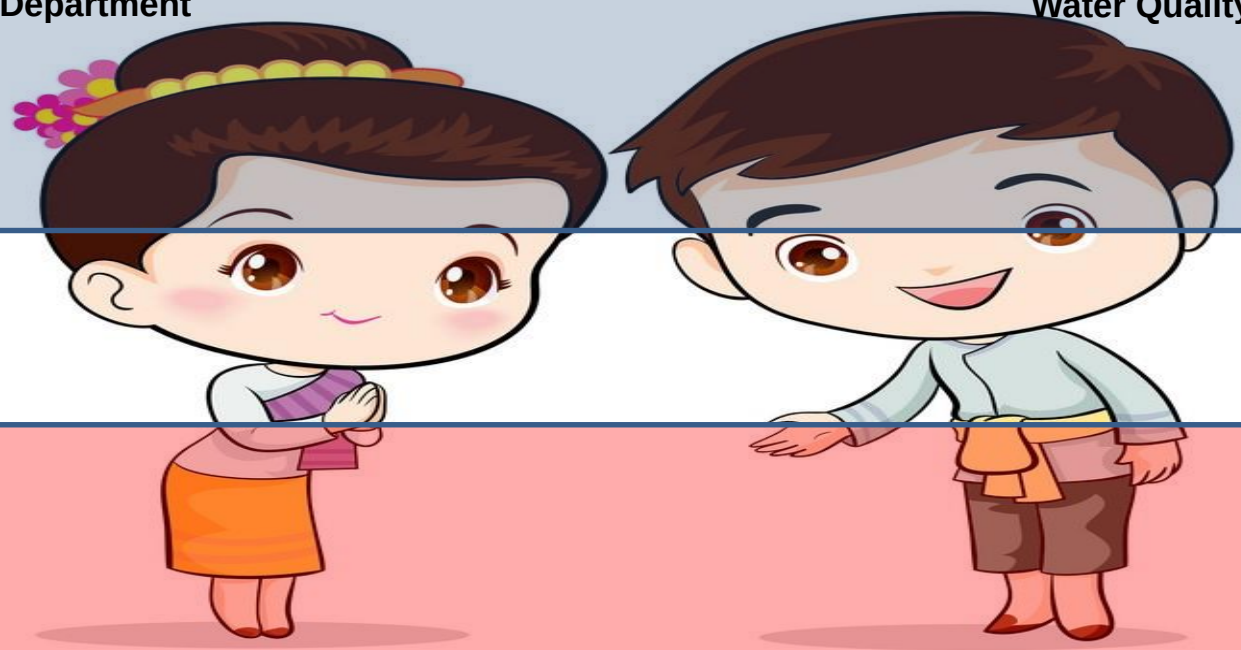
"SAWASDEE"

Wason Haesongsiri

Director of Water loss management operation
Technology Division
Water loss management Department

Aungkhoon Bunya

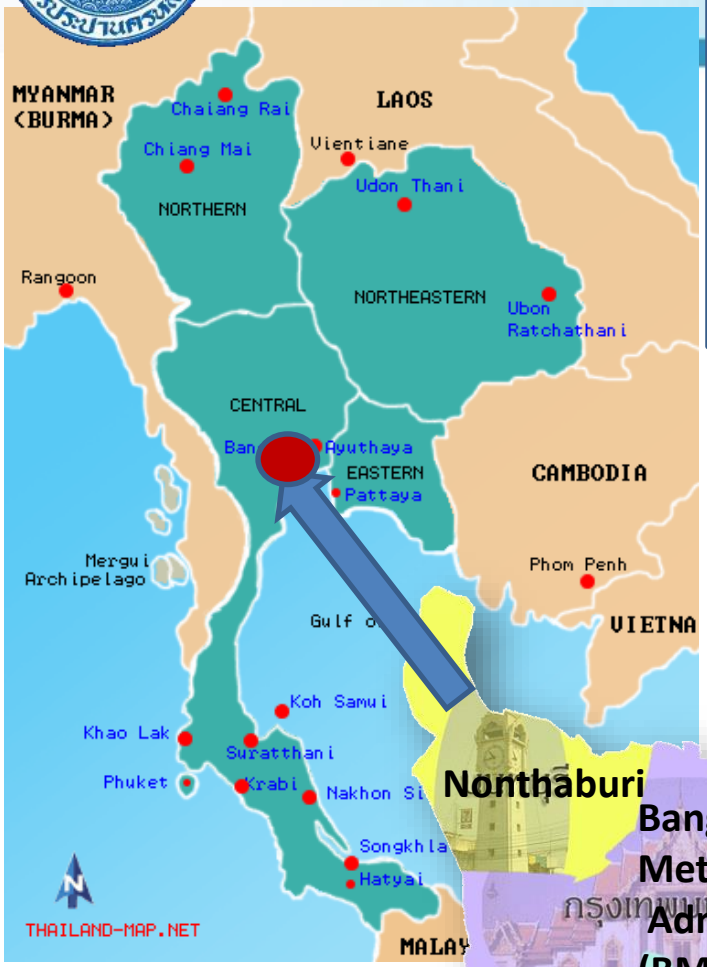
Chief of East Bank Water Resources Section
Water Quality Surveillance Division
Water Quality Department



