



ITU Regional Workshop on “Prospects of Smart Water Management (SWM) in Arab Region” Khartoum-Sudan, 12 December 2017

Integrated modeling of water demand and supply
The role of hydro economic models

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Outline and goal

Hydro – economic model

ICT growth enabling opportunities for managing water resources

Water management challenges met in developing countries

IoT based model for managing water demand and supply

Benefits

Conclusions

Goal

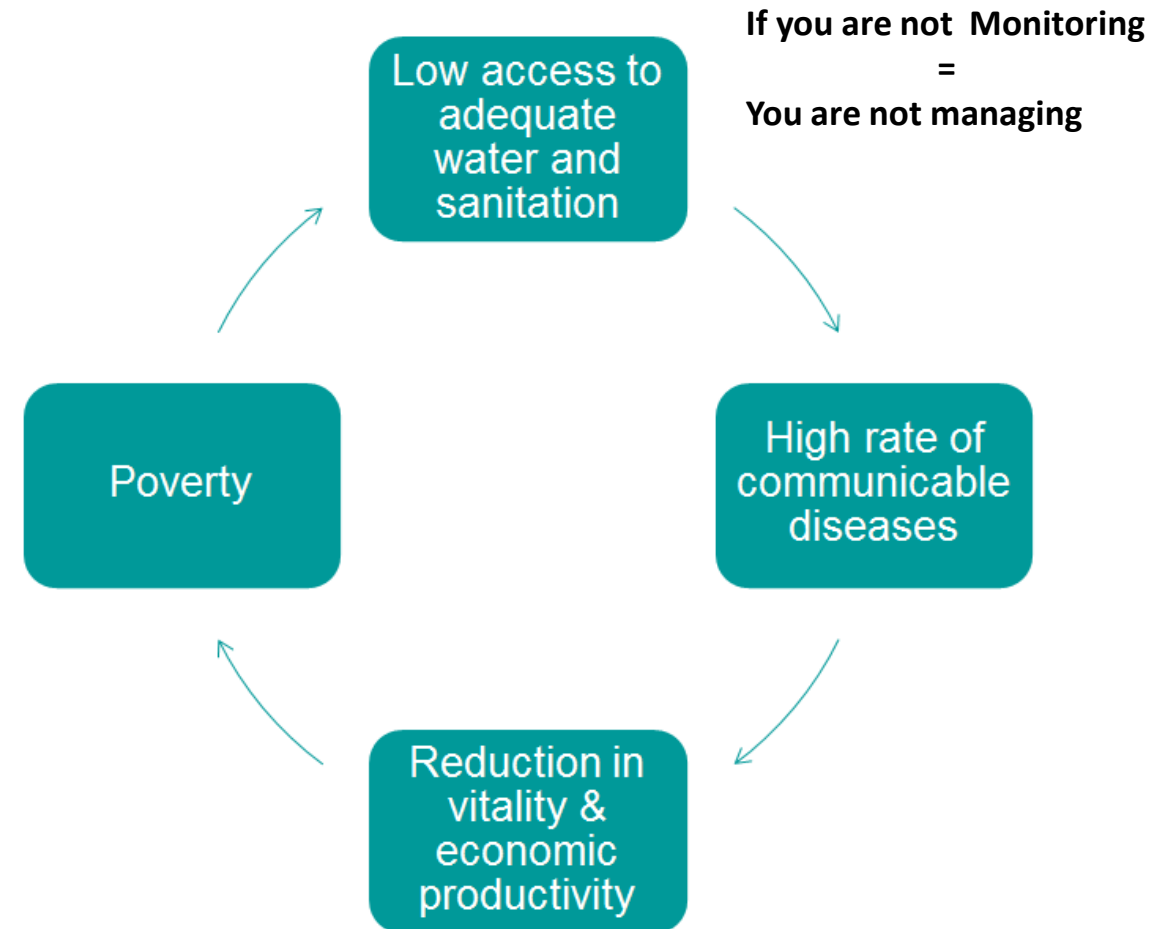
GOAL
Introduce ICT solutions for real time smart water management
Present the ICTs technologies and architecture
for real time smart water management.

