



POLICY BRIEF

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THE SILENT DRAIN: TACKLING HIGH NON-REVENUE WATER IN COMMUNITY-MANAGED RURAL WATER SUPPLY SYSTEMS

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Executive Summary

Community-managed rural water supply systems play a critical role in extending water access to communities with limited access to water services in Kenya. However, many such systems are undermined by persistently high levels of non-revenue water (NRW) – water that is produced but not billed or paid for – which erodes financial sustainability, constrains maintenance, and weakens service reliability.

This policy brief draws on a case study of the Sirembe Community Water and Sanitation Project (SICOWAP) in Siaya County, Kenya, where NRW is locally estimated at approximately 75%. This is almost four times the sector benchmark of 20%, and significantly above the national average of 44%. The study was conducted under the Ecological Sustainability of Rural Water Systems (EcoRural) Project, funded by the IHE Delft Water and Development Partnership Programme.

The findings reveal that high NRW is not solely a technical problem. It reflects the interaction of reactive maintenance practices, weak financial controls, fragile operational data systems, and governance constraints that limit enforcement. Addressing these drivers requires coordinated reforms across four areas: Preventive maintenance, hybrid county

oversight, financial governance, and incremental professionalisation of technical functions. This should be supported by targeted action from county governments, national regulators, and development partners.

Background

Community-managed rural water supply systems have been widely promoted as a cost-effective and participatory model for extending water services to rural populations that have limited access to water services in sub-Saharan Africa. Under this model, communities assume responsibility for day-to-day operation and maintenance once infrastructure is constructed, with the expectation that local ownership will improve service sustainability. Governments and development partners have invested heavily in rural water schemes under this framework.

Despite these investments, many rural water systems still face high rates of non-functionality and service disruption, often within only a few years of installation. Persistent failure is increasingly linked not only to technical limitations but also deeper governance and institutional weaknesses, including limited local management capacity, weak accountability mechanisms, and collective-action challenges in managing shared water resources.

Water service provision is a devolved function under the Constitution of Kenya (2010). The Water Act (2016) makes county governments responsible for oversight of all community-managed water schemes and for providing financial subsidies for operations and maintenance. Despite this legal mandate, many counties have not established effective oversight models, leaving community committees to manage complex infrastructure with minimal external support.

This policy brief is grounded in the case of SICOWAP in Siaya County, which illustrates how governance and institutional challenges manifest in practice through high NRW, reactive maintenance, and chronic financial constraints. It draws on research conducted under the EcoRural Project – a multi-country, interdisciplinary initiative implemented in Kenya and Ghana under the IHE Delft Water and Development Partnership Programme.

Sirembe Community Water and Sanitation Project (SICOWAP)

Sirembe, located in the Gem Sub-County of Siaya County, has a population of 4,862. The community faces significant water supply challenges, which are further exacerbated by its heavy reliance on agriculture for livelihoods. These challenges impact

health, education, and economic activities in Sirembé. SICOWAP, a community self-help group, was established in 2004 as part of an HIV/AIDS intervention programme focused on improving public health, particularly for schoolchildren. In line with its mandate to improve the health of community members, SICOWAP also operates water supply services to provide clean and safe water to the community.

The infrastructure SICOWAP uses for its water services consists of a 50-metre borehole that has a yield of 15m³ per hour, and an overhead 52,200 -litre capacity storage tank. Water is primarily distributed through 661 household connections and six water kiosks located at Barkomeno, Sirodho, Uhonya, and Ujimbe. In addition to overseeing water abstraction, storage, and distribution, SICOWAP is also responsible for maintaining the entire water infrastructure and collecting payments for the water services provided. This community management model is fraught with challenges. One of the most pressing challenges is NRW, which significantly impacts the financial viability and subsequently the operational efficiency of the system.

Problem Statement

Although Kenya has expanded rural water infrastructure under community-based management (CBM), many community-managed schemes struggle to maintain reliable and financially viable services. Key challenge is persistently high non-revenue water, due to leaks and bursts, faulty or absent metering, weak record-keeping, unbilled authorised consumption, and unauthorised water use. This challenge is rarely addressed systematically once schemes are handed over to communities.

At the national level, NRW in Kenya is estimated at 44%. This is more than double the sector benchmark of 20%, resulting in an estimated annual financial loss of Sh12.37 billion.

High NRW erodes revenue, constrains maintenance budgets, weakens service reliability, and undermines the sustainability that CBM was intended to secure.

