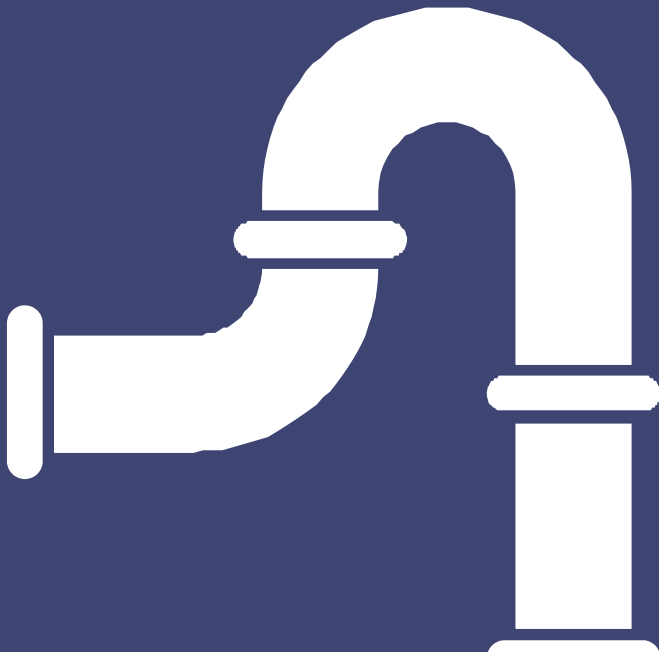


# BEST PRACTICE



## NRW Revolving Fund as a Stepping Stone to Safely Managed Water Services in Nakuru County

The District Metered Area (DMA) approach to locate, quantify and reduce NRW losses is an international 'best practice' that is endorsed by the IWA. [VEI research](#) reveals that this typically requires an investment of € 30-75 per connection, depending on the Commercial (Apparent)/ Physical (Real) losses volume ratio. This Best Practice note advocates for: i) larger '(operational) investment' budgets to improve the water use *efficiency* (SDG 6.4) - in infrastructure development programmes that tend to focus more on expanding network coverage (SDG 6.1), and ii) the establishment of Revolving Funds to (co-)finance the required interventions internally with generated cost savings and revenue increments.



## Challenge

With water utility expenditure concentrated on meeting growing water demand (i.e. new connections), budgets for 'small but smart' investments in NRW reduction measures (production/bulk/consumer meters, gate/air release/pressure reducing valves, telemetry, leak detection equipment etc.) are often very small, despite good potential Return on Investment (RoI). As a result, NRW levels increase, revenues decrease and operational costs gradually increase, the Operating Cost Coverage ratio dwindles, and debt financing capacity to finance large-scale investment is compromised.

Serving 400.000+ residents in Nakuru (one of the fastest growing cities in East Africa), NAWASSCO embarked on an ambitious NRW reduction agenda under the *ACP-EU Water Facility WOP (2012-15)* with [VEI](#). Encouraging results were achieved in a small pilot DMA as presented in [this](#) IWA publication. This triggered a first incremental reduction in NRW at company-level from 45% to  $\pm 40\%$  during the 4-year project duration. Under the *RVO - Sustainable Water Fund 'PEWAK' WOP (2016-2020)*, the hydraulic isolation of the 5 supply zones was completed and illegal water use was curtailed with the help of two dedicated consumer/water meter inspection teams that vigilantly followed up on suspected and reported water theft by consumers and (former) staff (some of whom were complicit) in exchange for a € 20 reward. As a result revenue levels increased by  $\pm 8\%$  on average between 2014 and 2022 - stimulating utility management to scale-up the approach in the (Eastern) zone with the highest NRW volume. Under the *WaterWorx (WWX) - 1 WOP (2017-20)*, small DMAs (of 500-700 consumers) were established to assess the Physical/Commercial loss volume ratio through Minimum Night Flow (MNF) measurements. The large number of detected (in)visible leaks triggered the replacement of water distribution pipe sections and service connections (PVC) with high quality HDPE. With a 100% grant from the project, the NRW volume in the Eastmore, Mawanga and St. Mary DMAs was reduced by 88.000 m<sup>3</sup>/year - hereby recovering the € 30k investment ([a 100% grant](#)) within a year.