Metropolitan Waterworks Authority of Thailand

Thailand Water Organization

Raw Water Resource	Department of Water Resource Royal Irrigation Department
Drinking Water	MWA,PWA
Waste Water	Local , BMA



- ❑ 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%

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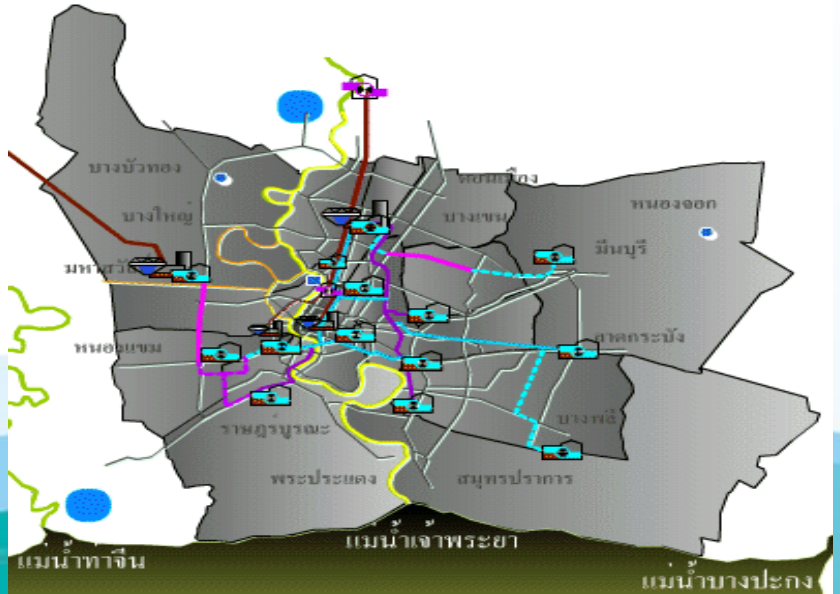
Policy "Water loss Management"

