

# Sawasdee

# Welcome to Thailand



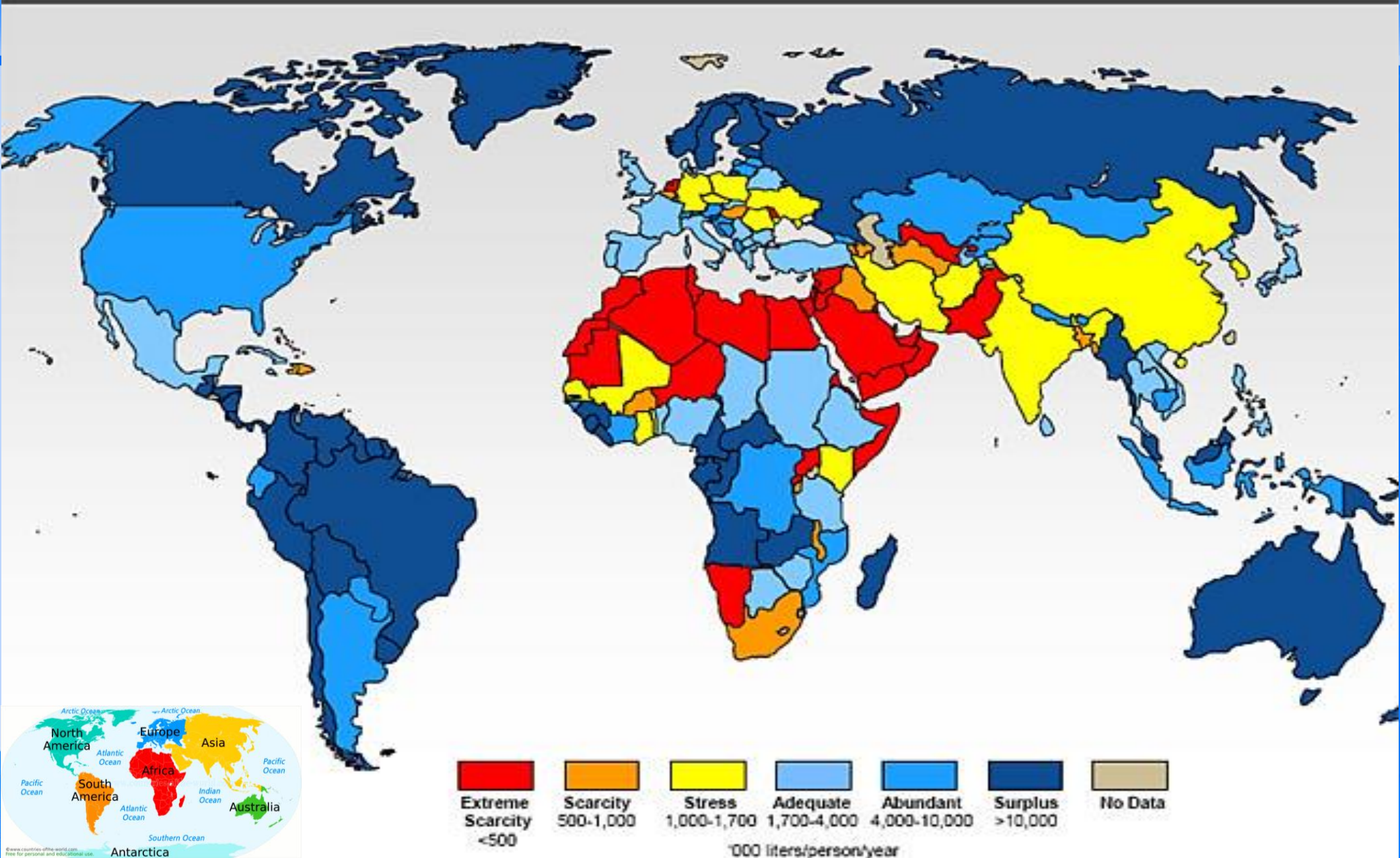


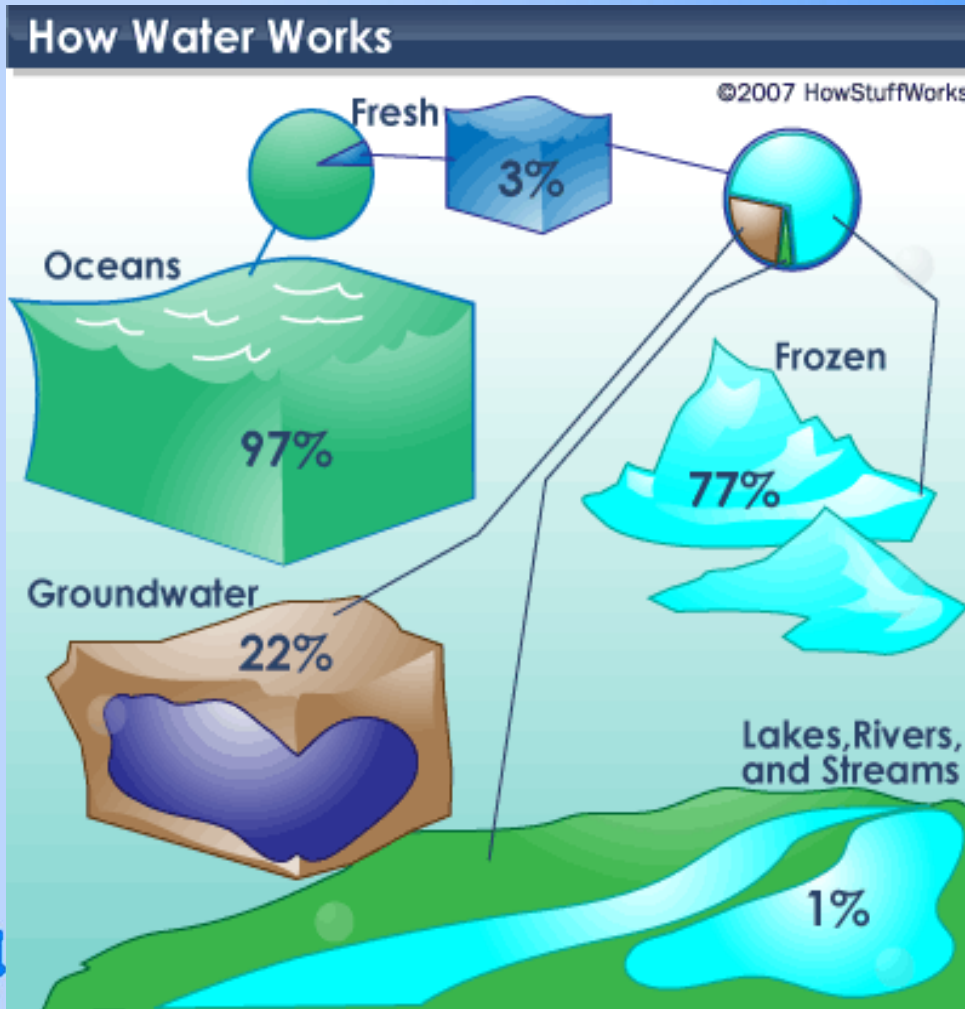
**การประปาส่วนภูมิภาค**  
Provincial Waterworks Authority

# Water Resources Management in Thailand

**Aiyanut Chalerchairattanakul**  
**Chief of Water Resources Analysis & Development Section**  
**Water Resources Development Division , PWA**  
**Email : [aiyanutc@pwa.co.th](mailto:aiyanutc@pwa.co.th)**

# Global Per Capita Water Availability (2025)





## World 's Water

- ❖ Sea/Ocean Water: 97 %
- ❖ Fresh water: 3%
  - 2.31% :Glacier / Iceberg
  - 0.66% :Groundwater
  - 0.03% :Surface Water