## COP6 Water Distribution



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# Approach

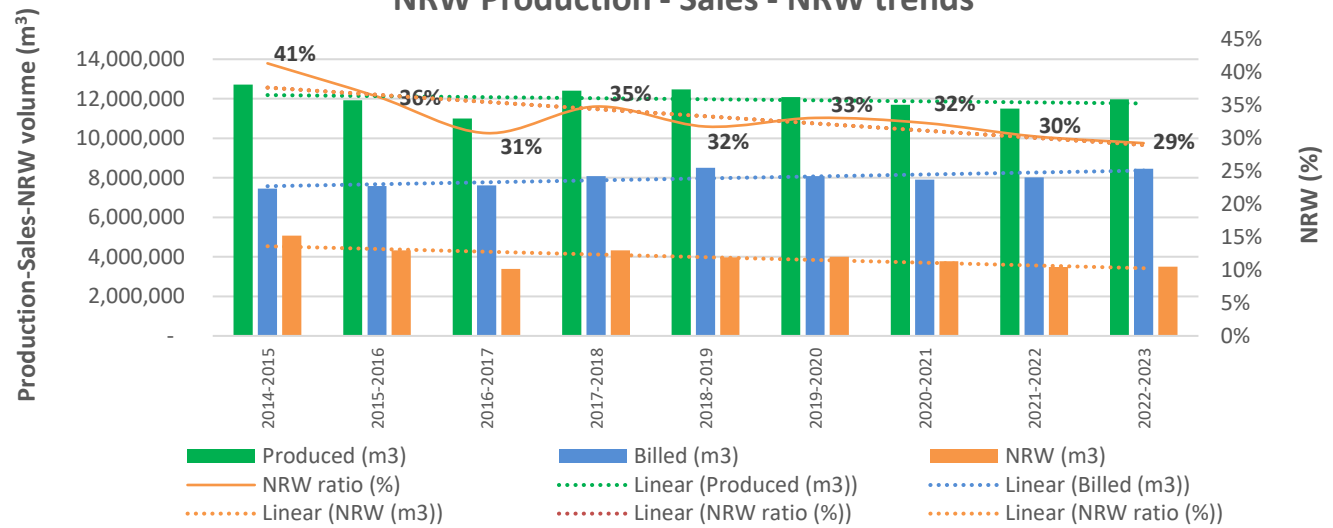
Encouraged by the 'demonstrated business case' of the 'DMA approach', NAWASSCO agreed to gradually increase its co-financing contribution under [WaterWorX-2 WOP \(2022-26\)](#) as outlined in the table on the right - hereby 'ploughing back' generated cost savings and revenue in a 'Revolving Fund' to further scale-up the approach with internally generated resources. This reflects the growing 'maturity level' of the NRW-related working processes which senior management has facilitated over the years.

Where the first ACP-EUWF WOP supported the *establishment* of a full-fledged GIS (of the water distribution network), training and coaching support under WWX-2 WOP focus on GIS *utilisation* i.e. the development of a hydraulic model to correlate the location of recurring leaks consumer complaints (e.g. about low pressure levels) with the simulated flow/pressure regime.

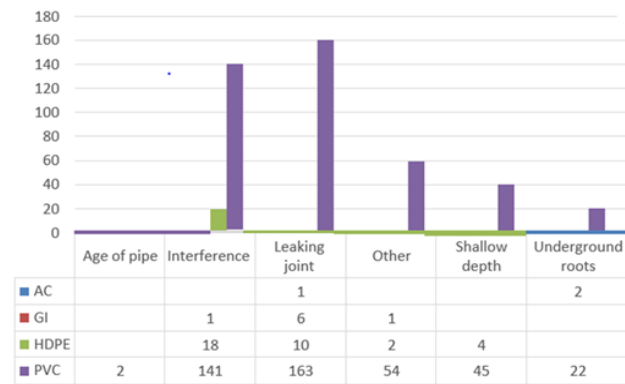
# Results

With a 60%/40% WWX-2 WOP/NAWASSCO co-financing contribution, intensive leak repair and line replacement efforts (see text box) reduced the NRW from 36% to 30% (4,360 m<sup>3</sup>/month). With 70% of this volume consisting of reduced physical losses, sustainably repaired leaks provided first-time Basic and/or incremental progress towards Safely managed access by approximately 10.000 people (4,360 m<sup>3</sup>/month \* 12 months per year / 365 days per year / 50 L/capita/day). This is reflected in a 14% increase (31.640 m<sup>3</sup>/month) in the System Input Volume and 24% increase (36.030 m<sup>3</sup>/month) in water Sales. By dividing the monetary value of the reduced Physical losses (with the marginal cost of produced water: € 0.56/m<sup>3</sup>) and Commercial losses (with the average price of sold water: € 0.72/m<sup>3</sup>) in a 1-year period with the investment sum, the 'paypack period' (return on investment) is (achieved within) only 14 months!