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

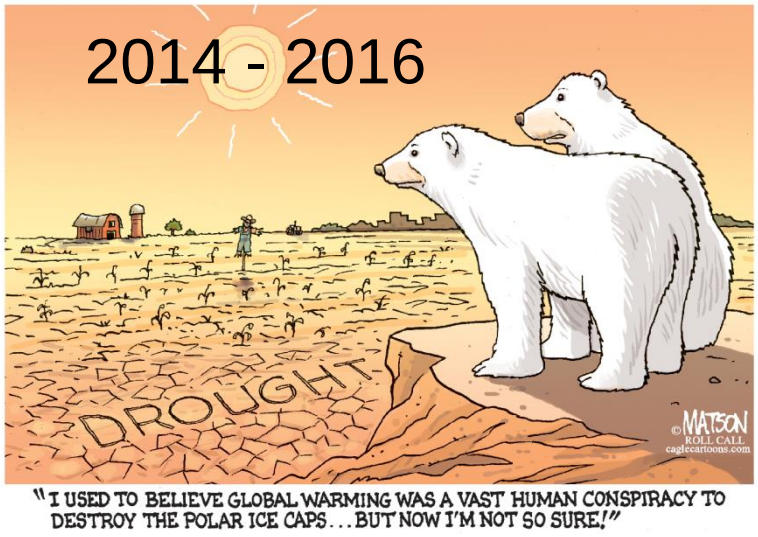
Seawater intrusion

Raw water

Tap water

Samlae Pumping Station

Salinity value < 0.25 g/l



Obstacles in salinity removing in WTP

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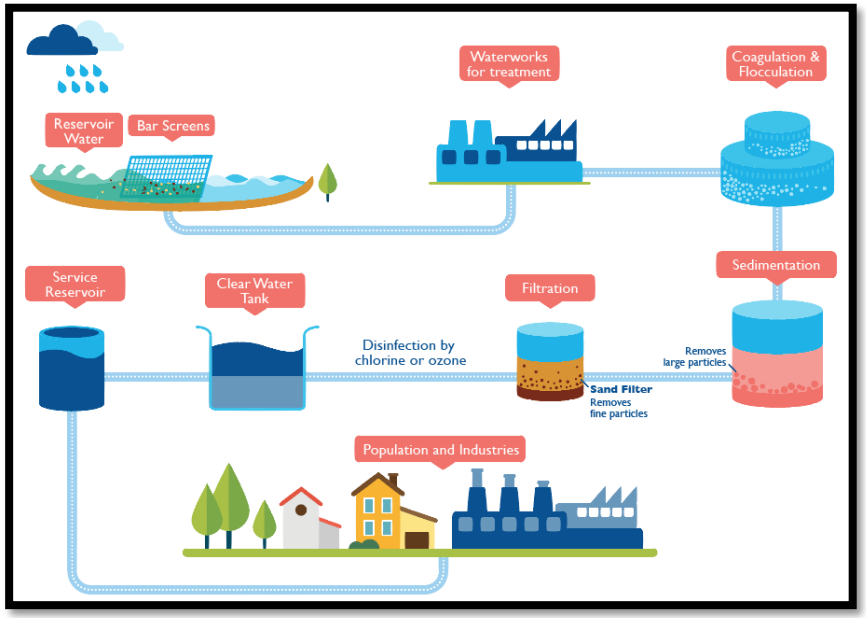
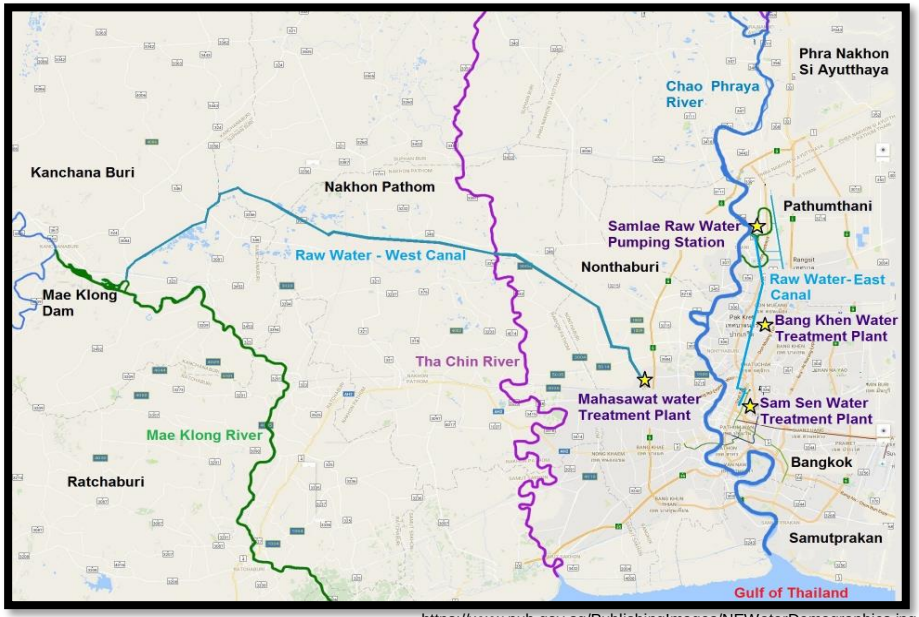
Find out the appropriate salinity management affected in tap water quality during drought crisis.

