Right to Access Water

Section 27 of the South African Constitution guarantees the right to access sufficient water as a fundamental human right. This clause requires the state to implement appropriate legislation and other measures to progressively fulfil this right (Ouweneel et al., 2020). The constitutional acknowledgement of water as an essential necessity highlights its significance for life and health, so establishing it as a social benefit and a central concern for policy formulation. South Africa's dedication is evident in its water legislation, highlighting the government's responsibility to provide fair access to water services, especially in historically marginalised groups (Ouweneel et al., 2020; Imawan, 2023). Furthermore, the Constitution's focus on public engagement corresponds with overarching democratic ideals, aiming to incorporate communities in water management choices (Brown, 2010). The realisation of this right has been obstructed by systemic problems, including insufficient infrastructure and inefficiencies in service delivery, highlighting a disparity between the aspirational legislative framework and its practical execution (Ruiters & Amadi-Echendu, 2022).

3.2 Distribution of Water Services Responsibilities Among Government Spheres

In South Africa, water management duties are assigned across three levels of government: national, provincial, and local. The National Water Act (No. 36 of 1998) creates a framework that enables various levels of government to manage water resources efficiently, specifying the duties related to water delivery, quality control, and conservation (Backeberg, 2005). Nonetheless, practical difficulties emerge from fragmented governance frameworks, when overlapping responsibilities among agencies result in inefficiencies and mismanagement (Ashton et al., 2006). Local government, chiefly accountable for delivering water services, frequently encounters financial limitations, exacerbated by restricted capacity and elevated corruption levels (Motadi, 2025). Specifically, municipalities are tasked with revenue collection, maintenance of infrastructure, and the delivery of essential water services, yet the persistence of inequitable access to resources continues to challenge governance outcomes (Adom & Simatele, 2020; Ruiters & Amadi-Echendu, 2022).

3.3 Legal Framework: National Water Act and Water Services Act

The National Water Act and the Water Services Act (Act 108 of 1997) serve as cornerstone legislative instruments for water governance in South Africa. The National Water Act emphasizes the integrated management of water resources to achieve social equity, economic efficiency, and sustainability while promoting the rights of communities (Backeberg, 2005). This Act outlines the establishment of catchment management agencies, which operate at regional levels to foster stakeholder participation and sustainable resource management practices (Meissner et al., 2016). Conversely, the Water Services Act focuses on the provision of water services and outlines the statutory obligations of water service authorities. It mandates standards regarding the quality of services, affordability, and accessibility, ensuring that municipalities adhere to equitable provision (Pahlow et al., 2015; Nieuwoudt & Backeberg, 2008). These statutory frameworks collectively denote an overarching strategy aimed at redressing historical inequities while promoting sustainable water practices.

3.4 Legal Obligations Relating to Tariffs, Cost Recovery, and Sustainability

The legal framework governing water services incorporates specific obligations regarding tariff-setting and cost recovery. Water service authorities are required to establish tariff structures that not only recover costs but also reflect principles of equity and sustainability (Kithiia & Gamoyo, 2020; This stipulation implies that tariffs must be set at levels that promote the long-term viability of water services while safeguarding access for vulnerable populations (Nieuwoudt & Backeberg, 2008; Ruiters & Amadi-Echendu, 2022). However, implementing cost recovery poses significant challenges. A considerable segment of the population remains unable to pay even nominal fees, leading to tensions between the need for fiscal sustainability and the imperative to deliver universal access (Busari & Ndlov, 2012). The bi-directional relationship between tariff structures and service sustainability emerges as a persistent theme as municipalities grapple with the dual mandate of maximizing revenue while ensuring equitable access (Harvey, 2007; Imawan, 2023).

3.5 Tensions Between Rights-Based Access and Financial Viability

The safeguarding of the constitutional right to water poignantly establishes a conflict between rights-based access and financial viability. With South Africa ranked as a water-scarce country, the reliance on user fees to support infrastructure and sustainability initiatives often contradicts the ethos of equitable access enshrined in the Constitution (Kithiia & Gamoyo, 2020; Backeberg, 2005). The compounding social and economic pressures create scenarios where municipalities must balance the need for revenue against the obligation to provide affordable water to all citizens (Adom & Simatele, 2020; Agholor, 2013). This fundamental conflict necessitates a nuanced approach to water governance that integrates legal, financial, and ethical considerations. Policymakers must seek innovative solutions to harmonize financial sustainability with the moral imperative of universal access, potentially exploring tariffs that account for environmental costs and broader social objectives (Imawan, 2023; Nyundu & -, 2025). Such reconciliation is crucial for creating a resilient and socially equitable water management system that can adapt to both current and future challenges (Adom & Simatele, 2020; Ruiters & Amadi-Echendu, 2022).

The constitutional and legal framework governing water services in South Africa intertwines rights, governance structures, and financial imperatives. A holistic understanding of this framework is essential for addressing the public water supply system's challenges, thereby moving toward achieving a more equitable and sustainable future.

4. Framework for Water Revenue and Cost Recovery Policy

The formulation of a comprehensive policy framework for water revenue and cost recovery in South Africa's public water supply system is essential for ensuring sustainable and equitable access to water services. This framework is guided by national pricing strategies, tariff structures, the Free Basic Water policy, and deficiencies in policy design and implementation capacity.

4.1 National Water Pricing Strategy: Aims and Principles

The National Water Pricing Strategy, as delineated in South African law, encapsulates ideas designed to attain economic efficiency, equity, sustainability, and financial viability in the water industry. The policy acknowledges that water, although a basic human right, must be administered as an economic resource to guarantee its sustainable utilisation (Ruiters & Amadi-Echendu, 2022). The main objectives are as follows:

Cost Recovery

Guaranteeing that the price framework encompasses the operational and maintenance expenses related to water supply and infrastructure. This is crucial to avert the financial strain from being transferred to governmental subsidies or resulting in increased public debt (Ruiters & Amadi-Echendu, 2022; Nyundu & -, 2025). **Equity:** Formulating a pricing system that ensures fair access to water, particularly for marginalised areas, which can be facilitated by strategies like cross-subsidization (LaVanchy & Winter, 2025). **Sustainability:** Promoting conservation and effective utilisation by pricing that include both operational and environmental costs linked to water

extraction and pollution (Cook et al., 2021; Ruiters & Amadi-Echendu, 2022). The pricing plan seeks to balance investment in water infrastructure with ensuring access to essential water supplies for low-income families.