That can assist in Modelling water demand and supply

CASE STUDY FROM MALAWI
Lilongwe Water Board
Utility company that manages
Water supply and distribution across
the capital city of Malawi

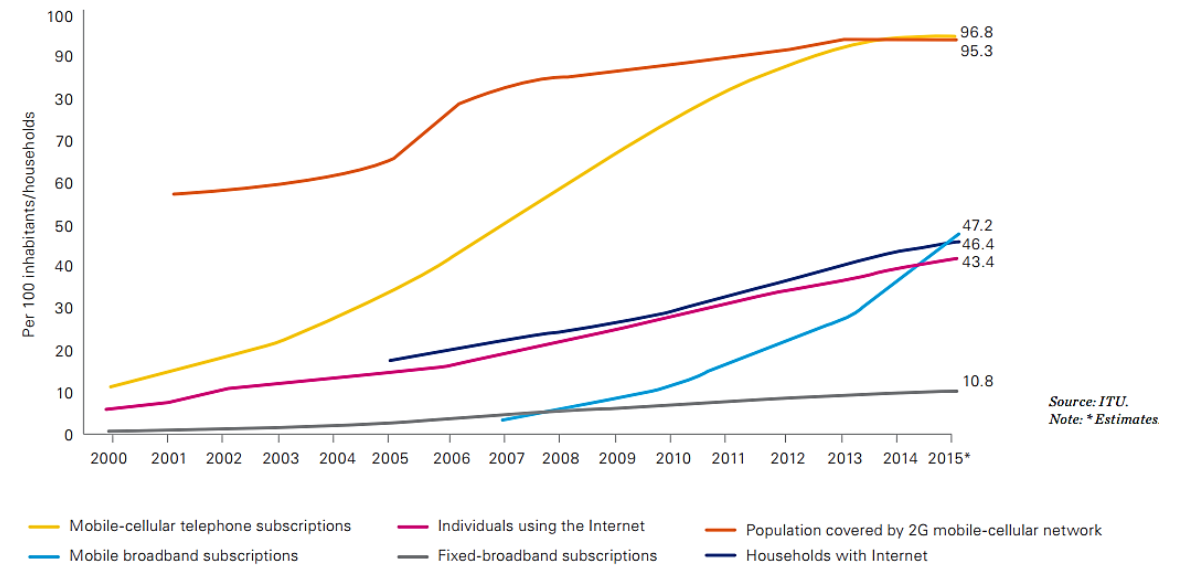
Hydro – economic model

- Water is vital for life, development, and the sustainability of the environment.
- In hydro-economic models, water allocation is driven or evaluated by the economic values it generates
- We Combine economic management concepts with an engineering-level of understanding of a hydrologic system to provide results and insights for water management strategic decisions and policies – through real time monitoring
- A need of striking perfect balance that meets the society water demands, without exceeding the unmanageable threshold of water supplies is crucial for the effective management of the resources.



ICT growth enabling opportunities for developing Smart Water Management systems

- Over the years there has been rapid growth of telecommunications and its services
- More devices are being connected online
- It is estimated that by 2025, 30 billion devices will be connected to the internet
- This has opened opportunities for developing ICT based service innovations that propel towards development and solving of typical day-to-day challenges encountered in many sectors ranging from agriculture to health.
 - We will dwell on water sector



Water Management Challenges Met in developing countries

- Different countries have different water challenges
- Different countries also use different techniques in finding solutions towards water problems
 - But we can learn and build stronger systems by sharing experiences and similarities
- We shall build this discussion from challenges and solutions from Malawi



