



WATER SAFETY SUMMARY

from source to cup for all in Kisumu

The Delegated Management Model of water supply has dramatically increased access to and affordability of safe water for low-income areas of Kisumu City over the last few years. However, service reliability and water quality still need to be assured. While water quality tests at the point of supply deem the water safe, contaminated water is found to varying extents at taps and point of use. The current testing regime does not clearly indicate the source of contamination. Users found water service providers slow to respond to complaints and quality issues. This policy brief is based on Practical Action's field experience and research in Kisumu, providing recommendations for strengthening water safety in Kisumu's Delegated Management Model (DMM).

RECOMMENDATIONS

- **Improve accountability of the service providers to customers**, providing information to users about the performance of the service and the enforcement mechanisms that will be enacted if the service does not meet agreed norms.
- **Improve the water quality testing regime** by identifying new critical test points. This will better reflect the Delegated Management Model set-up and potential contamination points, within a wider Water Safety Plan to assess the risks to water safety identified by Practical Action and others.
- **Promote good point-of-use water treatment and safe water storage for households** to ensure that when water is stored, it remains safe to drink.

WATER QUALITY AND CONTAMINATION

Kisumu's Delegated Management Model (DMM) of water supply aims to improve water supply in the city's low-income settlements. The DMM involves a range of stakeholders with different roles and responsibilities including the Kisumu Water and Sanitation Company (KIWASCO), Master Operators (MOs), small independent providers (SIPs), and individual households. In 2008, only 31 per cent of people in Kisumu were being served with piped water (WASREB, 2010). Over the last three years, expansion of the DMM in the Nyalenda and Obunga informal settlements has seen access to piped water increase from 60 per cent to 89 per cent. In addition, water is supplied by independent vendors from privately owned boreholes and wells.

Water quality in the network. The Water Services Regulatory Board (WASREB) reported that 95 per cent of water supplied by KIWASCO was safe.¹

95 %

of water supplied by KIWASCO was safe

25 %

of taps on the network were supplying contaminated water

However, an independent water quality test found that 25 per cent of taps on the KIWASCO pipe network were supplying contaminated water (Ayalew et al., 2014). The current testing regime is not able to identify the cause and location of the contamination. KIWASCO tests are carried out three times a week at the two treatment plants, as well as at 35 fixed sampling points across the network. WASREB's Water Quality and Effluent Monitoring Guidelines mandate that samples should be representative of different water sources and points at which water is obtained by consumers. The guidelines state that tests should be made 'at the most unfavourable sources or places in the supply system, particularly points of possible contamination'. However, this is difficult because KIWASCO's maps of the water supply distribution network and water source points are not up to date.

Water quality at point of use. It is common for Kisumu residents to use multiple sources of water for drinking, washing, and cooking. Intermittent piped water supply encourages people to store water at home to meet demand, which can increase the risk

of contamination, particularly if there is insufficient chlorine residue (Diep et al., 2017). It is difficult for customers to determine the source and quality of water supplied by water vendors. They may inadvertently assume that it is the same standard as that supplied by KIWASCO, which is not always the case. Once at home, storage increases the risk of contamination. Samples taken from household water storage in Kisumu found that, irrespective of the original water source, significant numbers were microbiologically contaminated (100 per cent in one study in Kisumu) (Ayalew et al., 2014) while only 55 per cent of households treated their drinking water (Oyaya et al., 2019).² In some cases, the cost of treatment exceeds the cost of the water itself.

Many times, water comes with too much chlorine thus [it's] not palatable. Sometimes it is smelly and brown (resident of Nyalenda A).

Damaged pipes and customer complaints. In some cases, Kisumu residents complain of visibly dirty water coming out of the taps, likely due to a burst pipe or contaminant ingress. Residents of Nyalenda A, Nyalenda B, and Obunga informal settlements complain of pipes not being fixed quickly, poor complaint response procedures, and confusion about responsibilities where the water service providers (KIWASCO and the Master Operators) were performing below expectation (Otieno, 2019). At community level there is a lack of trust in both KIWASCO's water quality testing and the water quality in Lake Victoria, one of the sources used by KIWASCO.

THE WAY FORWARD

The Delegated Management Model has improved access to affordable, more reliable, and better quality water for low-income areas in Kisumu while reducing non-revenue losses for the water provider (from 50 per cent in 2011 to 31 per cent in 2019). It does, however, introduce some complexity in assuring service reliability and quality with different responsibilities along the supply chain (see Table 1).

Our recommendations aim to build better water safety for DMM users in low-income settlements, with improved customer-service provider relationships.

Improve accountability of service providers to customers

Accountability in general includes providing the service, providing information about the performance of the service, and enforcement mechanisms if the service does not meet agreed norms. Under a delegated model, establishing accountability



Users need to be confident that water they collect is clean.