4.2 Tariff Frameworks and Cross-Subsidization Mechanisms

Tariff structures in the water supply sector are essential for achieving cost recovery while addressing the varied requirements of water customers. South Africa utilises multiple tariff types, including graduated tariffs, in which the unit price escalates with increased consumption. This framework theoretically enables affluent households to contribute more, hence subsidising reduced consumption for economically disadvantaged populations (Rabie & Burger, 2019; Cook et al., 2021). Cross-subsidization strategies are essential for attaining fiscal equality. These strategies frequently entail elevated tariffs for commercial users to subsidise reduced tariffs for residential users, especially for disadvantaged people (Sitishe et al., 2023). Notwithstanding these goals, execution continues to be challenging, as demonstrated by ongoing challenges in revenue collection and irregular tariff application among municipalities (Ruiters & Amadi-Echendu, 2022; Maphosa & Mabuza, 2017). Misalignment of prices with operational expenses may result in financial shortfalls, hence exacerbating local governments' capacity to provide dependable water services.

4.3 Free Basic Water Policy and Its Financial Consequences

The Free Basic Water (FBW) policy, implemented in South Africa, provides a lifeline of 6,000 litters of water per household per month at no cost to ensure basic access for all citizens (Smith & Green, 2005; Sinanovic et al., 2005). The policy is praiseworthy in its attempt to mitigate water poverty, although it presents considerable financial ramifications for towns. The expenses related to supplying free basic water might burden municipal budgets, especially in regions where financial sustainability is already compromised by inefficient billing and collection practices (Maphosa & Mabuza, 2017; Taing, 2019). The FBW policy is crucially linked to the overarching objective of financial sustainability in water supply systems. The disparity between policy objectives and municipalities' ability to manage associated costs can intensify inequities, as local governments may prioritise budget reductions over ongoing infrastructural investments, resulting in a decline in water service quality (Smith & Green, 2005; Sinanovic et al., 2005).

4.4 Discrepancy Between Policy Formulation and Implementation Capability

A continual difficulty in South Africa's water management system is the discrepancy between effectively formulated policies and their execution. Despite a progressive legal and regulatory landscape aimed at achieving equitable and sustainable water access, municipalities often lack the capacity, resources, and technical skills necessary for effective application of these policies (Sinanovic et al., 2005; Rabie & Burger, 2019). Capacity Constraints: Many local government authorities struggle with insufficient skills among staff responsible for managing water services and enforcing regulatory frameworks (Sitishe et al., 2023; Ruiters & Amadi-Echendu, 2022).

Infrastructural Deficiencies

A significant portion of the water distribution infrastructure is outdated or poorly maintained, leading to high levels of non-revenue water, which further complicates cost recovery efforts and reflects inadequacies in service delivery (Ruiters & Amadi-Echendu, 2022; Meyiwa & Chasomeris, 2016). **Policy Gaps:** While high-level policies advocate for participatory governance and inclusivity in water management, local execution frequently falls short, resulting in community disengagement and dissatisfaction with services (Cook et al., 2021; Rabie & Burger, 2019).

This mismatch highlights the need for enhanced capacity-building initiatives at the municipal level, focusing on training and resource allocation to support the effective realization of water policies and strategies. The policy framework surrounding water revenue and cost recovery in South Africa is multifaceted, interweaving national strategies with local implementation challenges.

Understanding this framework is vital for addressing water service sustainability while promoting equitable access in a context marked by socio-economic disparities.

5. Institutional Framework and Intergovernmental Obligations

The administration of water resources and services in South Africa is intrinsically linked to the institutional framework that supports governance, financing, and operational duties across several levels of government. As the nation confronts the issues of water shortage, infrastructure deterioration, and the urgent requirement for fair water access, a comprehensive understanding of the intergovernmental roles from national to municipal levels is crucial. This section analyses the functions and duties allocated to various governmental entities, the fragmentation and overlaps present within the system, and the resulting effects on fiscal sustainability.

5.1 The Function of National Government in Water Regulation and Financing

The South African government is pivotal in the regulation of water resources at the national level through laws, including the National Water Act and the Water Services Act. These actions establish the framework for water resource management and guarantee adherence to national requirements for water quality and accessibility (Yimer, 2024; Saah & Musvoto, 2020). The Department of Water and Sanitation (DWS) is responsible for the execution of these policies and is instrumental in funding water infrastructure projects via grants and loans, especially in economically disadvantaged municipalities that face challenges in revenue generation (Hassan & Meyer, 2022). Additionally, the national government encourages local authorities to adopt water conservation strategies via diverse programs. Financial aid frequently depends on towns adhering to sustainability objectives, indicating a shift towards integrated water resource management (Asah et al., 2020). The efficacy of these regulatory frameworks is often compromised by inadequate money and resources at the national level, leading to operational difficulties at the local level (Haffejee & Brent, 2019).

5.2 Provincial Supervision and Assistance Functions

Provinces in South Africa act as intermediaries between national directives and local implementation, offering oversight, technical assistance, and policy direction to municipalities. Provinces are tasked with maintaining compliance with national policies while adapting strategies to address local contexts and requirements. This assistance may encompass capacity enhancement, financial access, and the formulation of provincial water strategies that correspond with overarching national goals (Fanadzo & Ncube, 2018). Provinces have a vital role in the control of water services; yet, they frequently encounter constraints such as bureaucratic delays and insufficient coordination with municipalities (Grimes, 2011). These obstacles may impede the prompt execution of plans and intensify disparities in service delivery among regions. Thus, good provincial oversight is crucial for promoting accountability and efficiency in water resource management.

5.3 Municipal Accountability for Invoicing, Revenue Collection, and Upkeep

Municipalities bear the principal obligation for the direct delivery of water services, encompassing billing, revenue collection, and the upkeep of water infrastructure. This decentralised strategy demonstrates South Africa's dedication to local governance and seeks to tailor services to the specific need of communities (Stolpe et al., 2022). The financial sustainability of these communities is significantly undermined by elevated non-payment rates, inefficient billing systems, and antiquated infrastructure, resulting in wasted revenues that could be reinvested in service provision (Locke, 2024). Research demonstrates that numerous towns face liquidity challenges, lacking the funding to sustain and enhance water systems, resulting in a decline in service quality (Adom et al., 2023). The accumulation of unpaid consumer debts intensifies these issues, leading numerous municipalities to implement elevated charges that disproportionately impact low-income people, consequently worsening inequality in access to water services (Ruiters & Amadi-Echendu, 2022).

5.4 Fragmentation, Overlaps, and Accountability Deficiencies

The water governance structure in South Africa is frequently criticised for its fragmentation, as conflicting jurisdictions and responsibilities may undermine accountability and efficacy. Various governmental bodies may function within identical water basins or localities, resulting in miscommunication and ineffective service provision. This fragmentation affects water resource management and frequently leads to conflicts among stakeholders (McCallum et al., 2019). Moreover, uncertainty in roles and responsibilities can result in accountability gaps, allowing municipal officials to transfer blame for service delivery failures to higher levels of government, so complicating governance dynamics (Hope & Rouse, 2013). Such overlaps might hinder creative water management strategies that necessitate multi-stakeholder engagement, requiring reform initiatives to define roles and promote cooperation across all governance levels.

