Monitoring Performance in Non Revenue Water Management

By
Babatope Babalobi, Institutional Development Specialist, SUWASA

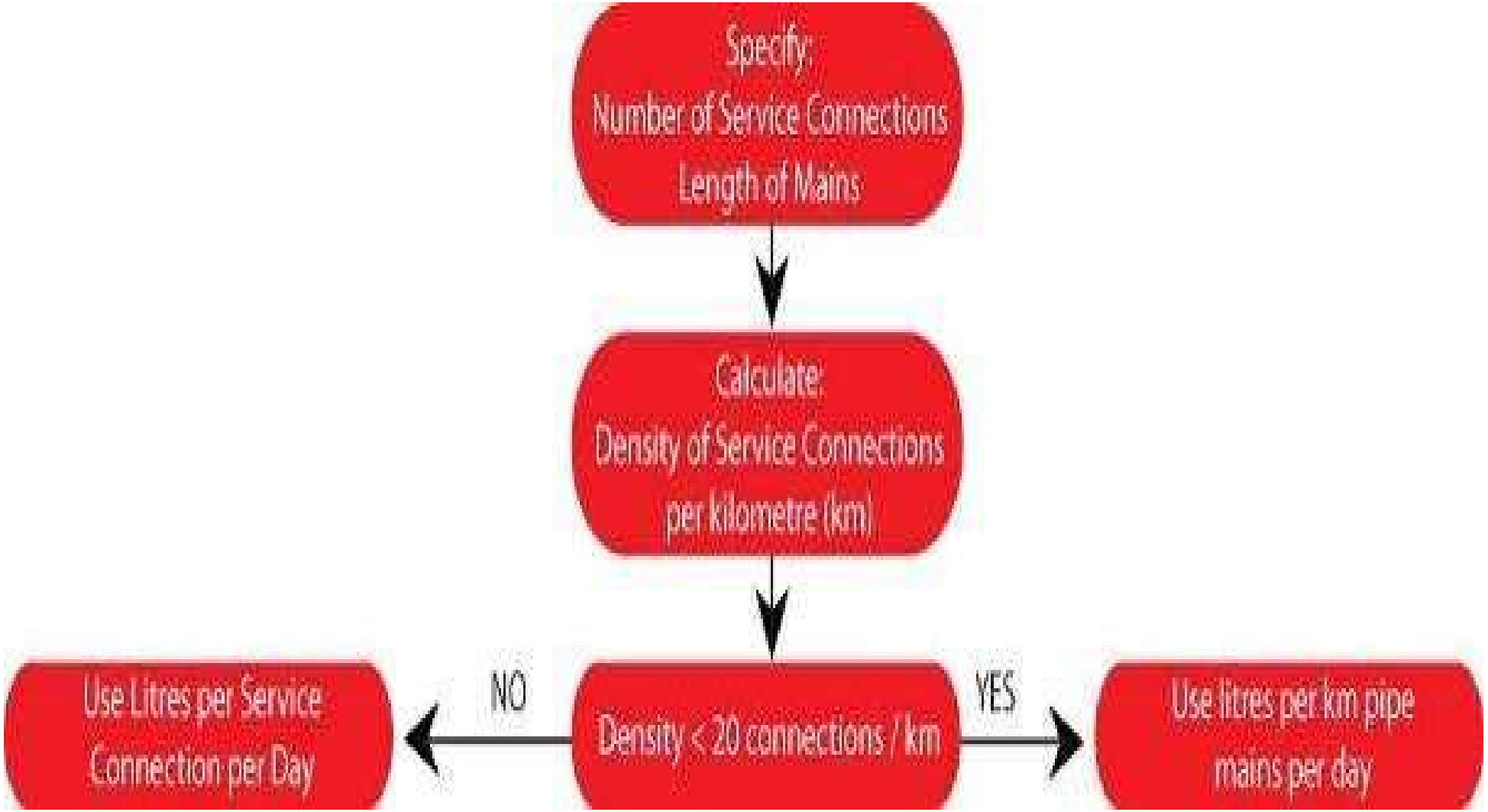
Workshop on Non Revenue Water Management
Abakaliki,, Ebonyi State April 2, 2015

Defining NRW

- NRW is a measure of a utility's efficiency in terms of both operational performance and financial performance.