## Thailand 's Water

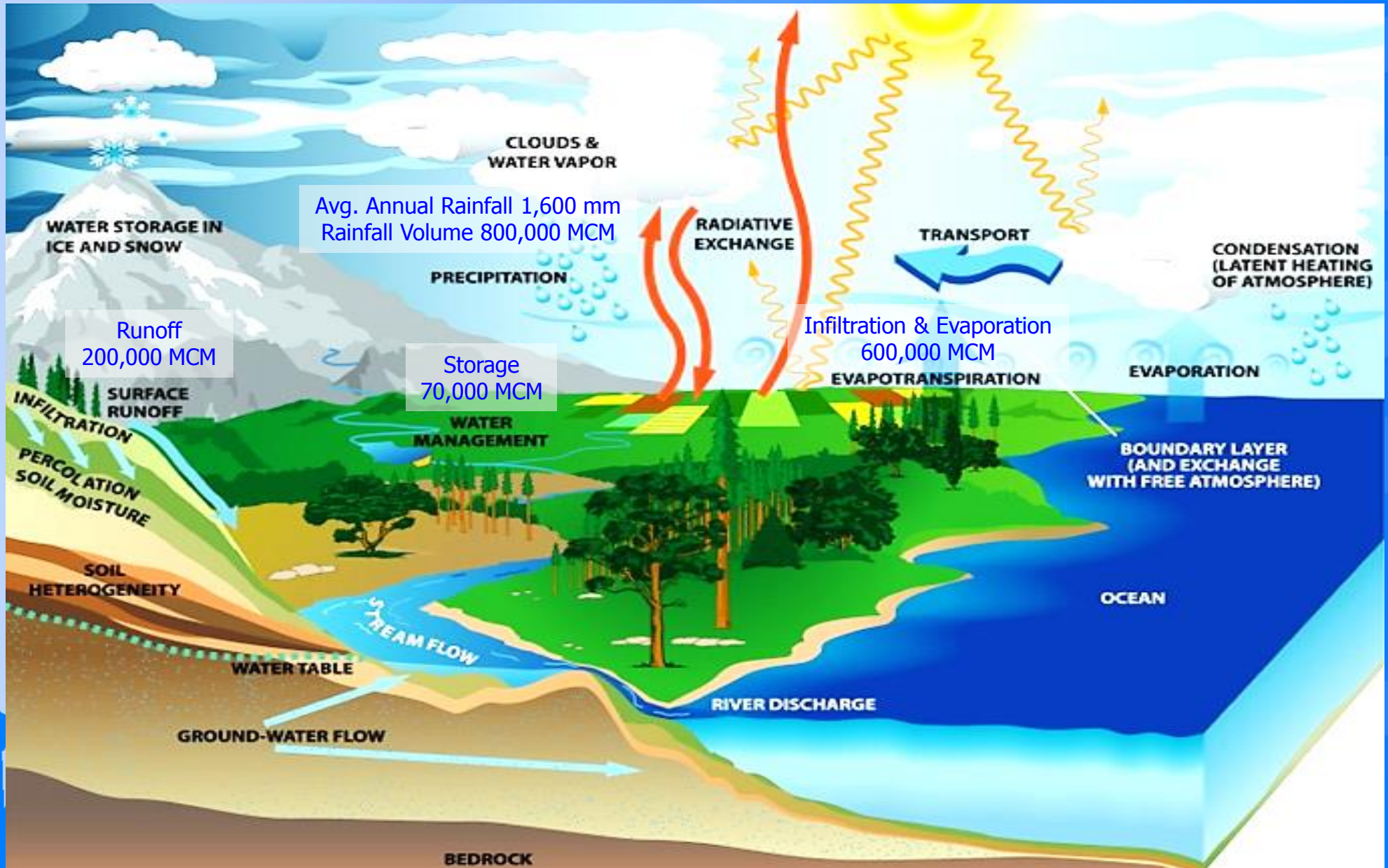
Thailand is located in the south eastern region (Asia continent).

- ❖ Area: 514,000 sq.km
- ❖ Populations: 65 million
- ❖ Average Annual Rainfall: 1,600 mm
- ❖ Rainfall Volume: 800,000 MCM
- ❖ Infiltration & Evaporation: 600,000 MCM
- ❖ Runoff: 200,000 MCM
- ❖ Storage Capacity: 70,000 MCM
  - Active Storage: 45,000 MCM
  - Dead Storage: 25,000 MCM



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## Thailand is divided into 4 regions.

- ❖ The North: The mountainous terrain
- ❖ The Northeast: Arid area on Korat Plateau
- ❖ The Central: The vast fertile agricultural land-Rice Bowl or Chao Phraya Delta
- ❖ The South: hilly on western coast and plain on the eastern coast

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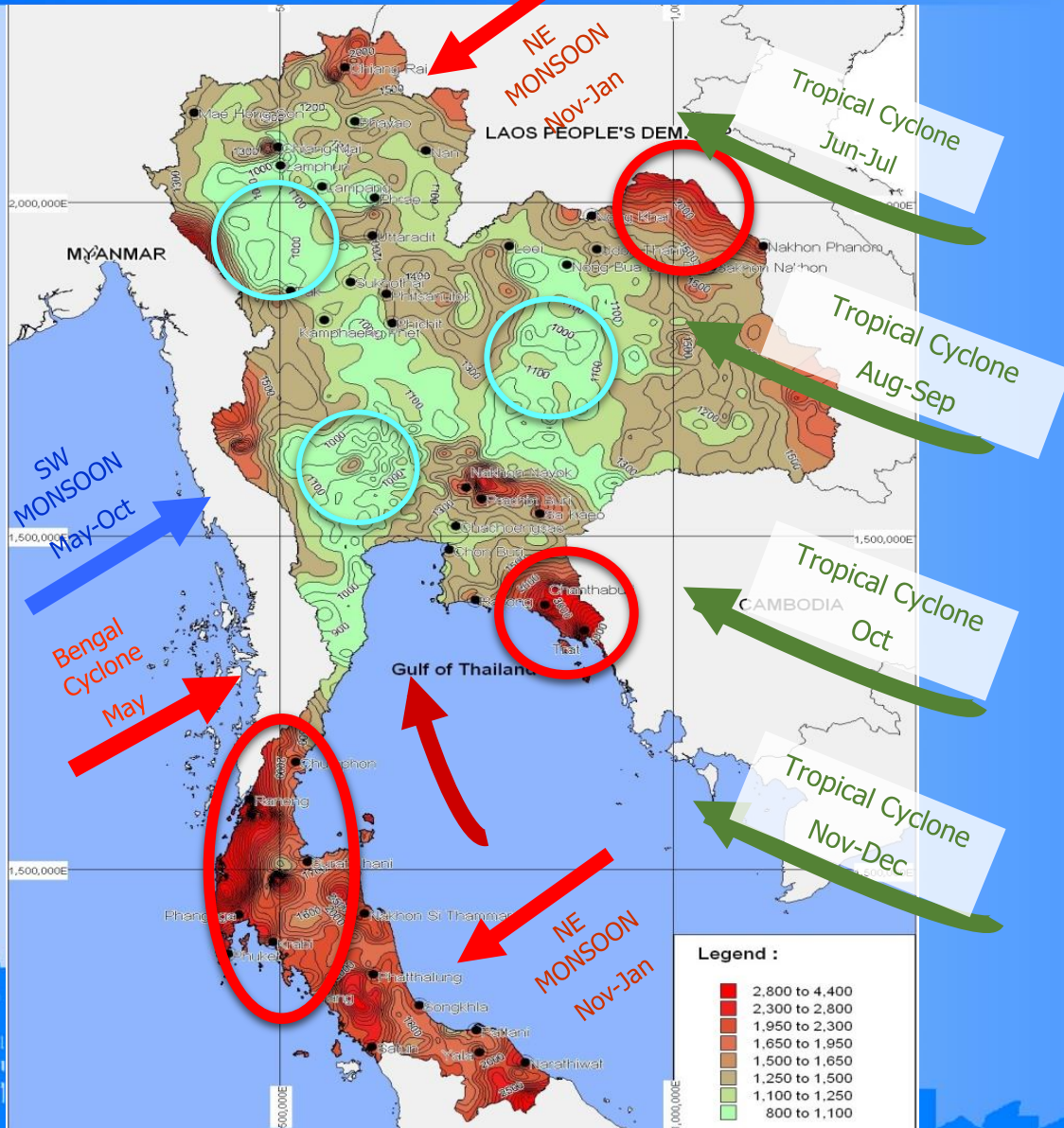


Region	Area (Km <sup>2</sup> )	Agriculture Area (Km <sup>2</sup> )	Irrigation Area * (Km <sup>2</sup> )	Percent of Irrigation Area
North	169,632	41,760	9,680	23.2%
North-East	168,848	92,664	10,080	10.9%
Central	104,866	42,848	21,920	51.1%
South	70,704	33,584	5,680	16.9%
<b>Total</b>	<b>514,050</b>	<b>210,856</b>	<b>47,360</b>	<b>22.5%</b>

