

ACTION PLAN FOR REDUCTION OF NRW

NAGAR PALIKA PARISHAD, MATHURA

March, 2017



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Action Plan to Reduced Non – Revenue Water (NRW)

1. Introduction

The Urban population in India is growing at a rate faster than ever and the services in cities are crumbling to the increasing pressure. Along with other key services of the city, water supply is also struggling to maintain adequacy and quality of services provided to the citizens. Few of the major problem faced by Water Supply sector is the large proportion of water loss in distribution and poor collection of revenue for the supplied water. This situation is common in majority of Indian cities and has led to inefficient performance of water supply services.

To overcome the challenge the city needs to identify the losses and take necessary measures to reduce it. Non-Revenue Water (NRW) is a good indicators to measure the losses and high NRW typically indicate a poorly managed water utility.

Non-revenue water (NRW) is water which is supplied (produced and purchased) but not paid for, including technical losses (leakage), not billed water, Illegal connections, poor water meter performance and inaccurate reading and accounting of metered flows. The impacts of NRW are the loss of scarce resources and financial revenue in a cash strapped water sector.

The central government under AMRUT mission has aimed to reduce the NRW in cities, and has included the same as a priority reform.

The extent of NRW in Mathura city is not accurately measured, however it has been estimated approximately 60% i.e. 63.6 MLD. This is unacceptable and for that reason UMC has prepared a Concept Note on Plan of Action to reduce the NRW less than 20% in next 5 years.

1.1 Measurement of NRW

This indicator highlights the extent of water produced which does not earn the utility any revenue. This is computed as the difference between the total water produced (ex-treatment plant) and the total water sold expressed as a percentage of the total water produced.

NRW comprises of:

- a) **Unbilled Authorized Consumption:** Consumption which is authorised but not billed, such as public stand posts water used by the utility for operational purposes, water used for firefighting, and water provided for free to certain consumer groups;
- b) **Commercial (or apparent) losses:** Apparent losses such as illegal water connections, metering inaccuracies, customer meter under registration, data handling errors and theft of water in various forms;
- c) **Physical (or real) losses:** Real losses which are leakages in the transmission and distribution networks from all parts of the system and overflows at the utility's reservoirs. They are caused by poor operations and maintenance, the lack of active leakage control, and poor quality of underground assets.

For the purpose of measurement of NRW following data is required:

Action Plan for Reduction of NRW

1. Total water produced and put into the transmission and distribution system (Million Litres per Day): a)

Daily quantities should be measured through metering, and records on the transmission and distribution system should be maintained. The total supply for the month should be based on the aggregate of the daily quantum. Only treated water input into the distribution system should be measured. If water is distributed from multiple points, the aggregate of that quantity should be considered. This quantum should include water purchased directly from any other sources and put into the distribution system, if any. Water may have been purchased from neighbouring ULBs, Cantonment Boards, etc.