Obstacles





https://www.pub.gov.sg/PublishingImages/NEWaterDemographics.jpg

Conventional Water Treatment

Do not change raw water sources

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

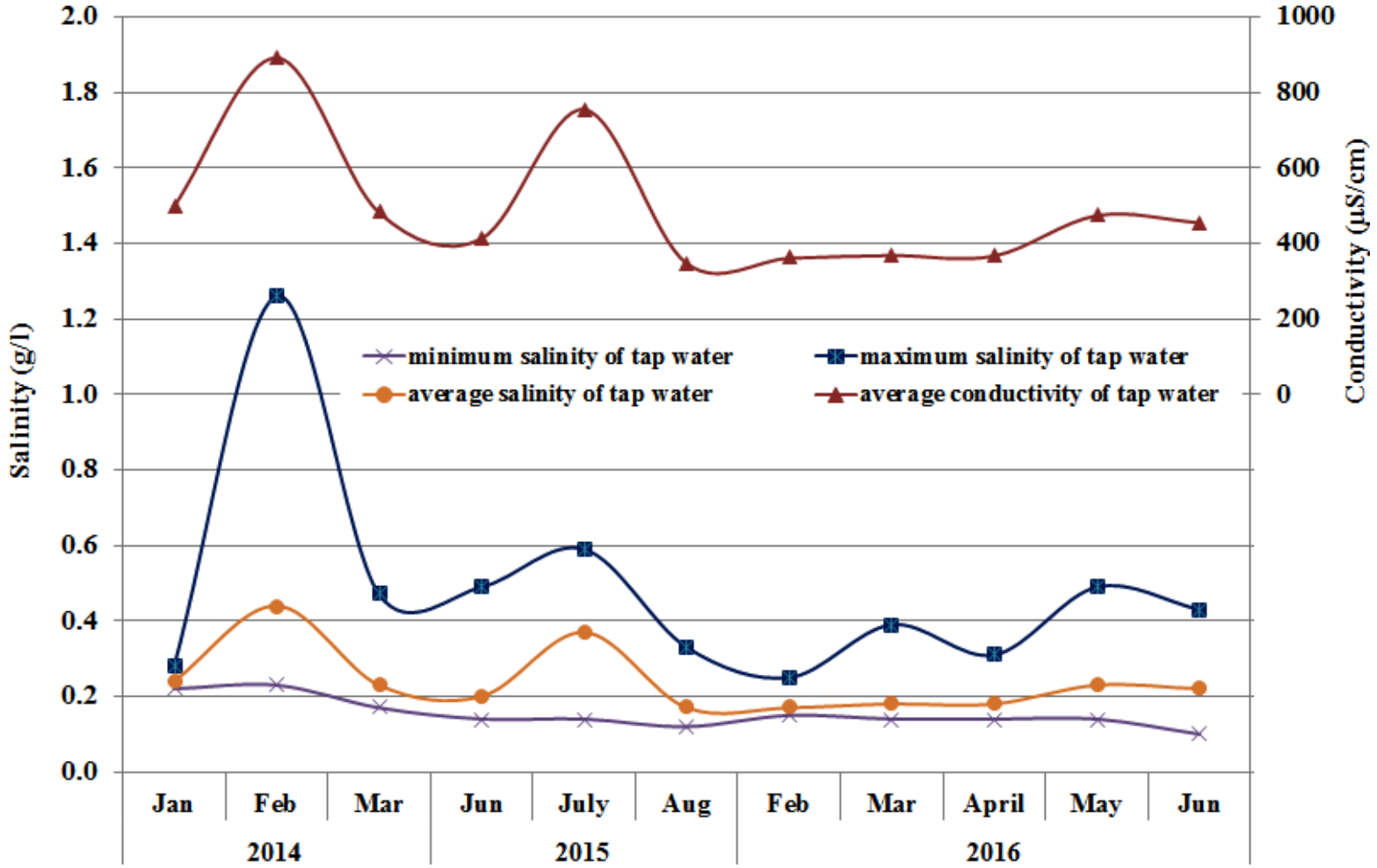