5.5 Effects of Institutional Discoordination on Financial Sustainability

The absence of coordination among national, provincial, and municipal entities has considerable implications for the financial viability of water services. This conflict leads to ineffective resource allocation, insufficient infrastructure investment, and a failure to successfully implement financial programs (Olarewaju & Msomi, 2021). Reports suggest that insufficient intergovernmental cooperation may result in fund misuse and ongoing financial deficits, creating a cycle of disinvestment that negatively impacts service delivery (Cooper, 2017). Furthermore, the ramifications of institutional disorganisation might ultimately impact wider social and economic advancement. Marginalised populations are often disproportionately affected, with elevated water prices and diminished service quality, thereby compromising the state's obligation to uphold acceptable living standards (Maumoh & Onoja, 2024). Consequently, it is essential to establish a consistent framework that improves intergovernmental cooperation and facilitates sustainable water governance and financing solutions.

The institutional framework regulating water resources in South Africa underscores the intricate interaction of responsibilities among national, provincial, and municipal tiers. A distinct definition of roles and improved coordination at different levels is crucial for promoting efficient governance and financial sustainability in water services. Given the escalating challenges of water shortages and societal injustices, altering the institutional structure is essential for improving the resilience and accountability of the water supply system. By mitigating fragmentation and enhancing intergovernmental collaboration, South Africa may strive for a more sustainable and equitable future in its water resource management.

6. Principal Factors Contributing to Revenue Deficiency and Cost Under-Recovery in South Africa's Public Water Supply System

The public water supply system in South Africa is presently seeing significant difficulties concerning revenue generation and expense recovery. Notwithstanding a constitutional need to ensure equitable water access, various institutional difficulties have led to considerable budgetary deficiencies. This section analyses five principal factors contributing to revenue failure and cost under-recovery: political opposition to cost-reflective tariffs, inadequate municipal billing and credit control systems, non-revenue water and infrastructure losses, a culture of non-payment, and reliance on national transfers and emergency bailouts.

6.1 Political Opposition to Cost-Reflective Tariffs

A major obstacle to successful water pricing in South Africa is the political opposition to the implementation of cost-reflective prices. Politicians frequently encounter pressure from constituents who are acutely aware of price escalations, especially in low-income regions where households find it challenging to afford even little charges for basic services (Meissner & Ramasar, 2014). This resistance is exacerbated by a historical context in which water is regarded as a fundamental human right, resulting in reluctance to impose rates that accurately reflect the true costs of water supply and infrastructure management (Merwe, 2016). As a result, numerous

municipalities implement below-cost pricing strategies to preserve public approval, resulting in inadequately supported and unsustainable water systems (Davies, 2007). Furthermore, political ideologies frequently emphasise rapid access at the expense of long-term sustainability, so deterring essential tariff revisions that may augment revenue collection and secure the financial viability of water services ("OECD Reviews of Innovation Policy: South Africa 2007"). Consequently, municipalities face challenges in recouping operational expenses, leading to infrastructure deterioration and escalating financial shortfalls that impede advancements in sustainable water management.

6.2 Inefficient Municipal Billing and Credit Management Systems

A significant factor contributing to revenue failure is the insufficiency of municipal billing and credit control systems. Numerous towns in South Africa possess insufficient technology capabilities to establish effective billing systems, resulting in elevated billing errors and inefficient collection procedures (Saunders & Limb, 2020). Consequently, significant revenue is forfeited due to erroneous invoicing, unmetered connections, and inadequate follow-up on existing debts (Subramanyam & Marais, 2022). The data regarding delinquent accounts reveals that non-payment is a substantial burden on municipal budgets, with a considerable segment of the population either incapable or disinclined to settle their water bills ("The global economy and democracy in South Africa", 1999). Ineffective credit control procedures compound these challenges, as municipalities lack the means required to pursue collections or establish payment arrangements for financially distressed households. The cumulative effect of these inefficient processes adversely affects financial sustainability in the water service sector, compromising both revenue collection and service delivery (Subramanyam & Marais, 2022).

6.3 Non-Revenue Water, Infrastructure Deficiencies, and Technical Inefficiencies

Non-revenue water (NRW) constitutes a critical element leading to revenue deficiencies in South Africa's public water systems. NRW denotes water generated but unbilled to consumers, arising from both physical losses (such as leaks and infrastructure breakdowns) and apparent losses (including unauthorised consumption or billing discrepancies) (Harries, 2000). Estimates suggest that towns forfeit roughly 36.8% of their generated water as non-revenue water, resulting in considerable financial losses that could be allocated to infrastructure upkeep and development (Bauer, 2024). Infrastructure losses are frequently ascribed to deteriorating pipelines and antiquated water distribution systems, prevalent challenges in numerous communities (Reddy et al., 2022). Technical inefficiencies in maintenance exacerbate NRW concerns, since insufficient proactive maintenance results in increased water loss rates. Addressing NRW necessitates integrated solutions that emphasise both technology enhancements and community engagement initiatives to foster efficient water use and improved leak reporting (Harries, 2000).

6.4 Culture of Non-Payment and Insufficient Enforcement

The widespread culture of non-payment is a significant obstacle to revenue recovery within South Africa's water supply system. This culture is frequently grounded in a confluence of socio-economic elements, encompassing pervasive poverty and a deficit of trust in governmental institutions. Numerous inhabitants in economically disadvantaged regions may regard water costs as exorbitant or inequitable, leading to prevalent payment defaults (Pauw, 2003). Moreover, inadequate enforcement of payment restrictions intensifies the problem. Municipalities often lack the resources or political resolve to enforce rigorous collection techniques, resulting in the assumption that non-payment for water services incurs minimal consequences (Harvey & Jenkins, 1994). This culture not only reduces income collection but also sustains infrastructural deterioration, as insufficient funding impedes towns' capacity to maintain and enhance water systems.

6.5 Reliance on National Allocations and Emergency Financial Assistance

Numerous local municipalities in South Africa demonstrate a significant reliance on national government allocations and emergency financial assistance to maintain fundamental water services. This dependence arises from insufficient internal income production and a lack of effective cost recovery systems (Yakubu et al., 2019). National transfers are frequently erratic and constrained by fiscal limitations, placing towns in vulnerable financial situations during economic recessions or heightened service demand (Venter, 2002). This dependence results in two primary consequences: local governments face diminished autonomy and motivation to enhance their financial conditions, while simultaneously, it may induce systemic instability within the whole water services industry. Dependence on emergency bailouts further diminishes the impetus to enact essential changes and foster sustainable financial governance within local municipalities (Sandambi, 2025).