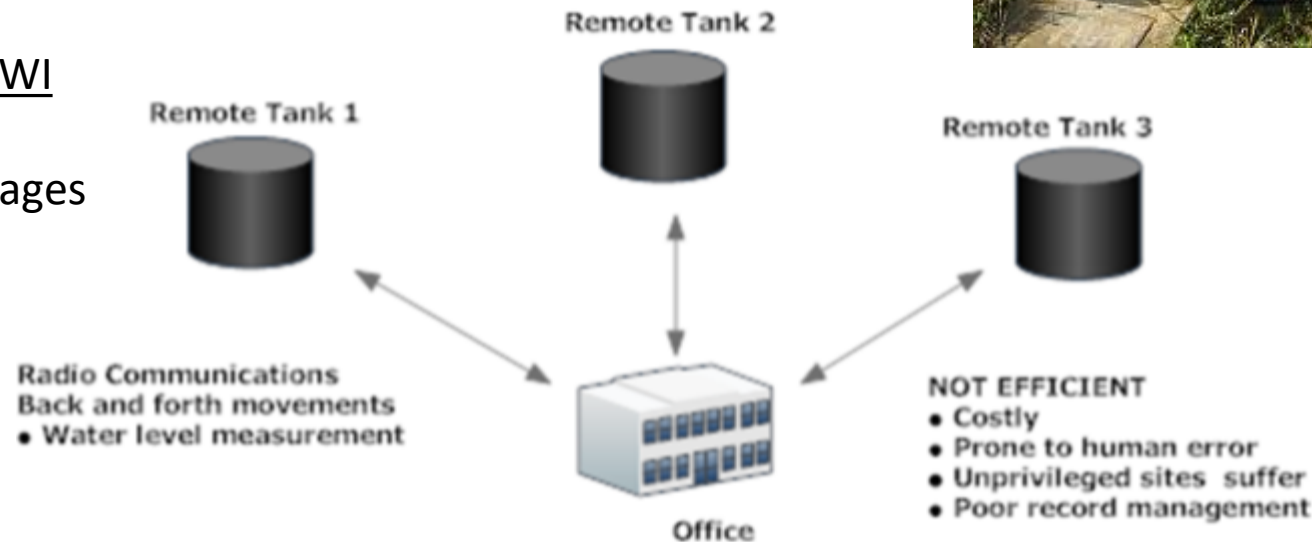
Water Management Challenges Met in developing countries

- Traditional ways of water level measurements present challenges in managing the resource for distribution
 - Inaccurate measurements
 - Long distance and poor road network between sites
 - Time consuming

- Need to develop a low cost solution through remote monitoring



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Water Management Challenges Met in developing countries

WASTED
WATER



MORE THAN 1/3 of the world's drinking water supply is **LOST** before it ever reaches consumers, mostly from **UNSEEN LEAKS**



In **DEVELOPING COUNTRIES**



the percentage is even higher:

