Number of customer: 2.2 Million
Production: 2,000 ML M^3/Y
Pipe Length: 32,000 km
Coverage Area: 3,195 sq.km
NRW Level: 30%

Metropolitan Waterworks Authority of Thailand

Thailand Water Organization

Raw Water Resource
Royal Irrigation Department

Drinking Water
MWA,PWA

Waste Water
Local , BMA

Bangkok Metropolitan Administration (BMA.)
Nonthaburi
Samutprakarn

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Policy “Water loss Management”
Reduce Non Revenue Water + Upgrade Operation Pressure

Target Goal 20% @ 2020
Pressure 1Bar @ 2020

Production-Transmission and Distribution System

No. of Treatment Plant: 4
No. of Pumping Station: 17
No. of Customer: 2.3 mil.
Operation Pressure: 8.8 m
Water Loss: 1.5 M M^3/day

Pipe system
PVC: 24,136 km (78.7%)
AC: 3,927 km (12.8%)
ST: 1,979 km (6.5%)
(CI,DI,GI,HDPE,PB,PC,PE): 612 km (2%)
Water Quality Problem

Seawater intrusion

Raw water  Tap water

Samlae Pumping Station
Salinity value < 0.25 g/l

2014 - 2016

96 km
Obstacles in salinity removing in WTP

Find out the **appropriate salinity management** affected in **tap water quality** during **drought crisis**.

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**Obstacles**

**Conventional Water Treatment**

- Do not change raw water sources

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[Image: https://www.pub.gov.sg/PublishingImages/NEWaterDemographics.jpg]
Key strategies to solve the problem

1. Raw water salinity monitoring
   - Salinity level < 0.25 g/l or Conductivity < 500 μS/cm
     - Monitoring and remote measuring points
     - Field monitoring salinity
     - Forecasting seawater intrusion

2. Pumping management of water source

3. Cooperation with Royal Irrigation Department
Current situation

Chart of tap water salinity level and conductivity during 2014 - 2016
Current situation

Salinity level of raw water and tap water in 2016

The highest salinity in
- Raw water: 0.87 g/l on 27th May, 2016
- Tap water: 0.45 g/l on 28th May, 2016

Flow Chaophraya river at Bangsai RMK 114
- 89 m³/s
- 90 m³/s

Recommendation salinity for MWA raw water (0.25 g/l)
Conclusions

- Limitations of MWA are unchangeable main raw water source and conventional water treatment technology.

- Problem solving should be integrated with disciplinary organization.

- MWA raw water pumping management, which is decreased by more than 10% off the tap water salinity level.

- The cooperation with Royal Irrigation Department contributes to increase drainage to push the saline water back to the sea.
Future solution

- **Advance Treatment Technology**
- **Tunnel Diversion**

https://www.pub.gov.sg/PublishingImages/NEWaterDemographics.jpg
% Water Loss, MWA (Thailand)

- **Passive Leakage Control**: Dealing only reported burst and Intensive Meter Replacement, Reduce Commercial Losses.
- **Active Leakage Control**: Set up Block system measure MNF. To prioritize Leakage Survey Activities.
- **Economic Crisis**: Routine sounding unreported burst.
- **Leakage Management (IWA Concept.)**: Set up DMA. To manage leakage WLMA.

2 Cycles per Year
- **Pipe Replacement**
  - Rational: 1000/yr
  - Intensive: 300-400 km/yr
  - 2 Cycles per Year: 900 km

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- **Routine Sounding**
- **Unreported Burst**
- **Water Loss**
- **Economic Crisis**
Current Situation

MWA don’t have own water supply
Total Loss 1500 Million Cubic Meter/Day
Full Production capacity
Climate Change / Flood / Drought

Future Problem

Large Investment in Water Treatment Plant
Raw Water Quality Risk
Complex Stake holder requirement
Obstacles in Water Loss @ Bangkok

- Density Areas/Owner Permission
- Complex Pipe System
- Lot of No Customer/Demand Forecast
- Pipe Material (non-metallic)
- Low Pressure (below 1 bar)
Water loss management Key Strategy

District Metered Area

Establishing DMA
Branch office’s area
SCADA instruments installation
RTU

IWA concept

WLMA

Knowledge Repository
Annual Water Balance
Economic Level of Leakage
Management Report
Infrastructure Information Management
Pressure Management
Field Services and Support Management

Leakage Survey Technology

Satellite Survey
JD7 Inpipe Survey
Hydraulic Model

Pipe replacement Project

Asset Management

METHOPOLITAN WATERWORKS AUTHORITY OF THAILAND
Lesson & Implications

- Water loss management should continue effort don’t lost focus or stop

- Use different solution for real loss and apparent loss.

- Apply new technology such as AI, Big data analysis for leakage survey

- Reduce NRW can delay large scale of investment

- Social collaborate is very important for project management