2. Total water sold (Million Litres per Day): b)

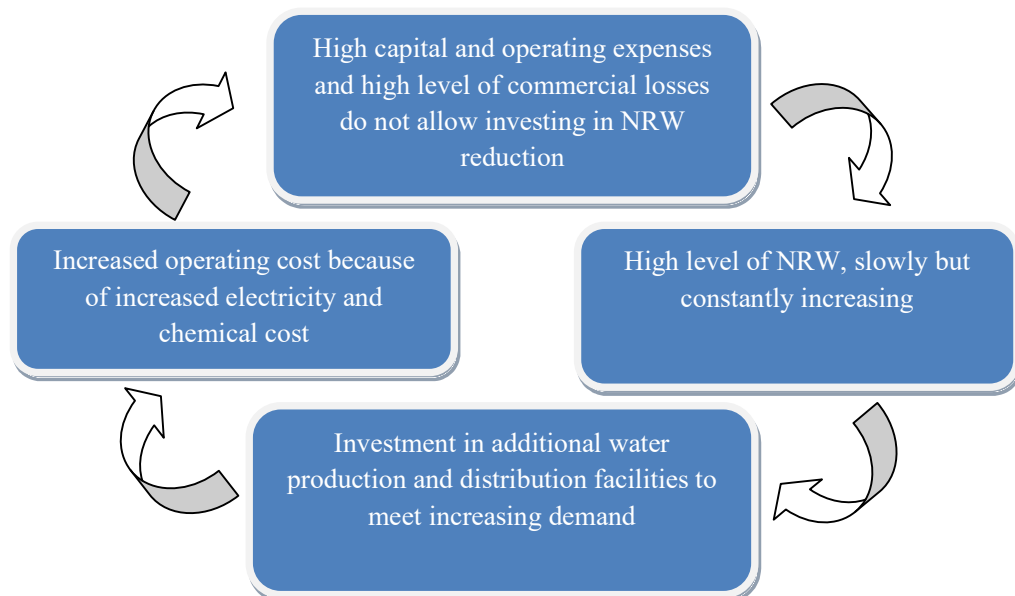
The actual volume of water supplied to customers who are billed for the water provided. Ideally, this should be the aggregate volume of water consumed as per which consumers have been billed. However, in the absence of a complete and functionally effective metering regimen, alternate methods of measurement need to be evolved, with lower but acceptable levels of reliability.

$$\text{NRW} = [(a - b)/a] * 100$$

1.2 General Theory of loss

The majority of funds for management of water supply system comes through the revenue generated from collection of user charges. Because of a large share of NRW, the revenue generated is very less, thus reducing the scope for improvement in the system. This becomes a vicious circle that does not address the core problem.

Figure 1: Vicious Cycle of NRW



Action Plan for Reduction of NRW

2. Action Plan to Reduce NRW

The key to developing a strategy for management of non – revenue water (NRW) is to gain a better understanding of the reasons for NRW, and the factors which influence its components. Then techniques and procedures can be developed & tailored to the specific characteristics of the network & local influencing factors, to tackle each of the components in order of priority. Causes of failure need to be investigated in depth at the stage of action planning & implementation & a more systematic approach needs to be developed.

Following are the components of NRW.

1. Leakage
2. Connections
3. Authorized consumption free of charge
4. Water for Municipal Services
5. Water Metering

SERVICE LEVEL BENCHMARKS

Extent of Non-Revenue Water

Performance Indicator		
Indicator	Unit	Definition
Extent of Non-Revenue Water	%	This indicator highlights the extent of water produced which does not earn the utility any revenue. This is computed as - Difference between total water produced (ex-treatment plant) and total water sold expressed as a percentage of total water produced. NRW comprises a) Consumption which is authorized but not billed, such as public stand posts; b) Apparent losses such as illegal water connections, water theft and metering inaccuracies; c) Real losses which are leakages in the transmission and distribution networks.

Data Requirements		
Data required for calculating the indicator	Unit	Remarks
a) Total water produced and put into the transmission and distribution system	million litres per day (or) month	Daily quantities to be measured through metering, and records should be maintained. Total supply for the month should be based on aggregate of daily quantity. Only treated water input into the distribution system should be measured. If water is distributed from multiple points, aggregate of that quantity should be considered. This quantum should include water purchased directly from any other sources and put into the distribution system, if any. Water may have been purchased from neighbouring ULBs, Cantonment Boards, etc.
b) Total water sold	million litres per day (or) month	Actual volume of water supplied to customers who are billed for the water provided. Ideally, this should be the aggregate volume of water consumed as per which consumers have been billed. However, in the absence of a complete and functionally effective metering regimen, alternate methods of measurement need to be evolved, with lower but acceptable levels of reliability.
Non Revenue Water	%	Non-Revenue Water = [(a - b) / a]*100

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Service Level Benchmarks for Mathura Nagar Palika Parishad

Total Volume of Water Produced	=	58.18
Total Volume of Water Billed	=	44
i.e. Extent of Non Revenue Water (NRW)	=	$(58.18 - 44) \times 100 / 58.18$
	=	24.37 %