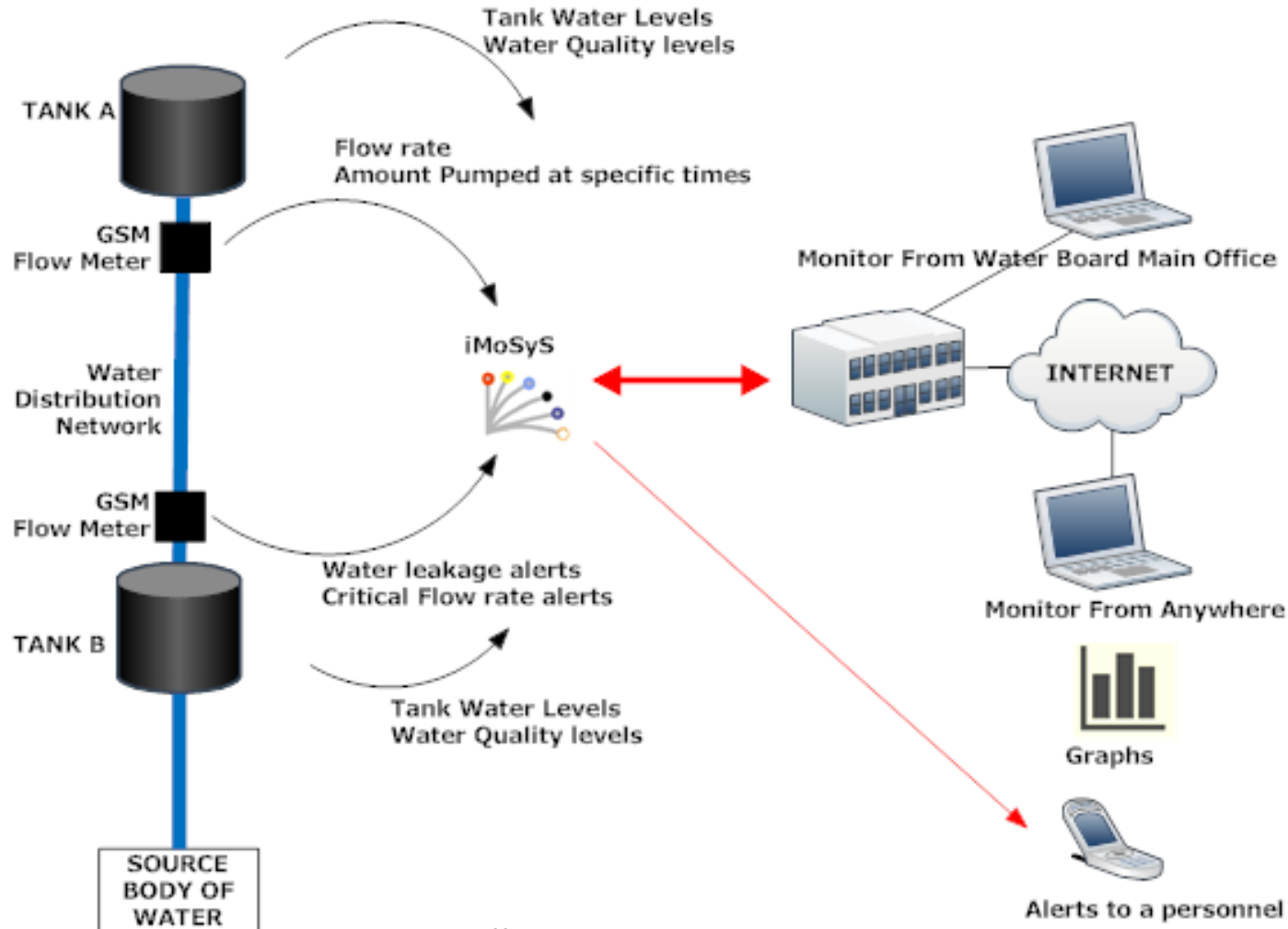
40-50%

- Non revenue water also bring the imbalance between supply and demand
- How to solve th

This wasted water is called non-revenue water (NRW) with estimated **LOST REVENUE** to utilities of