\* As of the year 2011

# การประปาส่วนภูมิภาค

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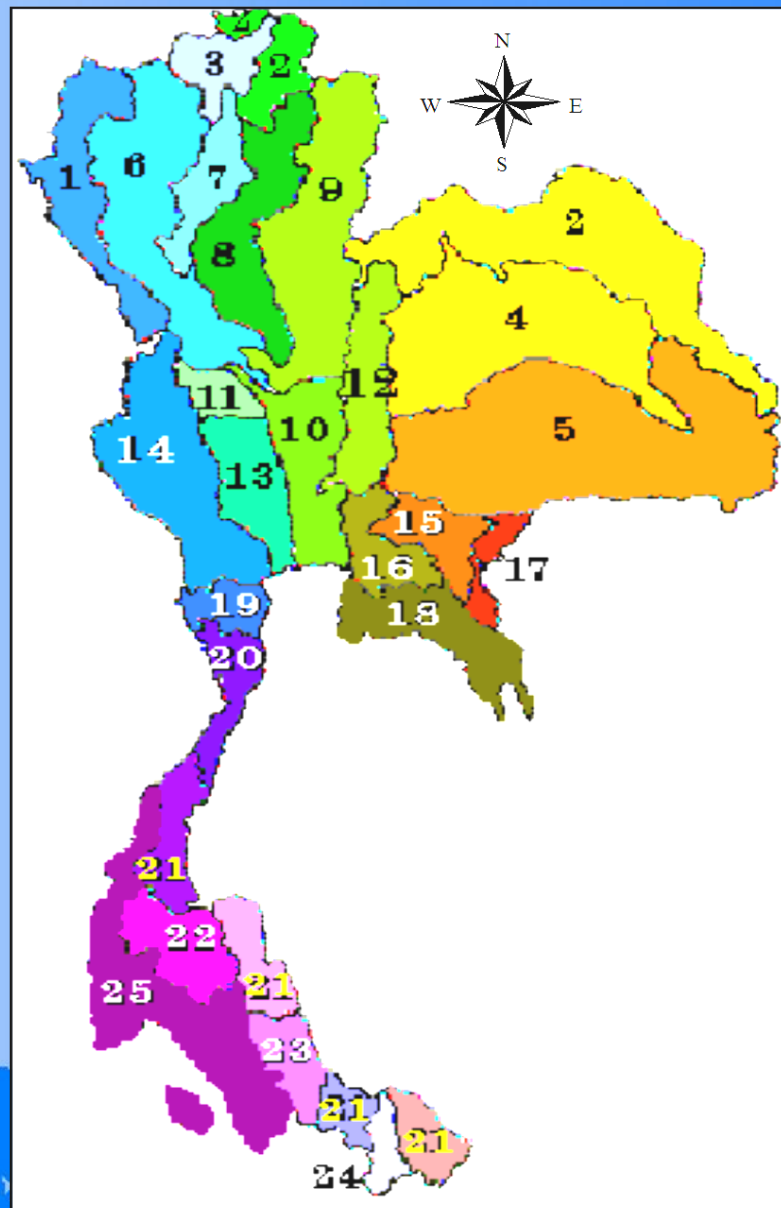
Map displaying Average Annual Isohyetal in Thailand



Summer: mid.Feb-mid.May  
 Rainy: mid.May- mid.Oct.  
 Winter: mid.Oct-mid.Feb.

Annual rainfall = 1,600 mm  
 Varied from 800-4,400 mm/yr

### Main River Basin



### Main River Basins of Thailand

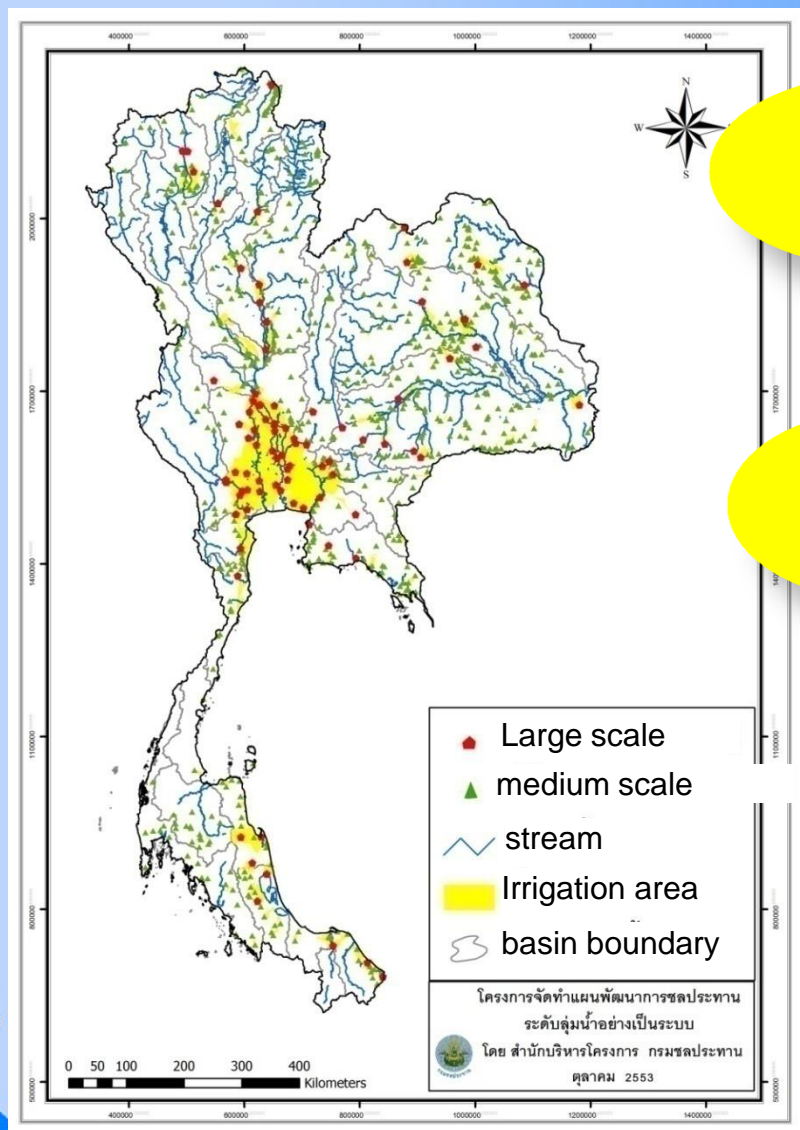
1. Mae Nam Salawin
2. Mae Nam Khong
3. Mae Nam Kok
4. Mae Nam Chi
5. Mae Nam Mun
6. Mae Nam Ping
7. Mae Nam Wang
8. Mae Nam Yom
9. Mae Nam Nan
10. Mae Nam Chao Phraya
11. Mae Nam Sakae Krang
12. Mae Nam Pasak
13. Mae Nam Thachin
14. Mae Nam Mae Klong
15. Mae Nam Prachin Buri
16. Mae Nam Bang Pra Kong
17. Tonle Sap
18. East-Coast Gulf
19. Mae Nam Petchaburi
20. West Coast Gulf
21. Peninsula-East coast
22. Mae Nam Tapi
23. Thale sap Songkhla
24. Mae Nam Pattani
25. Peninsula-West coast

## Water Resources Development Projects

Irrigation Project Classification	Number project	Capacity (MCM)	Irrigation Area (Km <sup>2</sup> )
Large Scale (RID 23 / EGAT 10)	33	70,151	28,859
Medium Scale	448	4,373	11,686
Small Scale	-	2,132	
Pumping	2,427	-	6,815
Total	-	76,656	47,360

\* RID : Royal Irrigation Department , EGAT : Electricity Generating Authority of Thailand

### Large & Medium Scale Projects



**Northern  
24,600  
MCM**

**Central  
28,900  
MCM**

**Southern  
8,900  
MCM**

**Northeast  
10,900  
MCM**

**Eastern 1,700  
MCM**

**Total Capacity  
75,000 MCM**

## Scale of Project

### Large scale Project

- storage capacity  $\geq 100$  MCM
- reservoir area  $\geq 15$  sq.km.
- irrigation area  $\geq 80,000$  rai (128 sq.km.)

### Small scale project

- construction period within 1 year
- no land compensation
- using people's canal system

## Large Scale Dam



Srinakarin Dam

- ❖ Active Storage: 17,745 MCM
- ❖ Kanchanaburi Province

## Large Scale Dam



### Bhumiphol Dam

- ❖ Active Storage: 13,462 MCM
- ❖ Tak Province

## Large Scale Dam



### Sirikit Dam

- ❖ Active Storage: 9,510 MCM
- ❖ Uttaradit Province

## Medium Scale Dam



### Mae Suai Dam

- ❖ Active Storage: 4,373 MCM
- ❖ Chiang Rai Province





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# RID

## Royal Irrigation Department

## Mission of RID

1. To develop water resources and to increase irrigated area according their potential and natural balance
2. To manage water allocation in equitable and sustainable manners
3. To prevent and mitigate water hazards as appropriate mission
4. To encourage people participation in water resources management and development



## WATER MANAGEMENT

- ❖ Dry Season
- ❖ Rainy Season

# Water Management in Dry Season



30 August 2015

1. Estimate supplies water and water demands
2. The priority of water allocation for different sectors
  - 1) For consumption
  - 2) For conservation of ecology system; for example pushing salt water away , driving waste water out
  - 3) For agriculture
  - 4) For industries

# Water Management in Dry Season



3. Formulate the water allocation plan for dry-season crop cultivation base on the water demand, the efficiency of irrigation system and the supplies water
4. Prepare the supplementary support (water pumping and trucks )
5. Cooperate with other government agencies to disseminate the water allocation plan to water users in every sectors to implement the water allocation plan