The interaction of political opposition to cost-reflective tariffs, inadequate billing and credit control mechanisms, elevated non-revenue water levels, a culture of non-payment, and reliance on national transfers poses substantial challenges to the financial viability of South Africa's public water supply system. Resolving these difficulties necessitates a unified effort from all tiers of government to strengthen governance frameworks, augment enforcement mechanisms, and promote community involvement in water management. By implementing integrated strategies that harmonise policy goals with practical operations, South Africa can strive to establish a more resilient and equitable water delivery system.

7. Consequences for Infrastructure Sustainability and Service Delivery

The public water supply system in South Africa faces critical consequences stemming from revenue failures and cost under-recovery. This section explores the impacts these issues have on infrastructure sustainability and service delivery, analysing the patterns of deferred maintenance, service interruptions leading to inequality, fiscal stress on municipalities, and the long-term risks posed to water security and public trust.

7.1 Deferred Maintenance and Infrastructure Decay

Deferred maintenance has culminated in significant infrastructure decay within South Africa's water supply system. Many municipalities have become over-reliant on insufficient revenue streams, leading to an inability to fund urgent maintenance or necessary upgrades to aging water infrastructure (Simelane et al 2020). The situation has been exacerbated by years of underinvestment, where revenue shortfalls hinder municipalities from keeping pace with infrastructure needs. The cumulative effect of these financial constraints has led to deteriorating asset conditions, posing escalating risks of system failures and service disruptions. Infrastructure decay is not merely a technical issue; it has profound social ramifications. Aging pipelines and treatment facilities contribute to leaks, reducing the efficiency of water distribution and increasing operational costs associated with non-revenue water. Technical inefficiencies not only exacerbate water scarcity but also adversely affect the overall quality of the services provided (Park et al., 1998). Without timely and sufficient financial resources, the sustainability of water services and the ability to deliver clean, safe water are critically threatened, raising alarms about the resilience of the water governance framework.

7.2 Service Interruptions and Inequality in Access

Service interruptions resulting from infrastructure decay disproportionately affect low-income communities, perpetuating existing inequalities in access to essential water services. Frequent disruptions and unreliable supply create a cycle of frustration and disenchantment among affected populations, disproportionately impacting the most vulnerable sectors of society (Sperling & Sarni, 2019). Research indicates that communities in poverty-stricken areas often bear the brunt of systemic failures, thereby reinforcing their marginalization and limiting their economic opportunities (Maumela et al., 2025). When service interruptions become a norm rather than an exception, they result in significant disruptions to daily life and hinder socio-economic development. Households may be forced to procure water from unsafe sources, exacerbating

health risks associated with waterborne diseases and leading to larger societal costs in healthcare and lost productivity (Eales, 2010). The growing dissatisfaction stemming from these disparities challenges the legitimacy of local governments and underscores the urgent need for strategic interventions aimed at rectifying service delivery failures.

7.3 Fiscal Stress on Municipalities and Water Boards

The persistent financial inadequacies faced by municipalities exert substantial fiscal stress on the overall system of water governance. This strain manifests as escalating operating deficits, restricting municipalities' abilities to invest in crucial infrastructure projects or deliver quality services sustainably (Tandlich et al., 2014). As municipalities operate under significant debt burdens, their capacity to manage existing resources is compromised, further threatening the fiscal health of water boards that rely on municipal funding to function effectively. The intersection of financial distress and governance creates a precarious scenario wherein water boards may become increasingly reliant on national government interventions and bailouts to maintain basic functions (Rasakanya, 2024). This cycle of financial dependence not only reduces local autonomy but also creates bottlenecks in governance, wherein strategic decision-making is clouded by immediate financial pressures. Without a robust financial foundation, local bodies may struggle to engage in proactive planning and foster the institutional arrangements necessary for sustainable water service delivery (Mercer, 2019).

7.4 Long-Term Risks to Water Security and Public Trust

The implications of revenue failure and cost under-recovery extend well beyond immediate service disruptions; they pose long-term risks to water security and public trust in governance. The reliance on insufficient funding mechanisms, combined with recurrent service interruptions, can contribute to a significant erosion of public confidence in water management systems (Thompson et al., 2021). South African citizens are increasingly aware of the disparities in service quality, leading to a growing discontent with how water resources are managed (Adom & Simatele, 2024). The long-term trajectory of water security hinges on effectively addressing these systemic challenges. Continued financial instability and neglect of infrastructure maintenance generate an unsustainable cycle that threatens not only current access to water but also the capacity to adapt to future demands and climatic changes (Piegdoń et al., 2025). Ensuring sustainable water management requires a concerted effort from all levels of government to embrace accountability, transparency, and public engagement, all of which are crucial for restoring trust and fostering collaborative governance mechanisms aimed at cementing long-term water security.

The consequences of revenue failure and cost under-recovery in South Africa's water supply system present significant challenges to infrastructure sustainability and equitable service delivery. Addressing these interconnected issues is critical for ensuring the long-term resilience and effectiveness of water governance. By investing in infrastructure, improving financial models, and fostering collaboration across government tiers, South Africa can work toward a more sustainable and equitable water future that meets the needs of all its citizens.

9. Strategies for Institutional and Regulatory Transformation

The inefficiencies afflicting South Africa's public water supply system underscore the pressing necessity for institutional and regulatory reform. By tackling the fundamental challenges through targeted strategies, such as clarifying legal cost recovery obligations, reforming tariff-setting and approval processes, bolstering municipal financial governance and oversight, improving intergovernmental coordination, and balancing equity, affordability, and financial sustainability, South Africa can initiate the development of a more efficient and resilient water management framework.

9.1 Legal Elucidation of Cost Recovery Responsibilities

A crucial measure in improving South Africa's water management systems is the explicit legal definition of cost recovery responsibilities. Presently, municipal revenue collection methods are hindered by unclear legislation that do not offer explicit guidance for creating equitable pricing structures that correspond with operating expenses (Amusa et al., 2008). Refining the legislative framework to clearly delineate obligations for cost recovery will enable municipalities to adopt efficient pricing strategies essential for financial sustainability. Moreover, amending laws to incorporate specialised tariff structures that emphasise social fairness, particularly for low-income households, can promote adherence to constitutional mandates while maintaining financial sustainability. Formulating a coherent legal framework for cost recovery will improve accountability and assist local authorities in developing transparent and equitable charging processes, essential for efficient service delivery (Madisha & Khumalo, 2024).