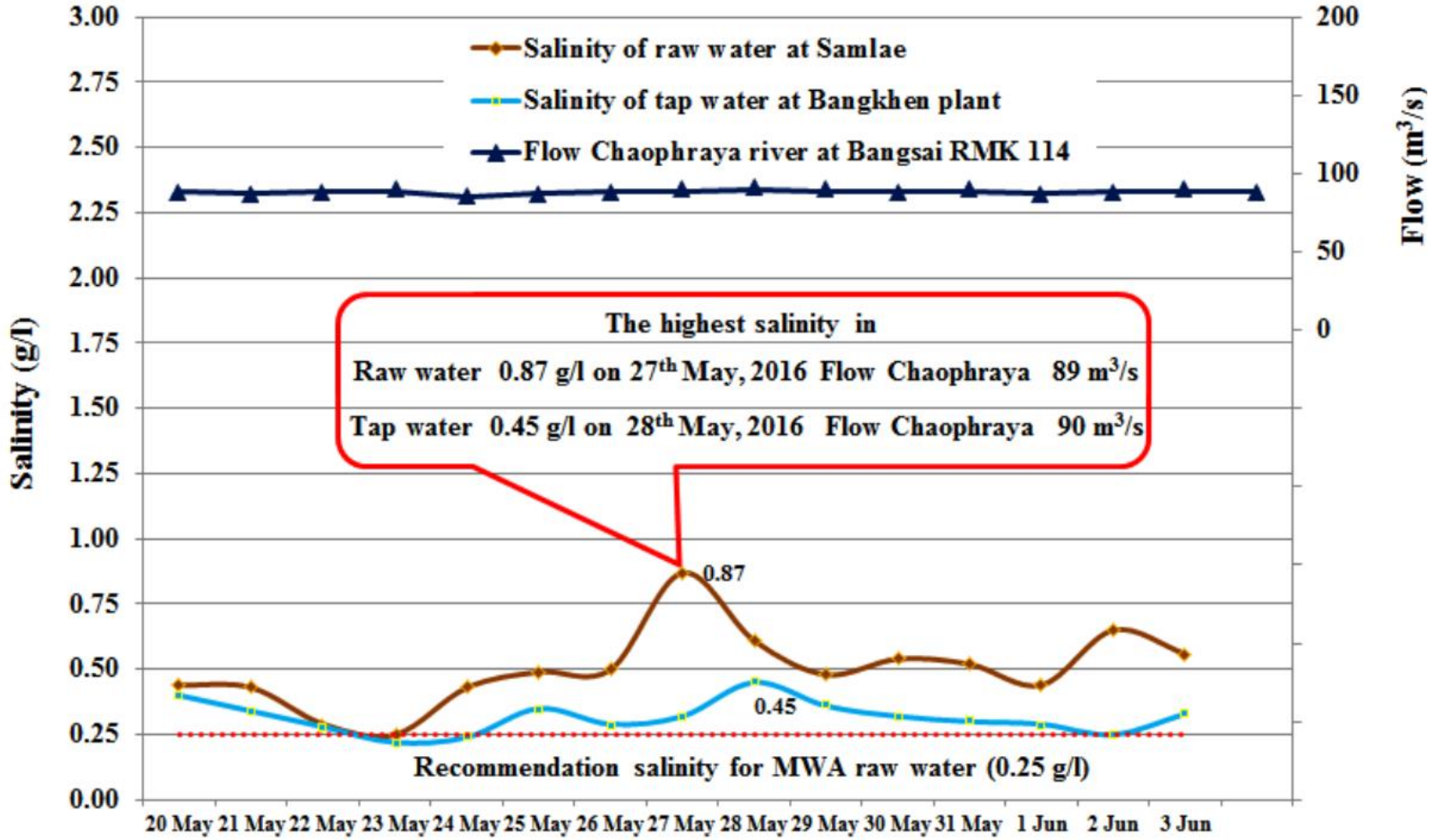


Chart of tap water salinity level and conductivity during 2014 - 2016

Current situation



Salinity level of raw water and tap water in 2016

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.