# Water Management in Rainy Season

## Rainy Season Water Management Plan

- 1 for wet-season crop cultivation
- 2 for flood prevention and mitigation



## Example at Mae Yom Weir

### Phrae Province

Mae Yom Weir in rainy season



Avg. maximum flow 1,042 m<sup>3</sup>/s

Mae Yom Weir in dry season



Avg. minimum flow 3 m<sup>3</sup>/s



Flood



Drought







## 1. Water shortages in dry season





## 2. Water fights among water users

## 3. Frequent farmer 's protests



## 4. Irrigation structures were broken by farmers



## 5. Farming was damaged from drought, thus causes the rural poor



## 6. Seasonal migration of farmers from countryside to capital, leading to social problems



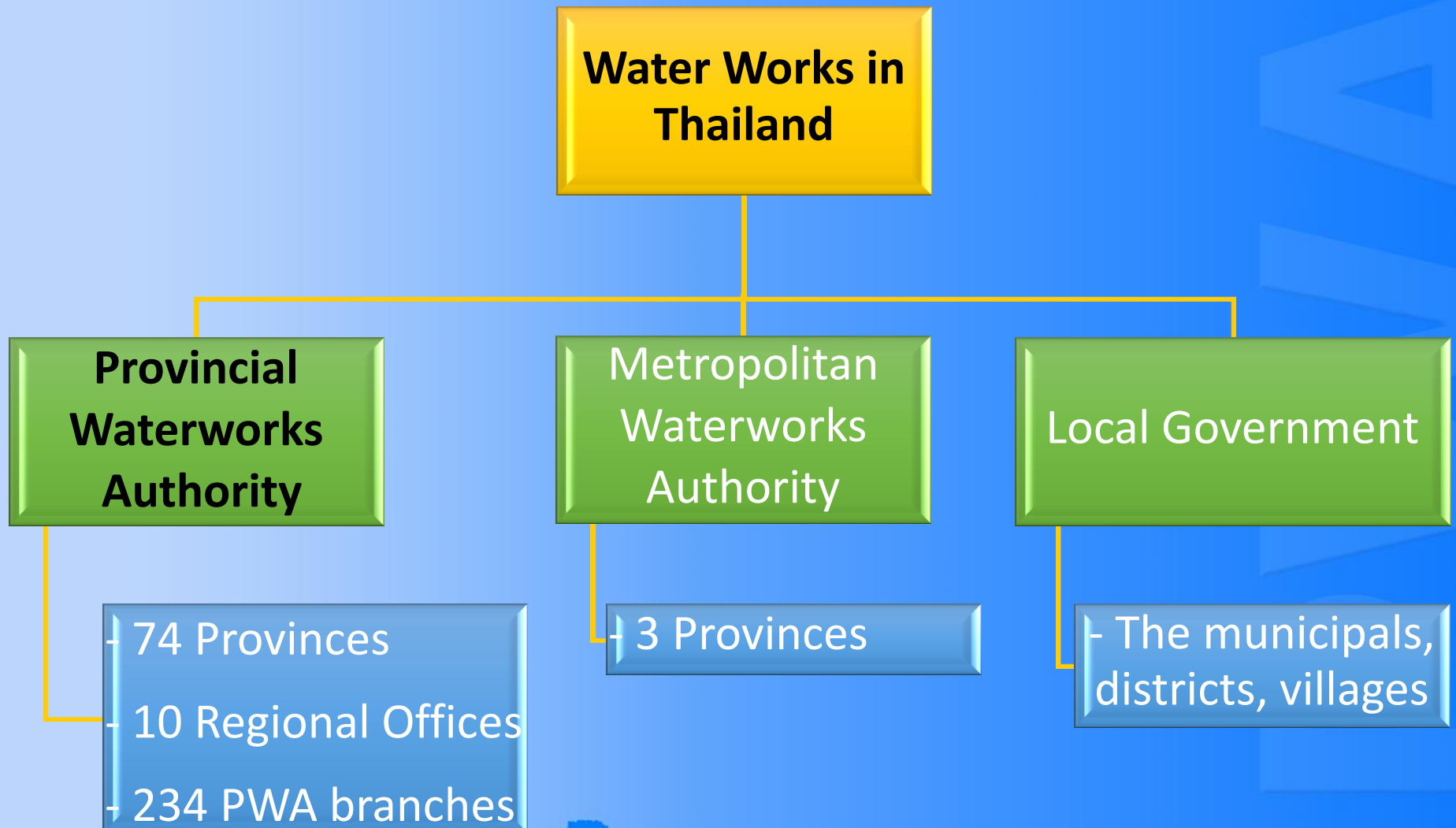


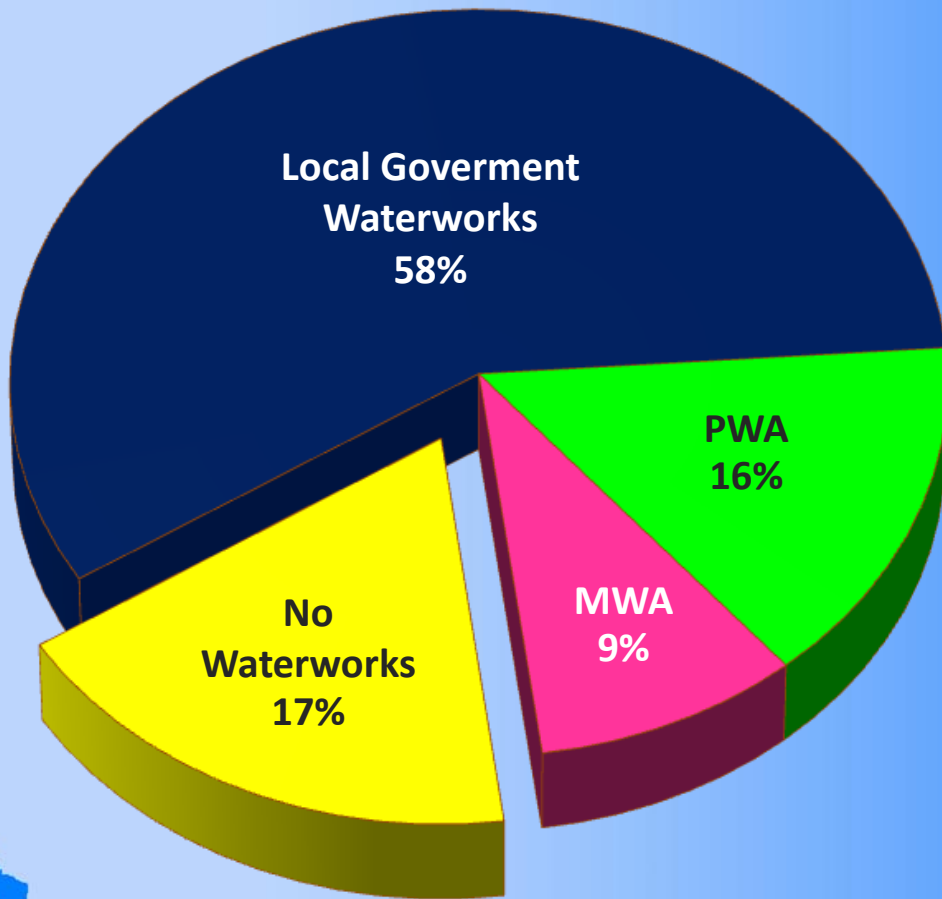
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# PWA