Why do we need to monitor performance?

- • Better understand water losses
- • Define and set targets for improvement
- • Measure and compare performance with other water utilities
- • Develop standards
- • Monitor compliance
- • Prioritise investments


Specify:
Number of Service Connections
Length of Mains
Calculate:
Density of Service Connections
per kilometre (km)
Density < 20 connections / km
NO
YES
Use Litres per Service
Connection per Day
Use litres per km pipe
mains per day

RECOMMENDED INDICATORS FOR PHYSICAL LOSSES AND NRW

Function	Level	Code	Performance Indicator	Comments
Financial: NRW by Volume	**1** (Basic)	**Fi 36**	Volume of NRW **[% of System Input Volume]**	Can be calculated from simple water balance, not too meaningful
Operational: Real Losses	**1** (Basic)	**Op 24**	**[liters/service connection/day]** or: **[liters/km of mains/day]** *(only if service connection density is < 20/km)*	Best of the simple 'traditional' performance indicators, useful for target setting, limited use for comparisons between systems
Operational: Real Losses	**2** (Intermed.)	**-**	**[liters/service connection/day/m pressure]** or: **[liters/km of mains/day/m pressure]** *(only if service connection density is < 20/km)*	Easy to calculate Indicator if the ILI is not known yet, useful for comparisons between systems
Financial: NRW by cost	**3** (Detailed)	**Fi 37**	Value of NRW **[% of annual cost of running system]**	Allows different unit costs for NRW components, good financial indicator
Operational: Real Losses	**3** (Detailed)	**Op 25**	**Infrastructure Leakage Index (ILI)**	Ratio of Current Annual Real Losses to Unavoidable Annual Real Losses, most powerful indicator for comparisons between systems

PHYSICAL LOSS TARGET MATRIX

Technical Performance Category		ILI	Physical Losses [Litres/connection/day] (when the system is pressurised) at an average pressure of:				
			10 m	20 m	30 m	40 m	50 m
Developed Countries	A	1 - 2		< 50	< 75	< 100	< 125
	B	2 - 4		50-100	75-150	100-200	125-250
	C	4 - 8		100-200	150-300	200-400	250-500
	D	> 8		> 200	> 300	> 400	> 500
Developing Countries	A	1 - 4	< 50	< 100	< 150	< 200	< 250
	B	4 - 8	50-100	100-200	150-300	200-400	250-500
	C	8 - 16	100-200	200-400	300-600	400-800	500-1000
	D	> 16	> 200	> 400	> 600	> 800	> 1000

Commercial losses

The indicator uses a base value of 5% of water sales as a reference, and the actual commercial loss value is calculated against this benchmark.

This is the Apparent (Commercial) Loss Index (ALI).

$$\text{Apparent Loss Index (ALI)} = \frac{\text{Apparent loss value}}{\text{by 5\% of water sales}}$$

Utility managers can use the matrix to guide further network development and improvement:

- Category A—Good. Further loss reduction may be uneconomic and careful analysis needed to identify cost-effective improvements.
- Category B—Potential for marked improvements. Consider pressure management, better active leakage control, and better maintenance.
- Category C—Poor. Tolerable only if water is plentiful and cheap, and even then intensify NRW reduction efforts.
- Category D—Bad. The utility is using resources inefficiently and NRW reduction programmes are imperative.

Key Messages

- Use any of the Indicators above
- Utility managers use performance indicators to measure progress in reducing NRW, develop standards, and prioritise investments.
- The best performance indicator for physical losses is the Infrastructure Leakage Index (ILI).
- A commonly used performance indicator for commercial losses is the Apparent Loss Index (ALI). Currently, the best commercial loss indicator is to measure it as a percentage of authorised consumption.
- Utility managers must develop and implement monitoring programs to ensure their NRW targets are being met.

Key messages

- An independent team should be established to audit progress.
- The implementation of the NRW strategy is a long-term process, often requiring four to seven years to complete.
- Continuous training in NRW monitoring is necessary
- The NRW audit team should also establish yearly targets for each department using one or more of the indicators, and monitor progress on a monthly progress. The number and
- *Utilities should continuously monitor NRW*