9.2 Revamping Tariff Establishment and Authorisation Procedures

Reforming the tariff-setting and approval processes is essential for creating a viable financial model for South Africa's public water supply systems. Present tariff-setting procedures frequently exhibit a deficiency in openness and neglect to engage critical stakeholders, resulting in rates that inadequately represent the actual costs of service delivery (Dithebe et al., 2019). Adopting a participative strategy that incorporates community feedback, involves diverse stakeholders, and coincides with national policy goals helps cultivate public endorsement for essential tariff modifications. Furthermore, instituting a clear and standardised protocol for tariff approval among municipalities is essential for fostering uniformity and predictability. A clearly delineated regulatory approach would not only optimise operations but also bolster financial planning and user confidence, consequently augmenting revenue stability (Dithebe et al., 2019). This strategy can alleviate concerns regarding price escalations and reinforce community confidence in the management of water resources.

9.3 Enhancing Municipal Financial Governance and Oversight

Enhancing municipal financial governance and monitoring procedures is essential for improving accountability and operational efficiency. Enhancing financial management practices by focused training, capacity-building programs, and the establishment of comprehensive monitoring and evaluation systems will enable municipalities to more effectively oversee their water infrastructure and finances (Seema & Kibuuka, 2017). Moreover, establishing explicit accountability frameworks, encompassing frequent audits and public disclosures of financial performance, can enhance public trust and mitigate unethical practices that obstruct efficient resource management (Fund, 2005). The creation of autonomous financial oversight entities that function transparently and monitor municipal finances can mitigate existing mismanagement difficulties, guaranteeing the effective use of funds designated for water services (Thokoa et al., 2022).

9.4 Improving Intergovernmental Coordination and Accountability

Effective water governance in South Africa requires strong intergovernmental cooperation and accountability systems. Due to the disjointed government structure, fostering coordination among national, provincial, and local levels is crucial for implementing cohesive water policies and guaranteeing uniform service delivery (Maher & McDonald, 2025). Coordination can be accomplished by formal partnerships, consistent communication channels, and collaborative activities that synchronise strategies and resources across various governmental levels. Through the promotion of collaboration, the government may more effectively tackle the structural issues encountered by municipalities, enabling more efficient responses to water crises (Ntshangase et al., 2024). Furthermore, the incorporation of regional water resource management strategies via catchment management authority can improve collaborative governance and promote proactive management of water resources (Akapelwa & Mwange, 2023). This method can enhance resource allocation efficiency and alleviate disputes stemming from competition for water resources.

9.5 Harmonising Equity, Affordability, and Financial Viability

Achieving a balance among equity, affordability, and financial sustainability is a considerable problem in South Africa's water governance. Stakeholders must prioritise the development of equitable tariff structures that account for the varied socio-economic conditions of households while ensuring enough revenue generation (Bi & Traum, 2022). Implementing a tiered pricing approach, in which users incur increasingly elevated charges based on consumption levels, can guarantee that low-income households maintain access to important water supplies at reasonable prices while offsetting expenses through increased tariffs on excessive usage (Mazibuko, 2021). Pricing systems should be supplemented by initiatives that support vulnerable groups in obtaining coverage and enhancing financial literacy, thereby promoting responsibility and underscoring the significance of water as an essential resource. Ultimately, reconciling these conflicting agendas will need dedicated stakeholder involvement and a commitment to comprehending the diverse circumstances and realities encountered by distinct groups. By tackling equity issues while pursuing financial sustainability, South Africa can establish a water governance system that guarantees fair access and responsible resource management. The avenues for institutional and regulatory reform in South Africa's water management system are essential for tackling the structural issues of revenue failure and cost under-recovery. South Africa may develop a more sustainable and equitable water service framework by elucidating legislative requirements, revamping tariff processes, fortifying financial governance, improving intergovernmental coordination, and reconciling equity with financial sustainability. The implementation of these reforms will enhance the resilience of water infrastructure, restore public trust, and promote collaborative management of vital water resources for future generations.

CONCLUSION

This article illustrates that the sustainability dilemma in South Africa's public water supply system is mostly attributed to systemic failings in revenue generation, cost recovery, and institutional governance, rather than absolute water scarcity. The analysis indicated that political opposition to cost-reflective tariffs, inadequate municipal billing and credit control systems, elevated non-revenue water levels due to infrastructure deterioration and technical inefficiencies, and a pervasive culture of non-payment collectively jeopardise municipal financial sustainability. The issues are exacerbated by an overreliance on national transfers and emergency bailouts, undermining local financial sovereignty and postponing essential structural reforms. The results confirm that water sustainability should be primarily regarded as a governance issue, necessitating cohesive institutional frameworks, explicit accountability systems, and legally robust alignment between the constitutional right to water access and the necessity for financial sustainability. In this context, effective reform necessitates regulatory clarification of cost recovery requirements, transparent and equitable tariff-setting procedures, enhanced municipal financial supervision, and greater intergovernmental collaboration. In the future, ongoing policy and legal reform, guided by comparative analysis and continuous assessment, will be crucial to rebuild public trust, protect infrastructure, and guarantee that South Africa's public water supply system remains socially equitable and financially viable amid increasing socio-economic and climatic challenges. A section intended to contain a detailed description of all the methods, materials, collaborators and participants at the study. The protocols used for data acquisition, techniques and procedures, investigated parameters, methods of measurements and apparatus should be described in sufficient detail to allow other scientists to understand, analyse and compare the results. The study subjects and participants should be described in terms of number, age and sex. The statistical methods should be described in detail to enable verification of the reported results. This section could contain a separate sub-section that comprises the explanation of the abbreviated terms used on the study.

REFERENCE LIST

Cartwright, A., Swilling, M., Cullis, J., Walsh, K., and Gcanga, A. (2024). *'Some for all, forever': Investing in universal access to water services in a warming world—the case of South Africa*. Preprints. https://doi.org/10.20944/preprints202407.0311.v1

Cook, J., Brühl, J., and Visser, M. (2021). Distributional statistics of municipal water use during Cape Town's drought: Implications for affordability, conservation, and tariffs. *Water Resources Research*, 57(6). https://doi.org/10.1029/2020WR028219

Dithebe, K., Aigbavboa, C., and Thwala, W. (2019). An appraisal of water infrastructure projects' financing challenges in South Africa. *Proceedings of the International Conference on Industrial Engineering and Operations Management*, 103–110. https://doi.org/10.1108/S2516-285320190000002022

Dithebe, K., Aigbavboa, C., Thwala, W., and Oke, A. (2019). Analysis on the perceived occurrence of challenges delaying the delivery of water infrastructure assets in South Africa. *Journal of Engineering, Design and Technology*, 17(3), 554–571. https://doi.org/10.1108/JEDT-10-2017-0101

Evaristo, J., Jameel, Y., Tortajada, C., Wang, R., Horne, J., Neukrug, H., and Biswas, A. (2023). Water woes: The institutional challenges in achieving SDG 6. *Sustainable Earth Reviews*, 6(1). https://doi.org/10.1186/s42055-023-00067-2