# Provincial Waterworks Authority







PWA : 16%



MWA : 9%



Local Government :  
58%



Road map  
To  
Excellence



2021  
**HPO**  
High Performance Organization



step 4 : 2018-2021  
Global Organization



step 3 : 2016-2018  
Smart IT Organization

step 2 : 2014-2016  
Learning Organization



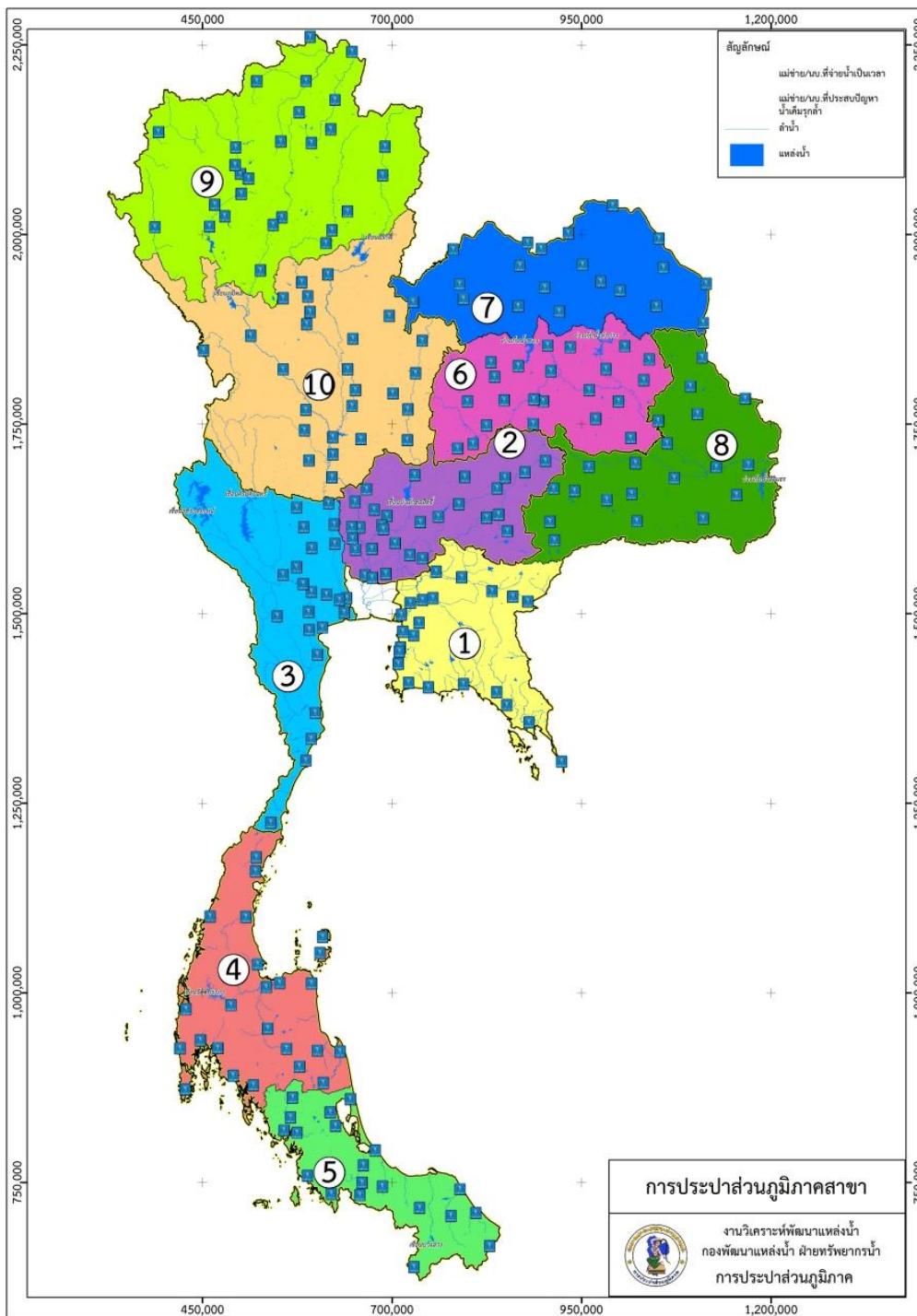
step 1 : 2012-2016  
Operation /Customer Service Excellence



# PWA

- ❖ 74 Provinces
- ❖ 5 PWA Service Areas
- ❖ 10 Regional Offices
- ❖ Productivity: 5.25 MCM/day





# PWA

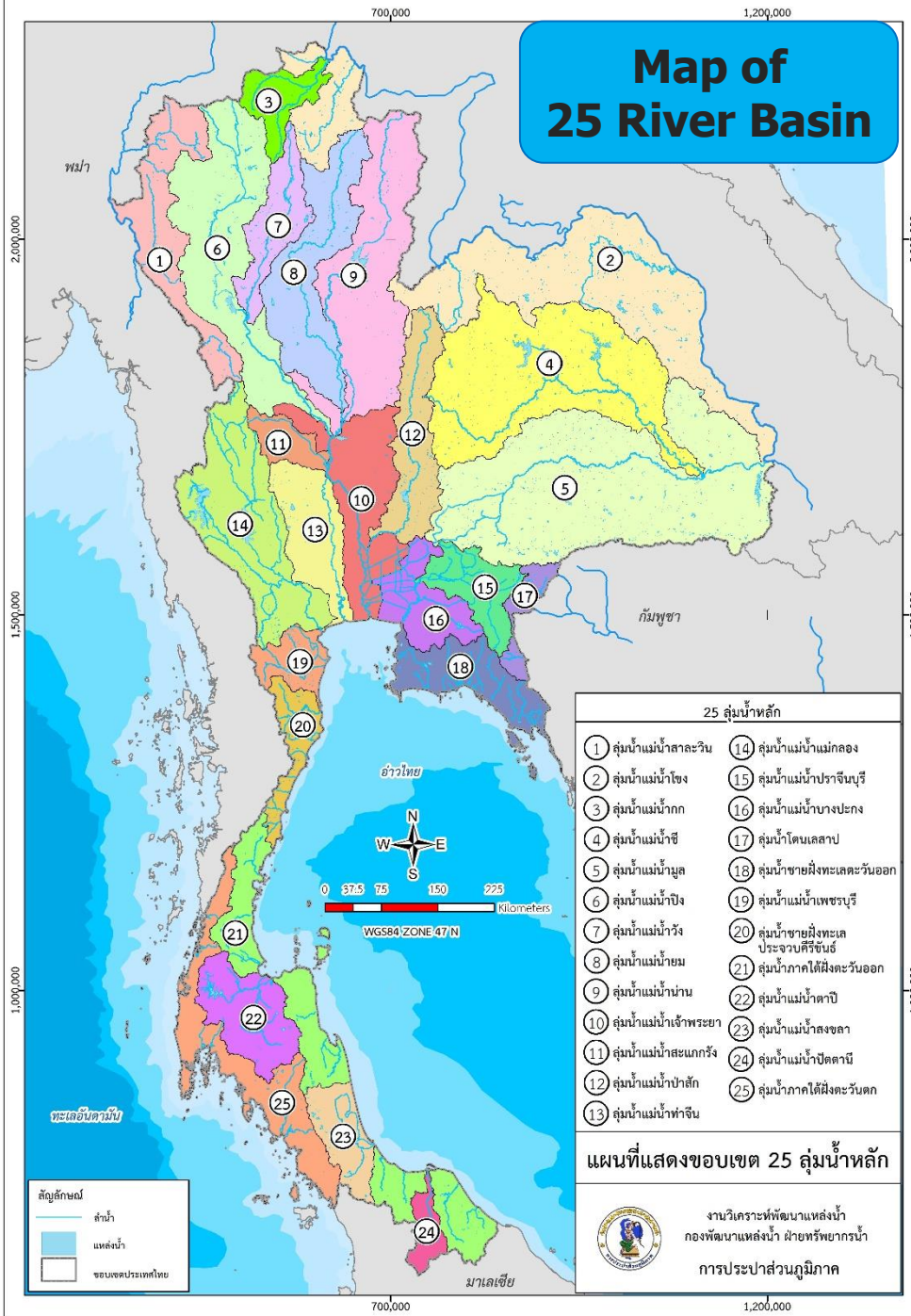
- ❖ 74 Provinces
- ❖ 10 Regional Offices
- ❖ 234 PWA Branches
- ❖ 358 Micro Branches