\$14B ANNUALLY

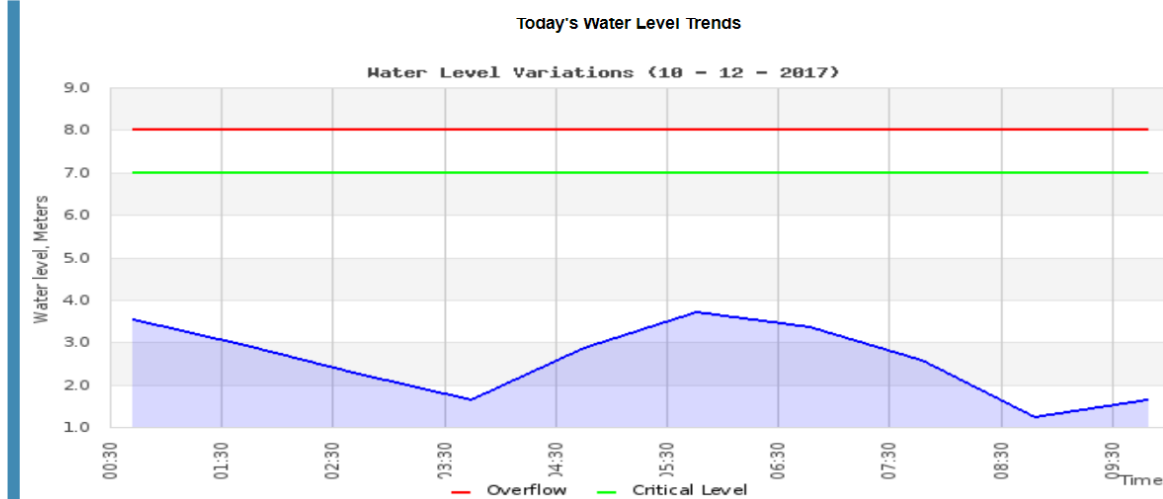
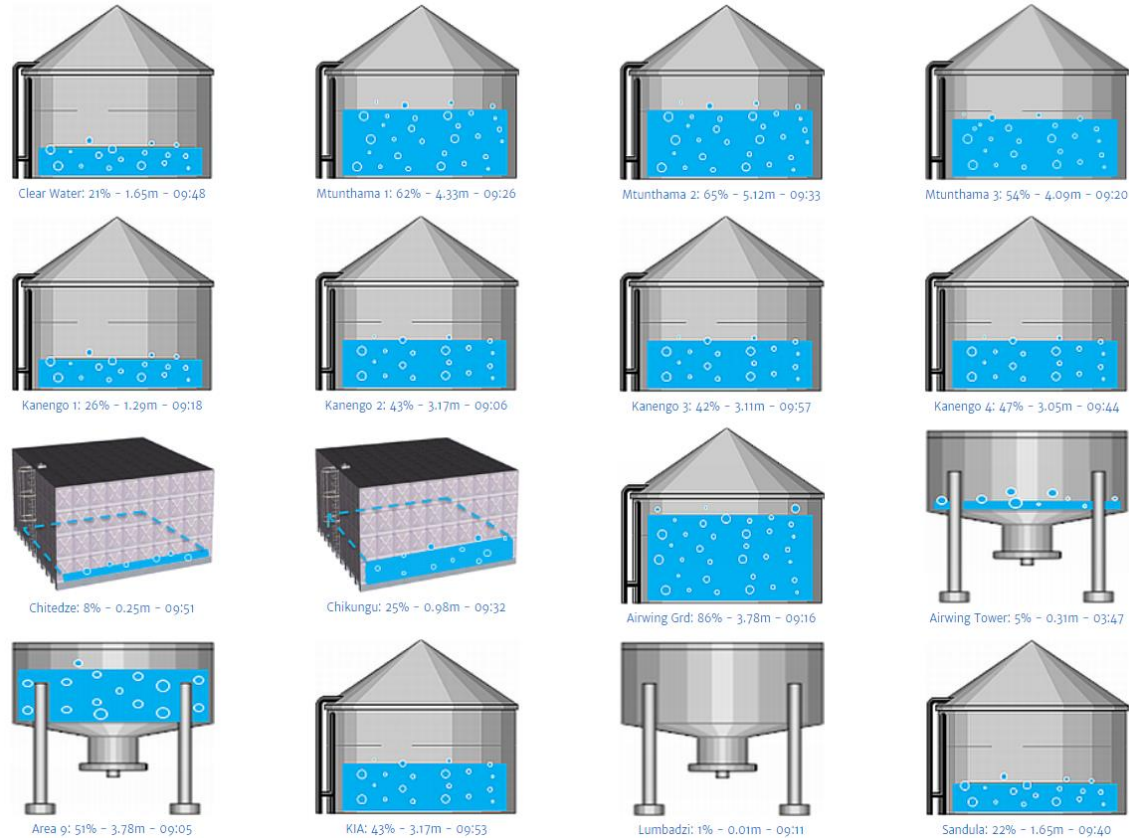
IoT based model for managing water demand and supply



- Water level monitoring
 - To avoid overflows
 - To manage demand
- Water flow rate monitoring in pipe systems
 - Scheme for detecting pipe bursts
 - Scheme for detecting illegal connections
- Water quality monitoring

Intelligent Monitoring Systems – iMoSyS Smart water Management model

Water system monitoring portal



Tabulated Summary (10 - 12 - 2017)														
Time	00:42	01:42	02:43	03:44	04:44	05:45	06:46	07:47	08:47	09:48	n/a	n/a	n/a	n/a
Level	3.54	2.93	2.26	1.65	2.87	3.72	3.36	2.57	1.23	1.65				

Trend of the tanks on a particular day

Presentation of the status of the tanks spread across the city
To enable quick decision making to meet demand