Ruiters, C., and Amadi-Echendu, J. (2022). Economic costs and investment challenges of water infrastructure in South Africa. *Infrastructure Asset Management*, 9(4), 194–206. https://doi.org/10.1680/jinam.21.00014

Ruiters, C., and Matji, M. (2016). Water institutions and governance models for the funding, financing and management of water infrastructure in South Africa. *Water SA*, 41(5), 660–668. https://doi.org/10.4314/wsa.v41i5.09

Sitishe, N., Ntshangase, B., Kloper, R., Lubbe, S., and Msosa, S. (2023). An analysis of the financial viability of municipalities in Free State Province: The case of Mangaung Metropolitan Municipality. *Socioeconomic Challenges*, 7(3), 184–199. https://doi.org/10.61093/sec.7(3).184-199.2023

Smith, L., and Hanson, S. (2003). Access to water for the urban poor in Cape Town: Where equity meets cost recovery. *Urban Studies*, 40(8), 1517–1548. https://doi.org/10.1080/0042098032000094414

Ackom, E., Ocansey, E., & Asamoah, F. (2025). The role of tax system and informal sector in enhancing revenue mobilization in Sub-Saharan Africa. *Journal of Economics Finance and Accounting Studies, 7*(3), 50–63. https://doi.org/10.32996/jefas.2025.7.3.6

Amusa, H., & Mathane, P. (2007). South Africa's intergovernmental fiscal relations: An evolving system. *South African Journal of Economics, 75*(2), 265–292. https://doi.org/10.1111/j.1813-6982.2007.00121.x

Fagbemi, F., & Bello, K. (2019). Foreign direct investment–growth linkage in Sub-Saharan Africa: Is governance a mediating factor? *International Journal of Business Economics and Management, 6*(2), 111–129. https://doi.org/10.18488/journal.62.2019.62.111.129

Institute, I. (2010). *Water governance*. https://doi.org/10.5337/2010.218

Kerandi, A. (1969). Governance agenda for Sub-Saharan Africa: Issues and challenges. *Federal Governance, 5*(1). https://doi.org/10.24908/fg.v5i1.4405

Matlala, L. (2025). Barriers to the institutionalisation of outcome-based approaches in South Africa's public sector. *Africa's Public Service Delivery and Performance Review, 13*(1). https://doi.org/10.4102/apsdpr.v13i1.939

Motadi, M. (2025). Corruption and the public money: The South African perspective. *International Journal of Business Ecosystem and Strategy, 7*(2), 260–269. https://doi.org/10.36096/ijbes.v7i2.779

Munzhedzi, P. (2020). An evaluation of the application of the new public management principles in South African municipalities. *Journal of Public Affairs, 21*(1). https://doi.org/10.1002/pa.2132

O'Connell, A., & Schot, J. (2024). Operationalizing transformative capacity: State policy and the financing of sustainable energy transitions in developing countries. *Green Finance, 6*(4), 666–697. https://doi.org/10.3934/gf.2024026

Olowu, D. (2012). The constitutionalization of local government in developing countries—Analysis of African experiences in global perspective. *Beijing Law Review, 3*(2), 42–50. https://doi.org/10.4236/blr.2012.32006

Ruiters, C. (2013). Funding models for financing water infrastructure in South Africa: Framework and critical analysis of alternatives. *Water SA, 39*(2). https://doi.org/10.4314/wsa.v39i2.16

Ruiters, C., & Matji, M. (2016a). Public–private partnership conceptual framework and models for the funding and financing of water services infrastructure in municipalities from selected provinces in South Africa. *Water SA, 42*(2), 291. https://doi.org/10.4314/wsa.v42i2.13

Ruiters, C., & Matji, M. (2016b). Water institutions and governance models for the funding, financing and management of water infrastructure in South Africa. *Water SA, 41*(5), 660. https://doi.org/10.4314/wsa.v41i5.09

Samuel, U., Ekwunife, F., Ibobo, B., Idamoyibo, H., Atakpa, O., & U., S. O. (2025). Green finance development, governance quality, and environmental sustainability: Evidence from Sub-Saharan Africa. *Southern African Business Review*. https://doi.org/10.25159/1998-8125/15782

Sinanovic, E., Mbatsha, S., Gundry, S., Wright, J., & Rehnberg, C. (2005). Water and sanitation policies for improving health in South Africa: Overcoming the institutional legacy of apartheid. *Water Policy, 7*(6), 627–642. https://doi.org/10.2166/wp.2005.0038

(2019). Untitled. *International Journal of Business Economics and Management, 6*(2). https://doi.org/10.18488/journal.62.2019.62

Adom, R., & Simatele, M. (2020). Systemic and structural challenges to sustainable water management in South Africa. *Journal of Environmental Assessment Policy and Management, 22*(01n02). https://doi.org/10.1142/s1464333222500028

Agholor, I. (2013). The revitalisation of water resources for sustainable agricultural development in South Africa: A review. *Journal of Agricultural Science, 5*(5). https://doi.org/10.5539/jas.v5n5p76

Ashton, P., Patrick, M., MacKay, H., & Weaver, A. (2006). Integrating biodiversity concepts with good governance to support water resources management in South Africa. *Water SA, 31*(4). https://doi.org/10.4314/wsa.v31i4.5135

Backeberg, G. (2005). Water institutional reforms in South Africa. *Water Policy, 7*(1), 107–123. https://doi.org/10.2166/wp.2005.0007

Brown, J. (2010). Assuming too much? Participatory water resource governance in South Africa. *The Geographical Journal, 177*(2), 171–185. https://doi.org/10.1111/j.1475-4959.2010.00378.x

Busari, O., & Ndlov, J. (2012). Leveraging water infrastructure for transformative socio-economic development in South Africa. https://doi.org/10.2495/eid120381

Harvey, P. (2007). Cost determination and sustainable financing for rural water services in sub-Saharan Africa. *Water Policy, 9*(4), 373–391. https://doi.org/10.2166/wp.2007.012

Imawan, R. (2023). The right to water: A comparative study of law in Indonesia and South Africa. *Jambe Law Journal, 6*(2), 103–124. https://doi.org/10.22437/jlj.6.2.103-124

Kithiia, J., & Gamoyo, M. (2020). Motion but no speed: Colonial to post-colonial status of water and sanitation service provision in Mombasa City. *Cities, 107*, 102867. https://doi.org/10.1016/j.cities.2020.102867

Meissner, R., Funke, N., & Nortje, K. (2016). The politics of establishing catchment management agencies in South Africa: The case of the Breede-Overberg Catchment Management Agency. *Ecology and Society, 21*(3). https://doi.org/10.5751/es-08417-210326