Table 1 Responsibilities of different stakeholders in the water supply chain, DMM system, Kisumu

Water chain	Source	Distribution (primary)	Distribution (community)	Collection (water kiosk)	Secondary distribution	Household
Service providers	KIWASCO	KIWASCO	Master Operator	Master Operator	Small independent providers	Households
Role	Water treatment	Bulk water supply & maintenance	Water supply & minor maintenance	Water supply	Water supply	Consumer
Water quality standard exists?	Yes, all water supply providers must test water quality in all networks against the national water quality standards (KS 05-459)				Unclear if KS 05-459 applies	
Water quality tested?	Yes	Some	Some	Some	Unclear	Unclear
Water quality communicated to public	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear
Potential contamination points/risks	Insufficient dosing and animal contamination	Damaged pipe network and low water pressure	Damaged pipe network, low water pressure and poor installation of household connections	Damaged pipe network	Multiple water sources	Multiple water sources Poor water storage practices
Possible mitigation measures	Improved water safety planning	Improved water safety planning and maintenance	Improved water safety planning, maintenance, enforcement of technical standards for household connections	Improved water safety planning	Improved continuity of supply from KIWASCO	Improved point-of-use water treatment and storage practices

between the end user and the lead provider (KIWASCO) can be difficult as there is no direct relationship. To build accountability relationships between all stakeholders, water providers should clearly communicate with customers about who is responsible for what. KIWASCO, as the lead provider, should present regular, accessible public information to all users about the performance of the service. WASH NGO partners can also support the community to benchmark water service providers' performance using social accountability tools, such as community scorecards or citizen report cards, embedding this as standard practice.

A priority area for customers is improving the responsiveness of service providers to complaints and damaged pipes. To build trust, KIWASCO, MOs, and SIPs should clarify, and if necessary streamline, the procedure for residents and water users to raise complaints. Information on the number of complaints received, resolved, and the response times should be shared with users. A warning system should be developed to alert users in the event of a water safety failure such as a broken pipe.

Improve the water quality testing regime

The County Public Health Department with the water service providers (KIWASCO, MOs, and SIPs) and the

WASH NGO Network should review the water quality testing regime. This should be amended in the light of a wider Water Safety Plan (WSP) assessing risks to water safety and security such as poorly performing network infrastructure, household storage and treatment practices, and intermittent water supply. The aim would be to ensure an adequate number and distribution of sample points and regular sampling. KIWASCO's network maps should be reviewed and updated as the DMM expands, and particular attention paid to testing at point of sale by MOs and SIPs, and point of use in households.

Water users should be meaningfully engaged in the development of WSPs and water sampling schedules, with an emphasis on including women, vulnerable and marginalized groups, and disabled people. If the training and laboratory capacity of Public Health Officers and the County Health and Sanitation department is under resourced to achieve this, this should be addressed in planning and budget allocation.

Promote good point-of-use water treatment and safe water storage

Measures to support safe water storage at home are needed to ensure that when water is stored, it is safe to drink. Water storage at home is common given that supply can be intermittent,

or because water has to be fetched from a water vendor. Improving point-of-use water quality should not be seen as a complete solution, but as a way of empowering households to manage risks. It is important to acknowledge that storage and point-of-use treatment by households increases the cost and time burden of accessing safe water and is a symptom of the level of supply.

For safe household storage, water should be stored in plastic, ceramic, or metal containers with a lid or cover that discourages users from placing potentially contaminated items, such as hands, cups, or ladles, into the stored water. The container should have a spigot or small opening to allow easy and safe access to the water without inserting hands or objects into the container and should be a size appropriate for the household water treatment method. A clay pot with

100 %

of stored household water was contaminated in one study

a lid or a plastic 20-L jerry can are simple and cost-effective options. In parallel to addressing the intermittent supply problems that cause households to store water, a behaviour change communication campaign should be developed and implemented to ensure that if water is stored, it is safe to drink. This should target key household behaviours such as safe water storage, including the proper cleaning of water storage containers, point-of-use

treatment, and hygienic water handling practices.

Conclusion

Ensuring households have adequate, affordable, reliable access to safe water is a building block for development. During the COVID-19 pandemic, having sufficient water for washing hands (and drinking) has been underlined as fundamental in protecting people from the disease. The DMM system

in Kisumu has been instrumental in dramatically increasing rates of access. However, to achieve its full potential, systems of governance and assuring water quality need to be realigned. This will reap benefits in terms of consumer confidence and preventing the spread of diseases.

Notes and References

1. Zero detection of thermotolerant coliforms per 100 ml.
2. Weighted average calculated based on data from the three informal settlements.

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About Practical Action

We are an international development organization putting ingenious ideas to work so people in poverty can change their world. Our vision is for a world that works better for everyone.




We help people find solutions to some of the world's toughest problems, including challenges made worse by catastrophic climate change and persistent gender inequality.

We believe in the power of small to change the big picture. And that together we can take practical action to build futures free from poverty.

Big change starts small.

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