The case of SICOWAP illustrates how these structural weaknesses manifest at scheme level. Local operational estimates suggest NRW levels of approximately 75%, significantly exceeding national averages. This high loss rate reflects the interaction of technical inefficiencies, fragile financial management systems, and governance constraints that limit enforcement and accountability.

Without policy measures that address these interrelated drivers, community-managed rural water systems risk continued infrastructure deterioration, declining revenue, and erosion of user trust.

Key Findings

Evidence from SICOWAP reveals how high NRW emerges from the combined effect of technical, financial, and governance weaknesses operating simultaneously.

1. Reactive Maintenance and Technical Losses

Maintenance practices are predominantly reactive, organised around a fix-on-failure approach. Repairs are initiated only after breakdowns or visible service interruptions. Routine inspections, systematic leak detection, and preventive maintenance are rarely undertaken due to limited technical capacity, lack of appropriate tools, and the absence

of dedicated maintenance budgets. Visible pipeline leaks, ageing infrastructure, and faulty or bypassed meters contribute to significant physical water losses that accumulate undetected over time.

2. Weak Operational Data Systems

Water production and consumption data are inconsistently recorded, often manually and in incomplete logbooks. Meter readings are not systematically reconciled with billed volumes, and kiosk sales are rarely matched against pumped or stored quantities. These data gaps prevent the committee from accurately quantifying NRW or identifying loss points within the distribution system, making targeted intervention difficult.

3. Financial Governance Gaps

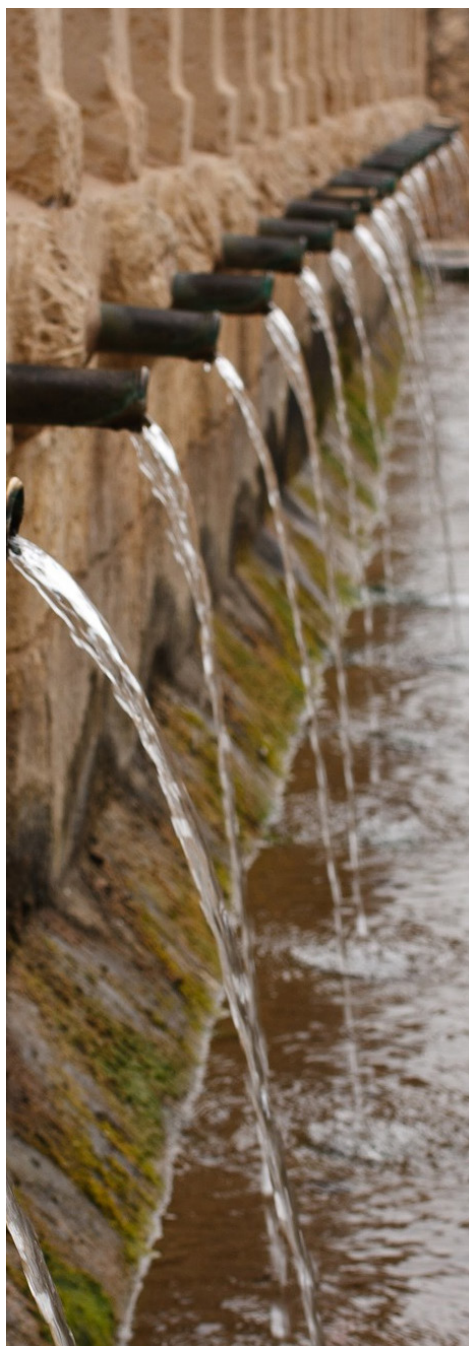
Billing and revenue collection systems lack transparency and standardisation. Household meters are frequently faulty, absent, or bypassed, while flat-rate billing practices in some cases remove incentives for efficient water use. These weaknesses constrain revenue collection and reduce the funds available for maintenance, creating a self-reinforcing cycle of deterioration and financial shortfall.

4. Governance and Enforcement Constraints

Local power dynamics and social relationships significantly shape the enforcement of payment and connection rules. Committee members reported reluctance to sanction neighbours, relatives, or influential community members, citing concerns about social conflict. This contributes to tolerated non-payment, informal connections, and weakened financial discipline — patterns consistent with broader collective-action challenges documented in the

governance literature. These enforcement constraints point to the need for external oversight support beyond what community committees can realistically provide alone.

Taken together, these findings demonstrate that high NRW at SICOWAP is not solely a technical problem. It reflects the interaction of infrastructure limitations, weak financial controls, and constrained enforcement capacity — a combination that requires an integrated policy response.



Policy Options

Reducing NRW in community-managed rural water systems requires policy responses that address the interaction between technical performance, financial governance, and local enforcement capacity. Four strategic reform pathways emerge from the SICOWAP evidence and wider sector literature.