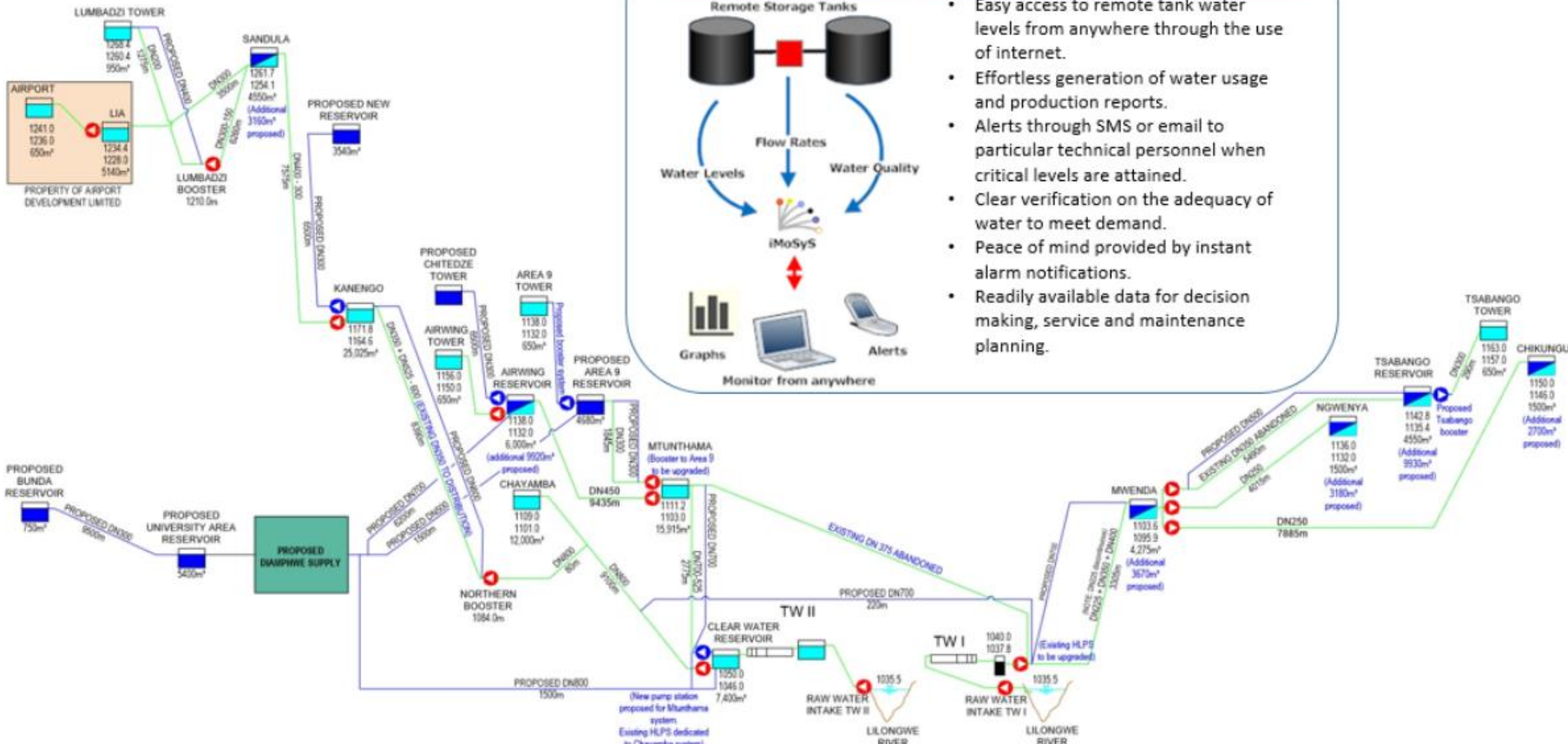


Benefits

- Collected data can be analysed to predict demand and supply trends
 - Trend analysis to assist economic growth
- Gives better understanding of the water system – from production to supply
- Assist in striking a balance between water supply and demand
 - No need of keeping too much water in a reservoir when other areas are suffering
- Great tool for reporting, planning and forecast
- Assist in reducing non revenue water
 - This is the water that is produced and is lost before it reaches the customer
 - Through tank overflows, pipe bursts and illegal connections

System benefits to operators

Remote Monitoring and Water Management



HOW IT WORKS



KEY BENEFITS

- Easy access to remote tank water levels from anywhere through the use of internet.
- Effortless generation of water usage and production reports.
- Alerts through SMS or email to particular technical personnel when critical levels are attained.
- Clear verification on the adequacy of water to meet demand.
- Peace of mind provided by instant alarm notifications.
- Readily available data for decision making, service and maintenance planning.



Conclusion

The presented models can assist water resource professionals, companies and governmental authorities to effectively:

- Manage,
- Predict, and
- Make proper decisions on the available water resource to meet demand.

ICT tools are used to

- synchronize water supply with demand,
- regulate pump operations to save energy,
- manage the wastage of water due to reservoir overflows and pipe bursts, and control the purification processes across the distribution system.



Thank You