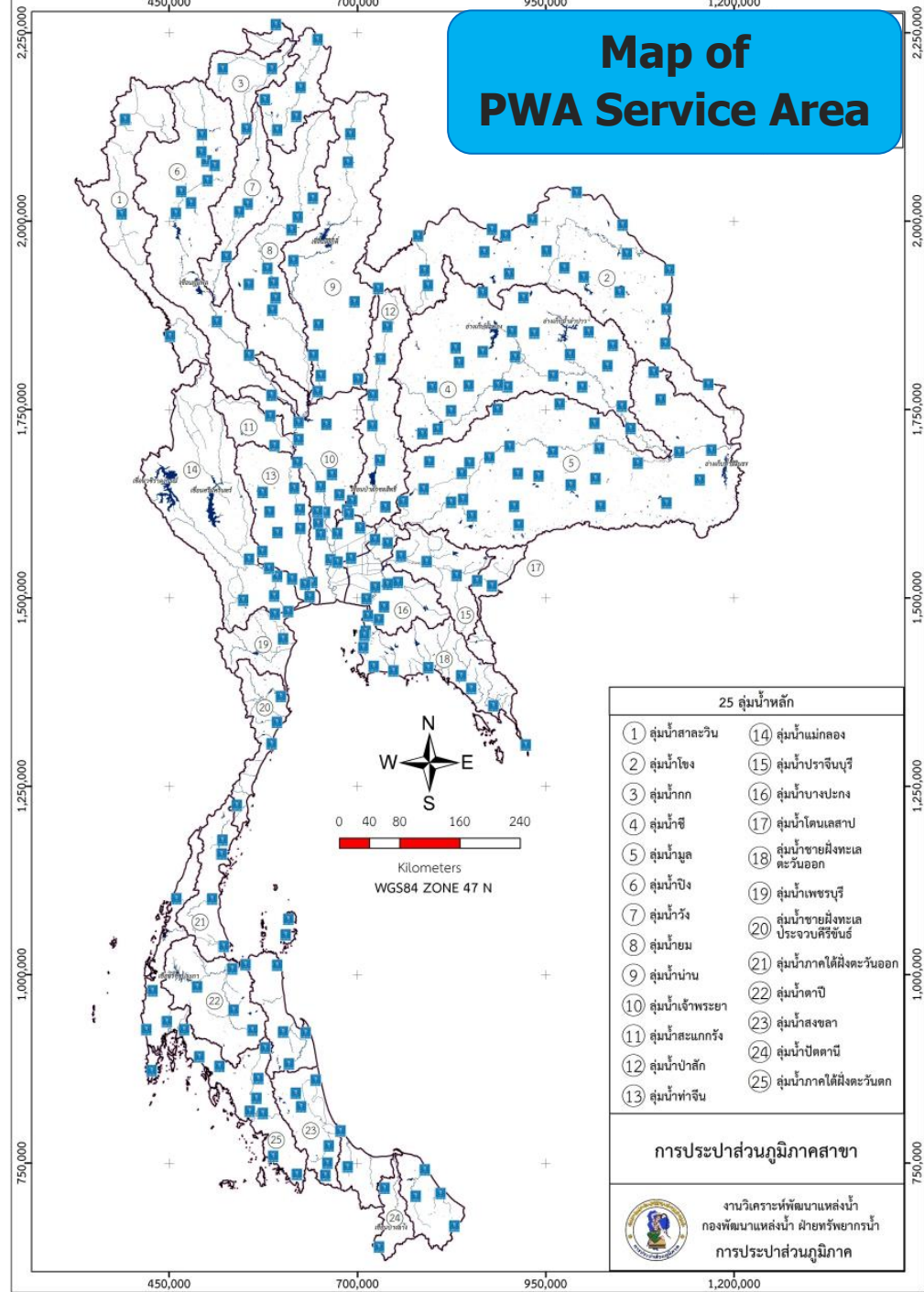
## Mission of PWA

1. Conduct surveys, provide water sources and procure raw water for water supply production.
2. Produce, deliver and distribute water supply across the country except Bangkok Metropolitan area, Nonthaburi and Samut Prakan provinces.
3. Undertake other businesses related to or in continuation with the water supply business.

# Map of 25 River Basin



# Map of PWA Service Area

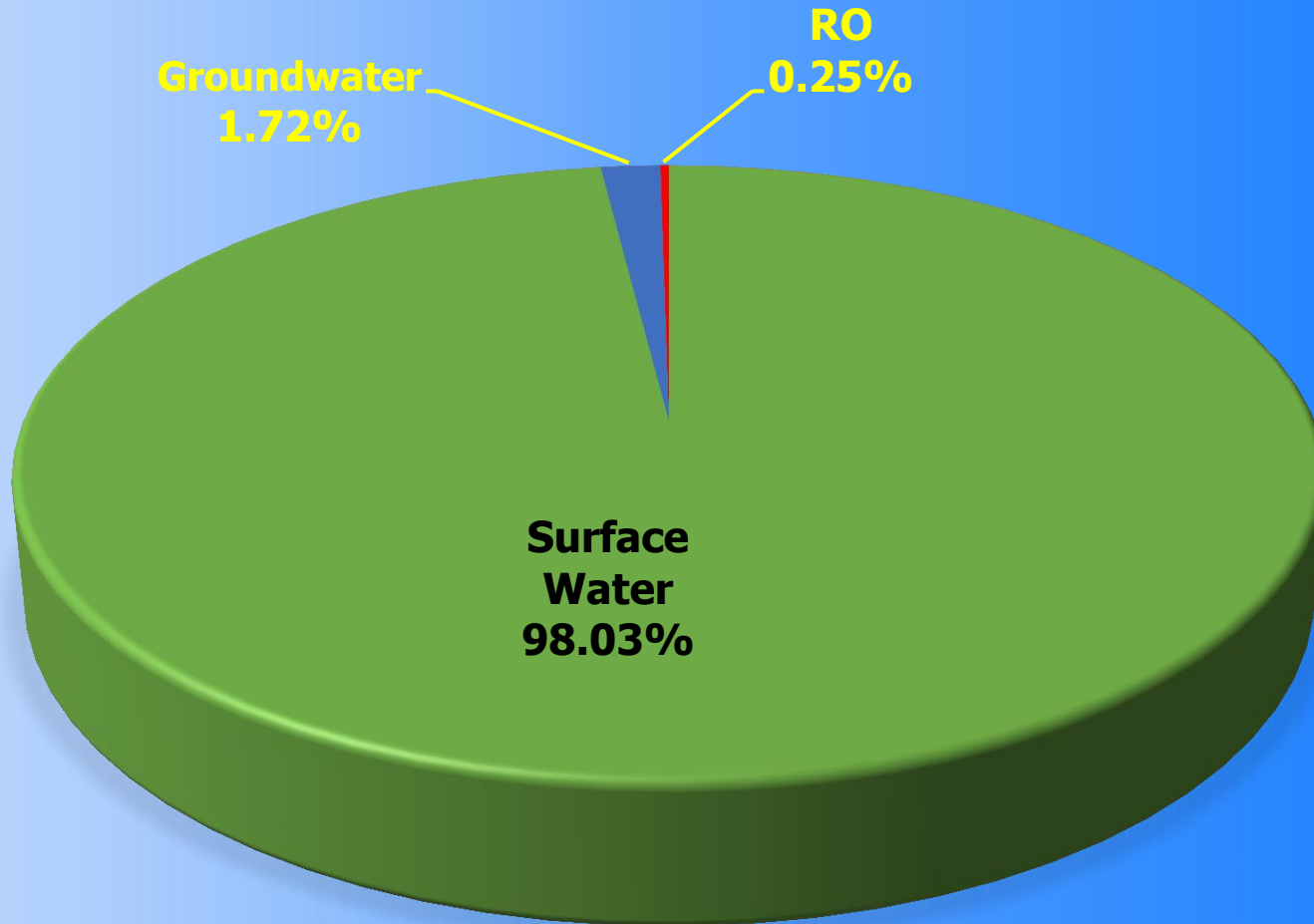




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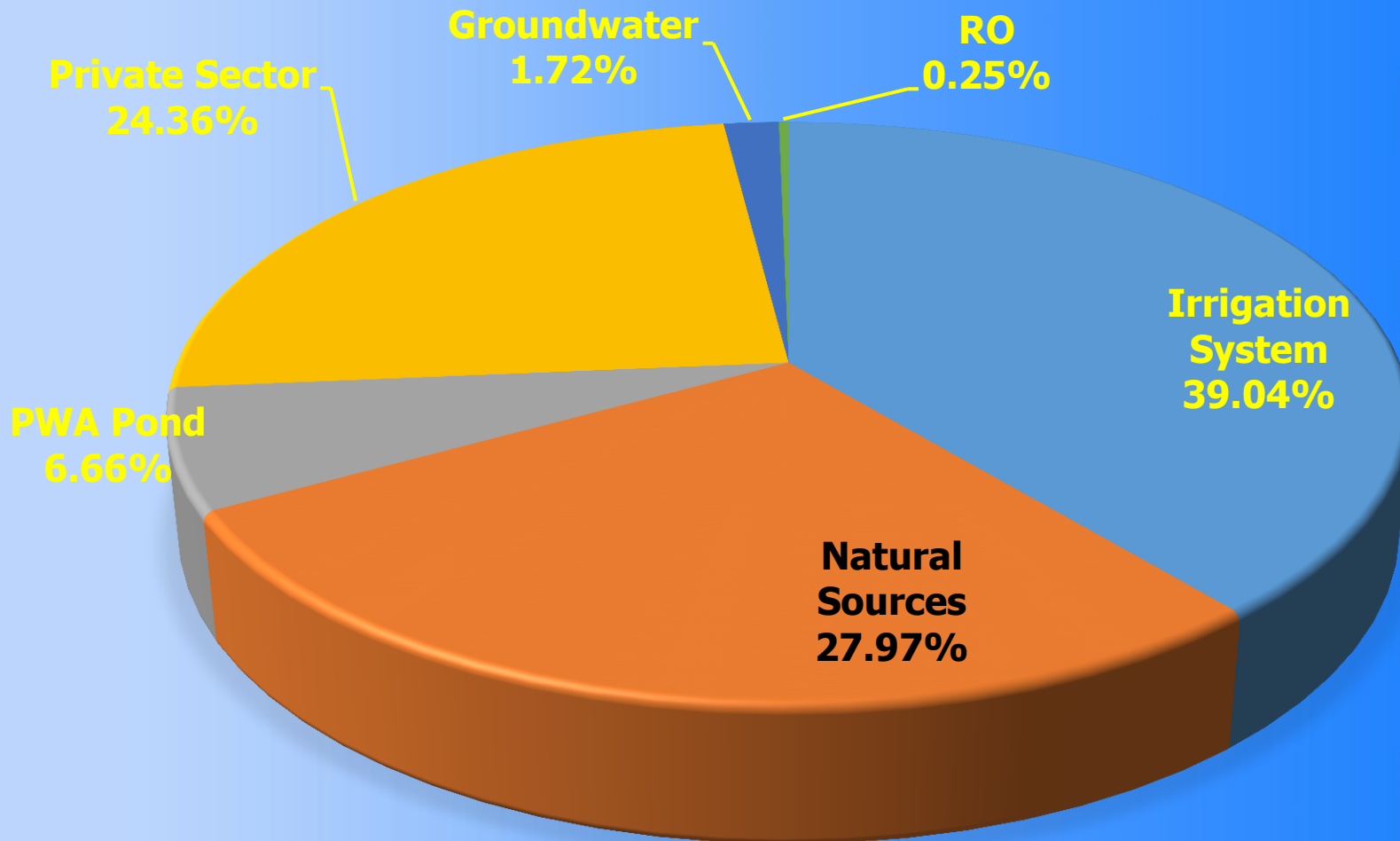
# PWA WATER RESOURCES