Option 1: Institutionalised Preventive Maintenance and Operational Data Systems

This pathway involves formalising preventive maintenance standards and minimum operational data requirements across community-managed schemes. Shifting away from reactive fix-on-failure practices toward routine inspections, structured leak detection, and systematic reconciliation of production and billing data would significantly reduce physical losses and improve NRW visibility.

This option is most viable where community-managed schemes demonstrate minimum organisational stability and can access periodic technical support from county authorities or licensed utilities. Implementation requires trained personnel, funding for inspection equipment, and county-level coordination capacity. Schemes in earlier stages of infrastructure deterioration are the most promising candidates for this pathway.

Option 2: Hybrid Governance and Structured County Oversight

A second pathway involves introducing hybrid governance arrangements that retain community operational roles while strengthening county-level oversight. Under this model, county governments or licensed utilities would provide structured supervision through reporting require-

ments, technical backstopping, and regular performance reviews focused on NRW reduction.

This approach directly addresses enforcement gaps and defuses the social and political costs of local rule enforcement, which are difficult to manage within purely community-led systems. The Water Act (2016) provides a legal foundation for this model. Key implementation challenges include the risk of dependency where county technical capacity is itself limited, and the need for clearly defined roles between community committees and county authorities.

Option 3: Strengthened Financial Governance and Revenue Protection

A third pathway focuses on reinforcing financial accountability mechanisms. Standardised tariff frameworks, traceable digital payment systems, separation of technical and financial responsibilities, and minimum financial reporting standards can reduce revenue leakage and improve the predictability of maintenance funding.

This option is particularly relevant where weak financial management and discretionary billing practices are the primary drivers of NRW-related revenue loss. Transition costs for digital payment systems may be significant for low-revenue schemes, and adoption will require accompanying training and change management support from county authorities or development partners.

Option 4: Incremental Professionalisation of Technical Functions

A fourth pathway involves targeted professionalisation of selected technical functions — including meter management, system diagnostics, and major infrastructure repairs through certified technicians or contracted service providers, while community committees retain governance and customer-facing roles.

This incremental approach strengthens technical performance without requiring full transfer of management to utilities or private operators, preserving community ownership while addressing capacity gaps. Sustainability depends on scheme revenue levels, and shared-service arrangements across multiple schemes may offer a more cost-effective model for smaller systems.

Recommendations

Based on the findings from SI-COWAP and broader sector evidence, the following recommendations are proposed for county governments, national regulators, and development partners.

- 1. Institutionalise preventive maintenance and operational data standards:** County governments should embed routine inspection protocols and minimum operational data requirements within formal oversight frameworks for community-managed schemes. Structured reporting on NRW levels should be a standard condition of county support and scheme registration.
- 2. Formalise hybrid governance arrangements:** The Water Act (2016) framework should be used to define the roles, reporting obligations, and performance expectations of both community

committees and county oversight bodies in NRW management. Clear accountability mechanisms should be established to ensure county oversight is substantive rather than administrative.

- 3. Strengthen financial governance and revenue protection:** Community-managed schemes should be required to adopt traceable payment systems and standardised financial reporting as conditions of county support. Transitional technical assistance should be provided to facilitate adoption, particularly for schemes with limited administrative capacity.
- 4. Support incremental professionalisation of technical functions:** County governments should facilitate access to certified technical services through shared-service arrangements that pool resources across multiple schemes, reducing scheme-level technical dependence while preserving community governance structures.

Conclusion

High non-revenue water in community-managed rural water systems is not merely a technical problem. It is a governance and institutional failure with direct consequences for the financial sustainability and service reliability of rural water supply across Kenya. The case of SI-COWAP demonstrates that NRW of approximately 75% reflects the accumulated effect of reactive maintenance, weak financial systems, and enforcement constraints that interact in ways no single technical intervention can resolve.

Sustainable NRW reduction requires coordinated reforms across governance, finance, technical capacity, and county over-

sight — reforms that are viable within Kenya's existing legal and institutional framework under the Water Act (2016). The four policy options presented in this brief provide a practical and scalable reform agenda that county governments can adopt progressively, beginning with the areas of greatest institutional readiness.

The cost of inaction is not abstract. Continued high NRW means continued revenue erosion, deferred maintenance, deteriorating infrastructure, and declining public trust in the very systems on which millions of rural Kenyans depend for daily water access. By adopting integrated and evidence-based policy reforms, county governments can transform community-managed water schemes into more resilient and sustainable service delivery models, contributing to equitable water access across rural Kenya.

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