Nieuwoudt, W., & Backeberg, G. (2008). Application of economic instruments, tradable licences and good governance for sustainable water conservation. *Water Resources Management Conference Proceedings I*, 15–24. https://doi.org/10.2495/si080021

Nyundu, K., & P. (2025). Accounting for environmental costs in public utility pricing: A case study of Zambia's water sector. *International Journal for Multidisciplinary Research, 7*(4). https://doi.org/10.36948/ijfmr.2025.v07i04.53808

Ouweneel, B., Winter, K., & Carden, K. (2020). How different Cape Town residential suburbs helped avert Day Zero. *H2Open Journal, 3*(1), 118–134. https://doi.org/10.2166/h2oj.2020.018

Pahlow, M., Snowball, J., & Fraser, G. (2015). Water footprint assessment to inform water management and policy making in South Africa. *Water SA, 41*(3), 300–313. https://doi.org/10.4314/wsa.v41i3.02

Ruiters, C., & Amadi-Echendu, J. (2022). Economic costs and investment challenges of water infrastructure in South Africa. *Infrastructure Asset Management, 9*(4), 194–206. https://doi.org/10.1680/jinam.21.00014

Cook, J., Brühl, J., & Visser, M. (2021). Distributional statistics of municipal water use during Cape Town's drought: Implications for affordability, conservation, and tariffs. *Water Resources Research, 57*(6). https://doi.org/10.1029/2020WR028219

LaVanchy, G., & Winter, K. (2025). Water reuse for Cape Town: Investing in resilience to avoid another "Day Zero." *Wiley Interdisciplinary Reviews: Water, 12*(4). https://doi.org/10.1002/wat2.70032

Maphosa, M., & Mabuza, P. (2017). The trade-offs between pro-poor and cost-reflective tariffs in South Africa: A regulatory perspective. *Journal of Economics and Behavioral Studies, 8*(6(J)), 206–215. https://doi.org/10.22610/jebs.v8i6(j).1494

Meyiwa, A., & Chasomeris, M. (2016). Restructuring port governance in South Africa. *Journal of Economic and Financial Sciences, 9*(3), 854–873. https://doi.org/10.4102/jef.v9i3.74

Rabie, B., & Burger, A. (2019). Benefits of transport subsidisation: Comparing findings from a customer perception survey and Most Significant Change Technique interviews. *African Evaluation Journal, 7*(1). https://doi.org/10.4102/aej.v7i1.371

Ruiters, C., & Amadi-Echendu, J. (2022). Economic costs and investment challenges of water infrastructure in South Africa. *Infrastructure Asset Management, 9*(4), 194–206. https://doi.org/10.1680/jinam.21.00014

Sinanovic, E., Mbatsha, S., Gundry, S., Wright, J., & Rehnberg, C. (2005). Water and sanitation policies for improving health in South Africa: Overcoming the institutional legacy of apartheid. *Water Policy, 7*(6), 627–642. https://doi.org/10.2166/wp.2005.0038

Sitishe, N., Ntshangase, B., Kloper, R., Lubbe, S., & Msosa, S. (2023). An analysis of the financial viability of municipalities in Free State Province: The case of Mangaung Metropolitan Municipality. *Socioeconomic Challenges, 7*(3), 184–199. https://doi.org/10.61093/sec.7(3).184-199.2023

Smith, J., & Green, J. (2005). Free basic water in Msunduzi, KwaZulu-Natal: Is it making a difference to the lives of low-income households? *Water Policy, 7*(5), 443–467. https://doi.org/10.2166/wp.2005.0027

Taing, L. (2019). Policy implementation considerations for basic services: A South African urban sanitation case. *Water SA, 45*(4). https://doi.org/10.17159/wsa/2019.v45.i4.7533

Adom, R., Simatele, M., Das, D., Mukalazi, K., Sonwabo, M., Mudau, L., & Zhou, L. (2023). Enhancing climate change adaptation governance through transforming institutions in Kwa-Zulu Natal Province, South Africa. *International Journal of Climate Change Strategies and Management, 16*(4), 413–438. https://doi.org/10.1108/IJCCSM-12-2022-0157

Asah, F., Louw, L., & Williams, J. (2020). The availability of credit from the formal financial sector to small and medium enterprises in South Africa. *Journal of Economic and Financial Sciences, 13*(1). https://doi.org/10.4102/jef.v13i1.510

Bohensky, E. (2008). Discovering resilient pathways for South African water management: Two frameworks for a vision. *Ecology and Society, 13*(1). https://doi.org/10.5751/ES-02301-130119

Cooper, N. (2017). After *Mazibuko*: Exploring the responses of communities excluded from South Africa's water experiment. *Journal of African Law, 61*(1), 57–81. https://doi.org/10.1017/S0021855317000055

Fanadzo, M., & Ncube, B. (2018). Challenges and opportunities for revitalising smallholder irrigation schemes in South Africa. *Water SA, 44*(3), 1–10. https://doi.org/10.4314/wsa.v44i3.11

Grimes, H. (2011). The right to water and its relevance to sustainable water governance. *Proceedings of the Institution of Civil Engineers – Engineering Sustainability, 164*(2), 119–128. https://doi.org/10.1680/ensu.2011.164.2.119

Haffejee, M., & Brent, A. (2009). Evaluation of an integrated asset life-cycle management (ALCM) model and assessment of practices in the water utility sector. *Water SA, 34*(2), 285–292. https://doi.org/10.4314/wsa.v34i2.183651

Hassan, A., & Meyer, D. (2022). Interplay between finance and institutions in the development process of the industrial sector: Evidence from South Africa. *Journal of Risk and Financial Management, 15*(10), Article 453. https://doi.org/10.3390/jrfm15100453

Hope, R., & Rouse, M. (2013). Risks and responses to universal drinking water security. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 371*(2002), Article 20120417. https://doi.org/10.1098/rsta.2012.0417

Locke, K. (2024). Integrated water resources management and the land–water nexus: A South African perspective. *World Water Policy, 10*(3), 755–779. https://doi.org/10.1002/wwp2.12204

Maumoh, I., & Onoja, A. (2024). Climate change policy uncertainty and challenges in carbon emissions for East and Southern African regions. *Transactions in Energy and Sustainability, 1*(1), 24–40. https://doi.org/10.1177/29768632241291418

McCallum, S., Viviers, S., & Ramírez, R. (2019). Investing in water purification infrastructure in an emerging market: Some considerations for impact investors in South Africa. *European Journal of Sustainable Development, 8*(3), Article 63. https://doi.org/10.14207/ejsd.2019.v8n3p63

Olarewaju, O., & Msomi, T. (2021). Factors affecting small and medium enterprises' financial sustainability in South Africa. *African Journal of Inter/Multidisciplinary Studies, 3*(1), 103–117. https://doi.org/10.51415/ajims.v3i1.893