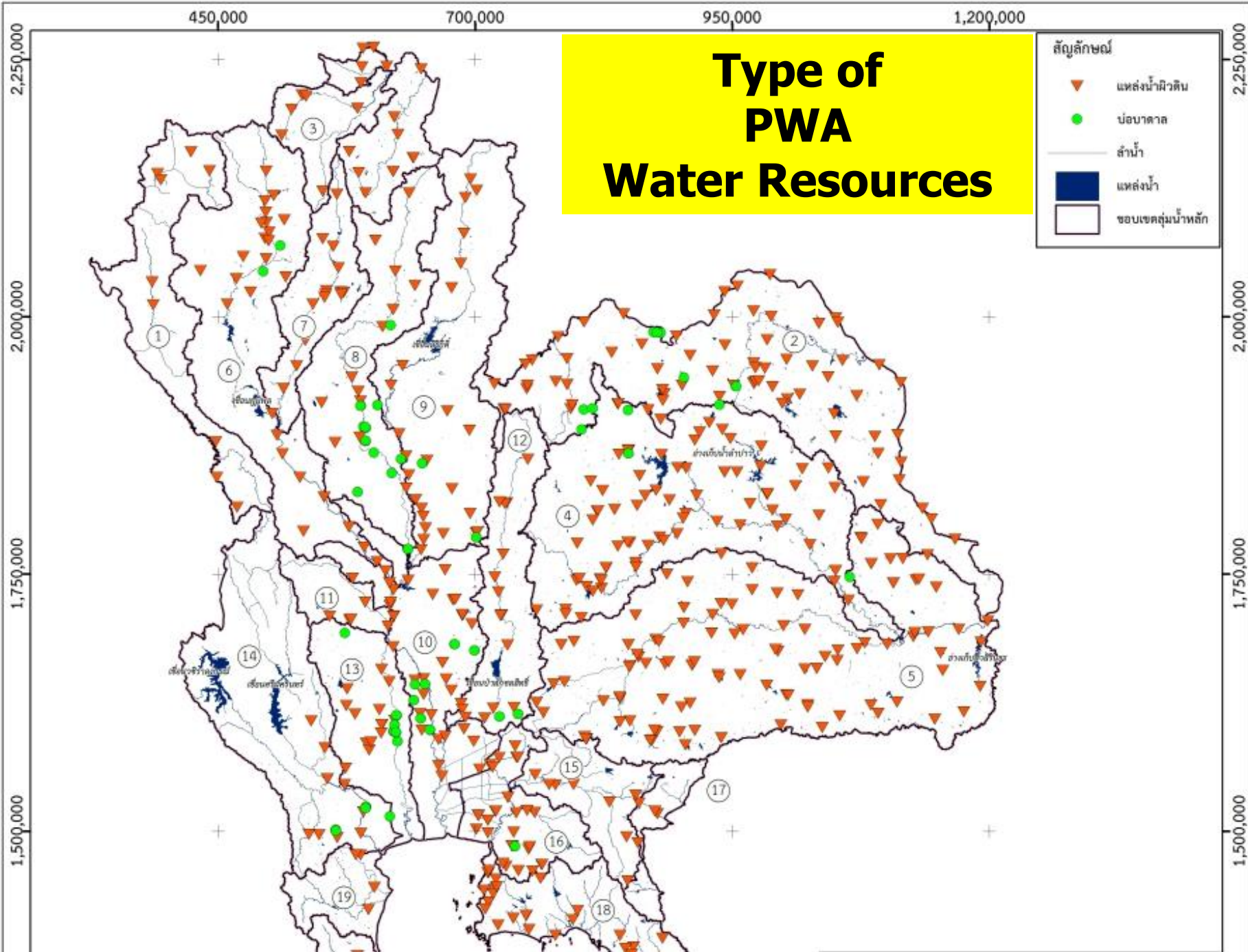


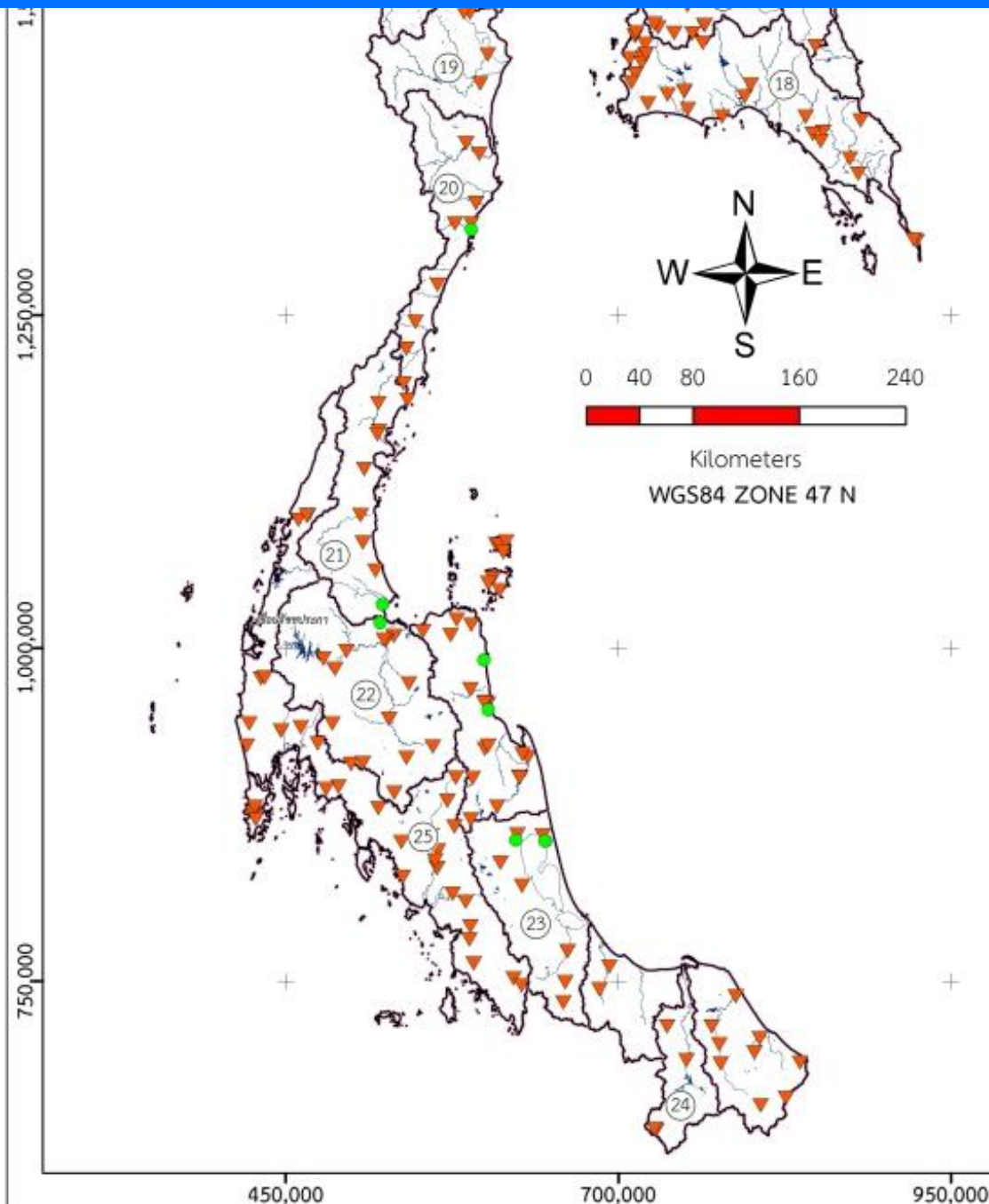


# การประปาส่วนภูมิภาค

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## 25 กลุ่มน้ำหลัก

- |                     |                                      |
|---------------------|--------------------------------------|
| ① กลุ่มน้ำสาละวิน   | ⑭ กลุ่มน้ำแม่กลอง                    |
| ② กลุ่มน้ำโขง       | ⑮ กลุ่มน้ำปราจีนบุรี                 |
| ③ กลุ่มน้ำกก        | ⑯ กลุ่มน้ำบางปะกง                    |
| ④ กลุ่มน้ำชี        | ⑰ กลุ่มน้ำโตนเลสาป                   |
| ⑤ กลุ่มน้ำมูล       | ⑱ กลุ่มน้ำชายฝั่งทะเลตะวันออก        |
| ⑥ กลุ่มน้ำปิง       | ⑲ กลุ่มน้ำเพชรบุรี                   |
| ⑦ กลุ่มน้ำวัง       | ⑳ กลุ่มน้ำชายฝั่งทะเลประจวบคีรีขันธ์ |
| ⑧ กลุ่มน้ำยม        | ㉑ กลุ่มน้ำภาคใต้ฝั่งตะวันออก         |
| ⑨ กลุ่มน้ำน่าน      | ㉒ กลุ่มน้ำตาปี                       |
| ⑩ กลุ่มน้ำเจ้าพระยา | ㉓ กลุ่มน้ำสงขลา                      |
| ⑪ กลุ่มน้ำสะแกกรัง  | ㉔ กลุ่มน้ำปัตตานี                    |
| ⑫ กลุ่มน้ำป่าสัก    | ㉕ กลุ่มน้ำภาคใต้ฝั่งตะวันตก          |
| ⑬ กลุ่มน้ำท่าจีน    |                                      |