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Future solution

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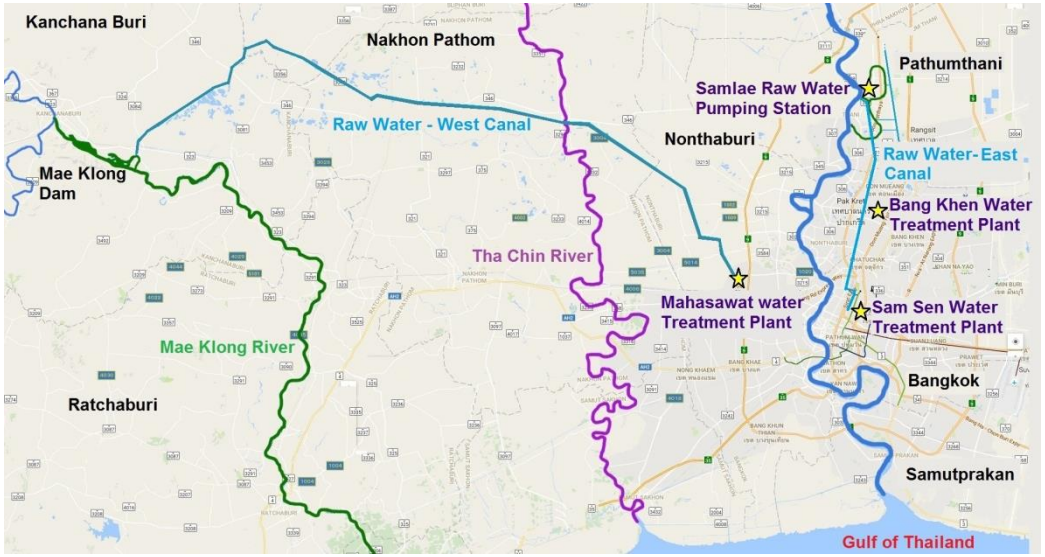
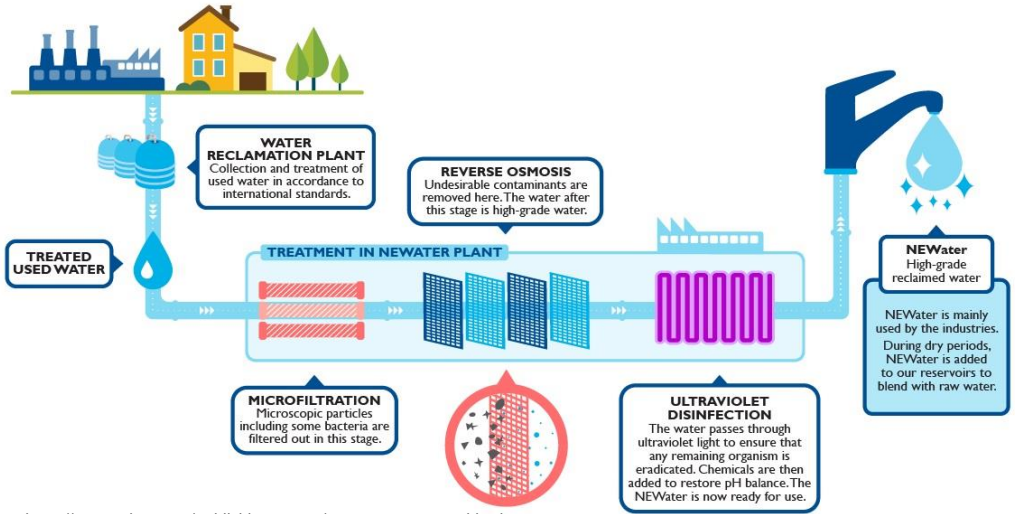


- **Tunnel Diversion**

- **Advance Treatment Technology**



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% Water Loss, MWA (Thailand)