Ruiters, C., & Amadi-Echendu, J. (2022). Public–private partnerships as investment models for water infrastructure in South Africa. *Infrastructure Asset Management, 9*(4), 180–193. https://doi.org/10.1680/jinam.21.00013

Saah, P., & Musvoto, W. (2020). Hindrance to benefit from the potential sources of finance to enhance the growth of small and medium-sized enterprises in South Africa. *Journal of Reviews on Global Economics, 9*, 413–422. https://doi.org/10.6000/1929-7092.2020.09.39

Stolpe, H., Hà, N., & Jolk, C. (2022). *Regional water and land use planning: Systematic planning support*. IntechOpen. https://doi.org/10.5772/intechopen.102713

Yimer, G. (2024). Sustainable finance in Africa: A comparative overview. *Mizan Law Review, 18*(1), 123–160. https://doi.org/10.4314/mlr.v18i1.5

(2007). *OECD reviews of innovation policy: South Africa 2007*. OECD Publishing. https://doi.org/10.1787/9789264038240-en

Bauer, N. (2024). *South Africa's easy election guide: Who to vote for in 2024*. https://doi.org/10.35293/esi.30

Davies, R. (2007). Rebuilding the future or revisiting the past? Post-apartheid Afrikaner politics. *Review of African Political Economy, 34*(112). https://doi.org/10.1080/03056240701449737

Harries, P. (2000). The theory and practice of race: The Swiss Mission in the late nineteenth and early twentieth centuries. *Le Fait Missionnaire, 9*(1), 41–54. https://doi.org/10.1163/221185200x00045

Harvey, C., & Jenkins, C. (1994). Monetary and financial policy in South Africa: Redistribution through the financial system? *IDS Bulletin, 25*(1), 10–16. https://doi.org/10.1111/j.1759-5436.1994.mp25001003.x

Meissner, R., & Ramasar, V. (2014). Governance and politics in the upper Limpopo River Basin, South Africa. *GeoJournal, 80*(5), 689–709. https://doi.org/10.1007/s10708-014-9589-z

Merwe, J. van der. (2016). An historical geographical analysis of South Africa's system of accumulation: 1652–1994. *Review of African Political Economy, 43*(147). https://doi.org/10.1080/03056244.2015.1049521

Pauw, J. (2003). The politics of underdevelopment: Metered to death—How a water experiment caused riots and a cholera epidemic. *International Journal of Health Services, 33*(4), 819–830. https://doi.org/10.2190/KF8J-5NQD-XCYU-U8Q7

Reddy, P., Wissink, H., & Kariuki, P. (2022). *Coalition building and municipal governance in South Africa: Implications for municipal leadership and service delivery*. https://doi.org/10.36615/9780639745701

Sandambi, N. (2025). *The giant sleeping in SADC countries*. https://doi.org/10.31235/osf.io/8czkf_v1

Saunders, C., & Limb, P. (2020). *Historical dictionary of South Africa*. https://doi.org/10.5771/9781538130261

Subramanyam, N., & Marais, L. (2022). Making Mangaung Metro: The politics of metropolitan reform in a South African secondary city. *Urban Studies, 59*(14), 2893–2911. https://doi.org/10.1177/00420980211065895

Venter, A. (2002). The politics of social protection in South Africa: Reflections on establishing a welfare state. *Acta Academica, 34*(2), 109–137. https://doi.org/10.38140/aa.v34i2.763

Yakubu, Z., Loganathan, N., Hassan, A., Mardani, A., & Štreimikienė, D. (2019). Financial and economic determinants of sustainable economic growth in Egypt, Nigeria and South Africa. *Journal of International Studies, 12*(4), 160–176. https://doi.org/10.14254/2071-8330.2019/12-4/11

Akapelwa, K., & Mwange, A. (2023). Theories, principles, opportunities and challenges of local government financing: A comprehensive review of literature. *International Journal of Multidisciplinary Research and Growth Evaluation, 4*(5), 774–781. https://doi.org/10.54660/ijmrge.2023.4.5.774-781

Amusa, H., Mabunda, R., & Mabugu, R. (2008). Fiscal illusion at the local sphere: An empirical test of the flypaper effect using South African municipal data. *South African Journal of Economics, 76*(3), 443–465. https://doi.org/10.1111/j.1813-6982.2008.00205.x

Bi, H., & Traum, N. (2022). *Unconventional monetary policy and local fiscal policy* (Research Working Paper No. RWP 22-15). Federal Reserve Bank of Kansas City. https://doi.org/10.18651/rwp2022-15

Dithebe, K., Aigbavboa, C., & Thwala, W. (2019). An appraisal of water infrastructure projects' financing challenges in South Africa. In *Proceedings of the International Conference on Industrial Engineering and Operations Management* (pp. 103–110). https://doi.org/10.1108/S2516-285320190000002022

Dithebe, K., Aigbavboa, C., Thwala, W., & Oke, A. (2019). Analysis on the perceived occurrence of challenges delaying the delivery of water infrastructure assets in South Africa. *Journal of Engineering Design and Technology, 17*(3), 554–571. https://doi.org/10.1108/JEDT-10-2017-0101

International Monetary Fund. (2005). *El Salvador: Report on the observance of standards and codes—Fiscal transparency module* (IMF Country Report No. 05/67). https://doi.org/10.5089/9781451834734.002

Madisha, M., & Khumalo, P. (2024). Intergovernmental relations and implementation of social housing policy in Gauteng Province, South Africa. *International Journal of Research in Business and Social Science, 13*(4), 388–402. https://doi.org/10.20525/ijrbs.v13i4.3257

Maher, C., & McDonald, B. (2025). Introduction to the issue. *Public Finance Journal, 2*(1), 3–6. https://doi.org/10.59469/pfj.2025.54

Mazibuko, G. (2021). Local government: Getting the South African municipal finances right. *Information Management and Business Review, 12*(4), 1–11. https://doi.org/10.22610/imbr.v12i4(i).3148

Ntshangase, B., Makole, K., & Msosa, S. (2024). Overcoming the socio-economic challenges to good governance: Streamlining cooperative governance model. *Socioeconomic Challenges, 8*(4), 19–30. https://doi.org/10.61093/sec.8(4).19-30.2024

Seema, N., & Kibuuka, P. (2017). Innovative financing mechanisms for government to leverage private sector investment in infrastructure for sustainable development in South Africa: A case study in the water sector. *Public and Municipal Finance, 6*(3), 33–44. https://doi.org/10.21511/pmf.06(3).2017.04

Thokoa, R., Nadioo, V., & Herbst, T. (2022). An exploration of internal branding at the National Treasury of South Africa. *South African Journal of Business Management, 53*(1). https://doi.org/10.4102/sajbm.v53i1.2593