

Can NRW reduction programmes lead to improved services for the poor?

Reducing non-revenue water (NRW) is a common development goal for water utilities, but does it help the poor? In Antananarivo (Madagascar), reducing NRW losses is helping the utility JIRAMA to free up water resources that are being used to supply low-income communities.



Leakage detection training in Nairobi, Kenya, where WSUP is supporting a similar NRW reduction programme.

The Madagascan water utility JIRAMA struggles to provide water to its existing customers in Antananarivo (Tana). Water production is inadequate to meet growing demand, and Tana's ageing network has physical losses estimated at 12 million m³ per year. In low-income districts, many residents rely on unimproved water sources, or on community kiosks which provide water for only a few hours a day. As part of a wider capacity development programme, WSUP is supporting JIRAMA with NRW reduction, with the primary aim of freeing up water to increase supply to low-income communities.

JIRAMA's NRW reduction programme

NRW comprises both physical losses (due to leaks) and commercial losses (unpaid bills, and water that is unbilled for reasons including poor metering or theft). The first phase of JIRAMA's NRW reduction programme has prioritised leakage reduction. Following the International Water Association's best practice guidelines for NRW reduction,¹ the network is being divided into District Meter Areas (DMAs). Two pilot DMAs were chosen for the first phase, Sabotsy and Alasora. These are mixed-income peri-urban districts in which about 40% of people currently depend on community water kiosks. This first phase of the programme involved equipment installation (including a pressure management system in Sabotsy), coupled with training and capacity development in continuous flow measurement, non-visible leak location, and pressure control. In addition, a customer survey helped JIRAMA assess commercial losses and better understand consumption patterns. In parallel with these location-specific interventions in Sabotsy and Alasora, the programme has involved city-wide components including staff training and development of NRW management systems.

Potential pro-poor benefits: direct impacts of NRW reduction in low-income districts

- Improved pressure → Improved continuity
- Improved continuity → Reduced kiosk queuing times*
- Improved pressure → Improved water quality
- Improved pressure, continuity, quality → People encouraged to use the piped supply rather than poor-quality non-piped supplies

* In Tana, queuing at water kiosks is primarily a problem for people living in the central parts of the city, not in peri-urban districts where other unimproved water sources are available.

Potential pro-poor benefits: longer-term impacts of citywide NRW reduction strategies

- Better understanding of network flows and consumption patterns → Facilitates better planning and management
- Improved profitability in poor districts → Leads to prioritisation of investment in poor districts
- Water resources freed up → Available for unserved areas
- City-wide revenues increased → Available for pro-poor investment

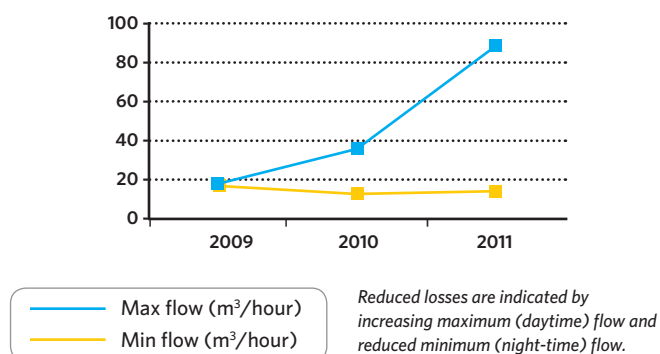
¹ Farley M & Trow S (2003) *Losses in Water Distribution Networks: A Practitioner's Guide to Assessment, Monitoring and Control*. IWA Publishing.

Installation of the pressure management system in Sabotsy has resulted in reduced physical losses (see Figure 1 overleaf) and greatly improved continuity of water supply (24 hours per day versus only 3 or 4 hours previously). This has enabled JIRAMA to supply several new kiosks in Sabotsy; furthermore, we expect the improved continuity to favour use of kiosks (as opposed to unimproved sources). Direct impact in the pilot districts is only one aspect of this programme; the primary focus is to achieve wider, longer-term impacts. Overleaf, we discuss these impacts in more detail.

NRW Tana assessment to date

As noted, the primary focus of this programme is on long-term impacts. The programme is ongoing, and the full impacts will not be seen for some time. However, initial benefits are already beginning to emerge.

Figure 1. Flow trends for Sabotsy 2009-2011, indicating reduced physical losses.



Water savings and increased utility revenue

Early results from Sabotsy and Alasora (Figure 1) indicate a clear improving trend in physical water losses. In Sabotsy, JIRAMA's monthly sales have increased by about 8,000 m³ as a result of improved pressure management, leading to a 20% increase in total revenue (about \$3,000 per month).

The Infrastructure Leakage Index (ILI) is a measure of the ratio of real losses to unavoidable losses; higher values indicate high leakage. ILIs in Sabotsy and Alasora, measured in 2010, were around 11 and 6 respectively. The ILI for Tana as a whole is around 14, classed as 'poor'. If a 'good' value (ILI between 0 and 4) could be achieved city-wide, an estimated 23,000 m³ of water would be saved per day (70% of total physical losses), representing about \$2.9 million increased revenue each year, and enabling improved supply to many of the peri-urban districts that are currently unserved or underserved.

Currently, JIRAMA is extending its NRW reduction programme into an area of Tana's Western Zone, where there are clear potential gains to be had (current ILI 13); unlike the first phase fully funded by WSUP, this phase is being 30% financed by JIRAMA. In addition, JIRAMA has recently set up an NRW reduction unit for Tana, and is developing a nationwide urban NRW reduction strategy.

Maximising pro-poor impact

JIRAMA's ongoing NRW reduction programme is clearly improving operational capacity and commercial viability, and is freeing up water resource that can then be used to improve supply for poor consumers. However, JIRAMA is under strong pressure to increase supply to all consumers, not just the very poor. WSUP has therefore argued for specific metrics of pro-poor service provision, and JIRAMA has recently made a formal commitment to the following citywide goals:

- increased number of poor people served as a result of increased allocation of water resources
- increased investment in network expansion to unserved areas
- increased hours per day of service to poor consumers
- reduced distance to water kiosk for kiosk-dependent consumers

As at June 2011, there are grounds for cautious optimism: despite serious resource constraints, JIRAMA is strongly committed to pro-poor service provision. In part this is thanks to the strong working relationship between WSUP and JIRAMA, as expressed in a Professional Services Agreement: by supporting NRW reduction and other aspects of business management, WSUP has been able to influence policy much more effectively than by simply offering to "help serve the poor".

Credits: This Practice Note was researched and written by Sylvie Ramanantsoa, Julie Ranaivo and Pippa Scott, with review inputs from Baghi Baghirathan, Alan Etherington, Guy Norman, Jo Parker, and Sam Parker. Coordination: Gemma Bastin. Design: AlexMusson.com. Version 1, July 2011.