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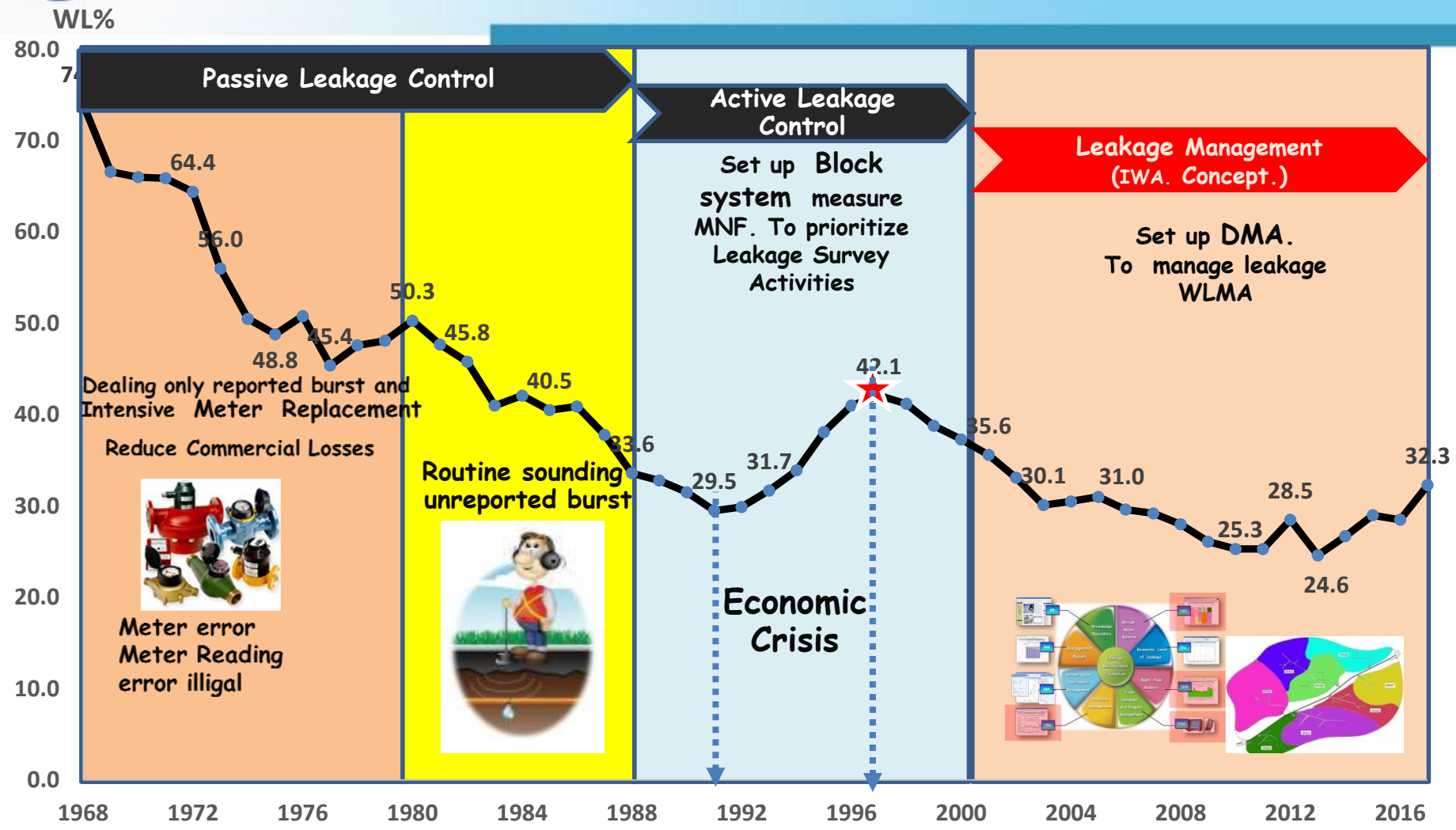

2 Cycles per Year	Intensive		Rational
Pipe Replacement	900 km	1,500 km	300-400 km/yr	1000/yr

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

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Obstacles in Water Loss @ Bangkok