## NRW Production - Sales - NRW trends



WWX2-NRW Project	NRW Investment	Responsible Entity
Year 1 (2022)	€50,000	WWX/Utility -60%/40% of €50,000
Year 2 (2023)	€50,000	WWX/Utility -40%/60% of €50,000
Year 3 (2024)	Savings from Year 1	Utility 100%
Year 4 (2025)	Savings from Year 1 & 2	Utility 100%
Year 5 (2026)	Savings from year 1, 2 & 3	Utility 100%





## Success factors


The establishment of a dedicated NRW team (supported by a senior long-term NRW expert on the ground), the allocation of the required financial (budget) resources, and moral support by senior management are the main contributing factors to success. The gradual performance improvement over a 10+ year period also underlines the need for long-term WOPs in achieving systemic change.

## Conclusions


There is good Return on Investment in reducing Non Revenue Water, particularly when levels exceed 30% (of System Input Volume). The investment cost per DMA connection varies based on the established Physical/Commercial losses volume ratio during the intervention. The scale-up of the 'DMA approach' utility-wide calls for increased prioritization of 'small but smart (operational) investment' to improve water use efficiency (SDG6.4) in infrastructure development programmes that predominantly focus on expanding network coverage (SDG6.1). This case study demonstrates how Revolving Funds can be effectively used to finance these interventions with internally generated resources - as a stepping stone to large-scale funding by local and international financing institutions.

## Documentation

You can access a more detailed PPT capturing the approach and achieved results by 3 utilities under the WWX-2 WOP (including results for NAWASSCO presented in this 'Best Practice Note') in the Knowledge Library of Water Distribution Community of Practice (see the hyperlink to the Global WOPs Community of Practitioners in the text box bottom-right).

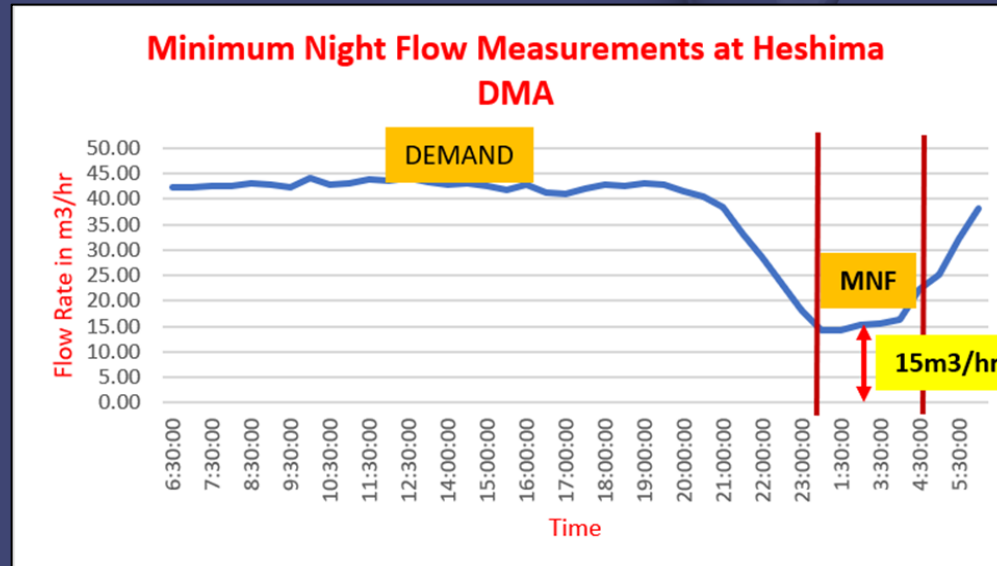



NAKURU WATER AND SANITATION SERVICES COMPANY LIMITED



LEGEND.	SIZE	LENGTH (M)
* Bulk meters	DN 40	2009.87
Pipeline	DN 50	3134.99
	DN 63	5627.52
	TOTAL	10772.38

EPSG:32637  
WGS 84 / UTM zone 37N  
EPSG:7030  
meters  
Universal Transverse Mercator (UTM)



The scale-up of the the DMA approach to utility-level also requires the gradual introduction of telemetry to facilitate online flow and pressure monitoring as outlined in [this](#) 'Best Practice Note' (case study VEI - PDAM Semarang Indonesia).

[Here](#) you can register -free of charge- on the Global WOPs Community of Practitioners (Workplace) platform hosted by GWOPA.