Density Areas/Owner Permission

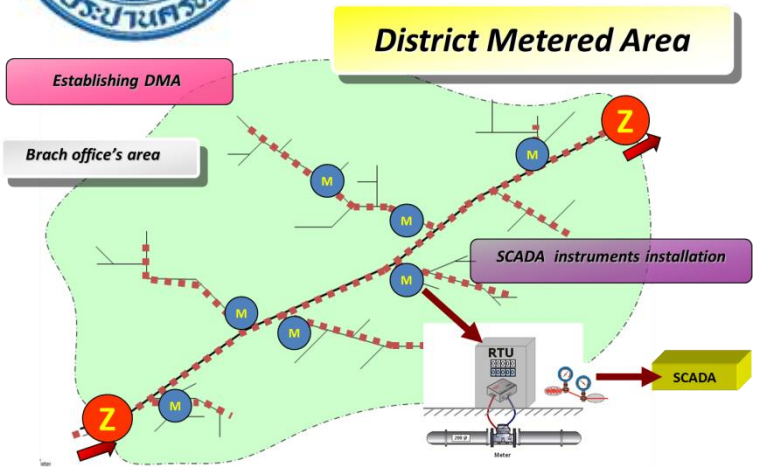
Complex Pipe System

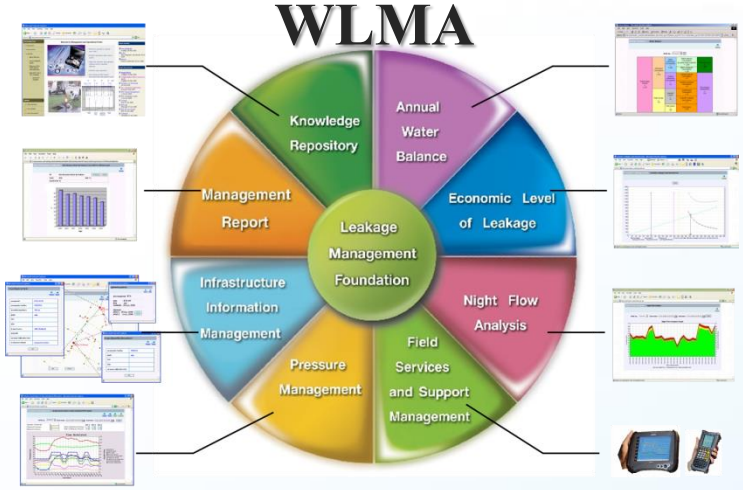
Lot of No Customer/Demand Forecast

Pipe Meterial (non-metalic)

Low Pressure (below 1 bar)

Water loss management Key Strategy





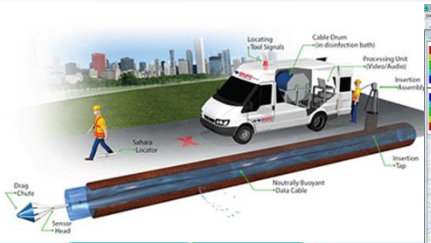
IWA concept

Leakage Survey Technology

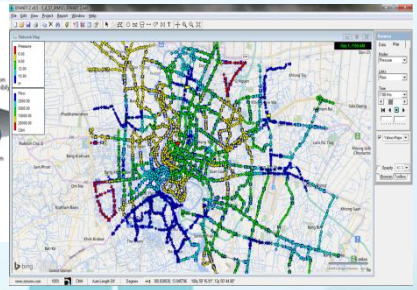
Asset Management

Pipe replacement Project

Satellite Survey



JD7 Inpipe Survey



Hydraulic Model

Lesson & Implications

- Water loss management should continues 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


thank you
danke
謝謝
gracias
merci
obrigado
teşekkür ederim
go raibh maith agat
dziękuję
bedankt
sukriya
kop khun krap
terima kasih
mochchakkeram
tapadh leat
ngiyabonga
спасибо
arigatô
dakujem
grazie
takk
taiku
sagolun
hvala
maururu
감사합니다
ευχαριστώ
ありがとう
мерси
рахмат
Баярлалаа
dank je
faafetai lava
kiitos
dankie
dhanyavad
nanni
nandri
köszönöm
bayarlalaa
gràçie
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mersi
kia ora
barka
welalin
tack
spas
vinaka
спасибі
blagodaram
misaotra
matondo
paldies
grazzi
mahalo
хвала
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tanemirt
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shukriya
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