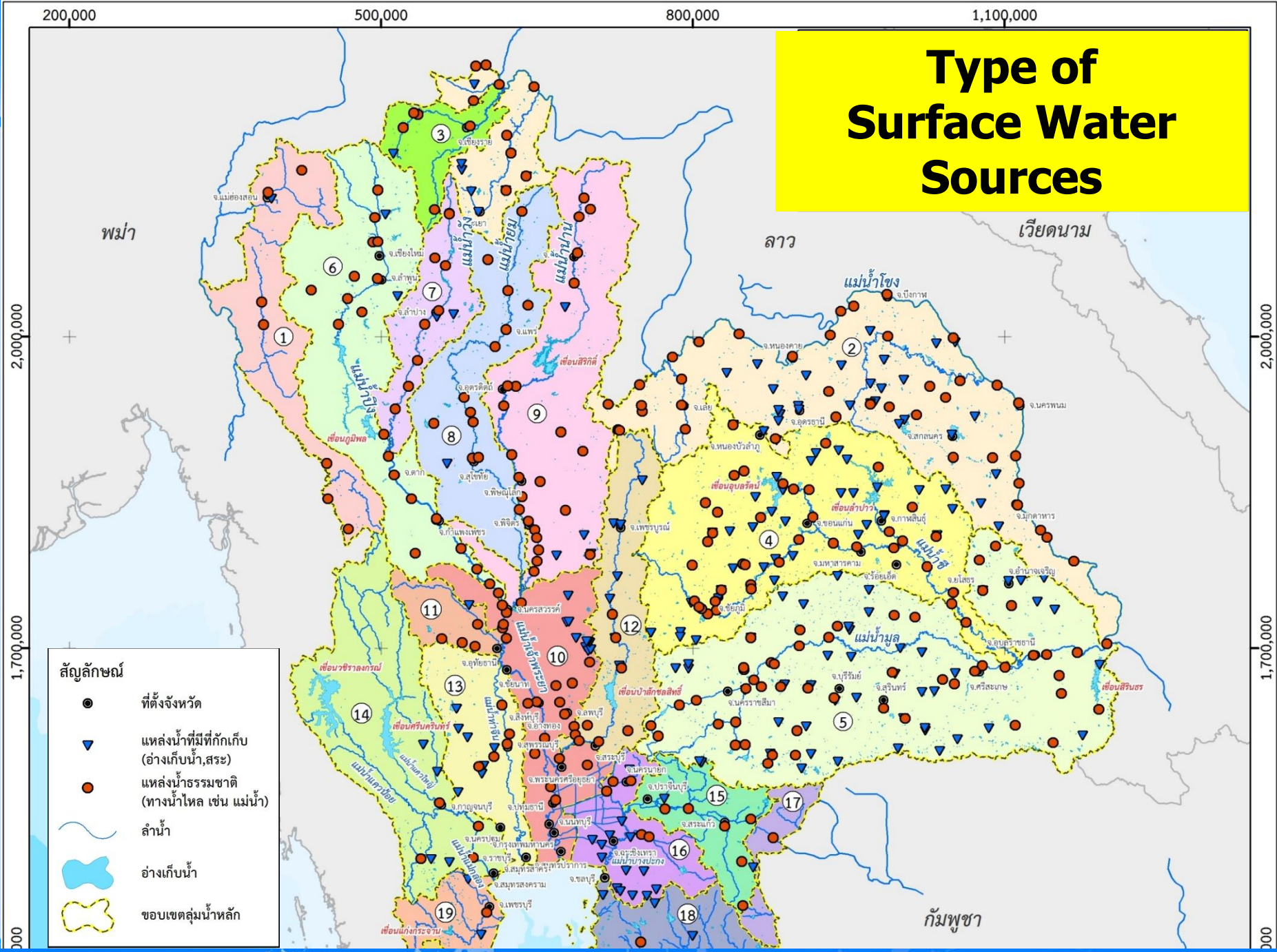
## แหล่งน้ำดิบของการประปาส่วนภูมิภาค

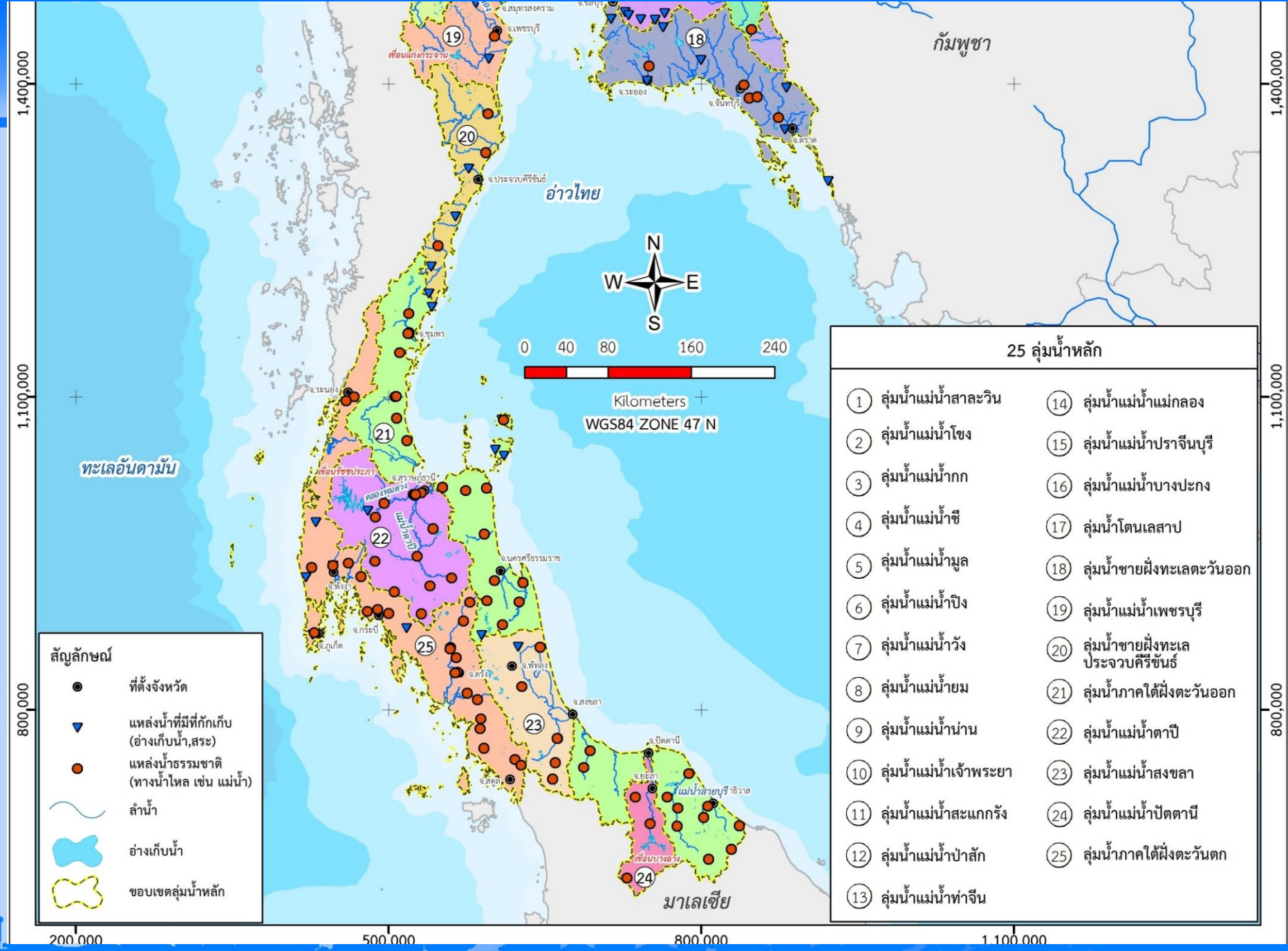


งานวิเคราะห์พัฒนาแหล่งน้ำ  
กองพัฒนาแหล่งน้ำ ฝ่ายทรัพยากรน้ำ  
การประปาส่วนภูมิภาค

1,200,000

# Type of Surface Water Sources





## Surface Water Sources



Raw Water  
Pumping  
Station



## Surface Water Sources



Raw Water  
Pumping  
Station



## Surface Water Sources



## Groundwater Sources



## Groundwater Sources



## RO System





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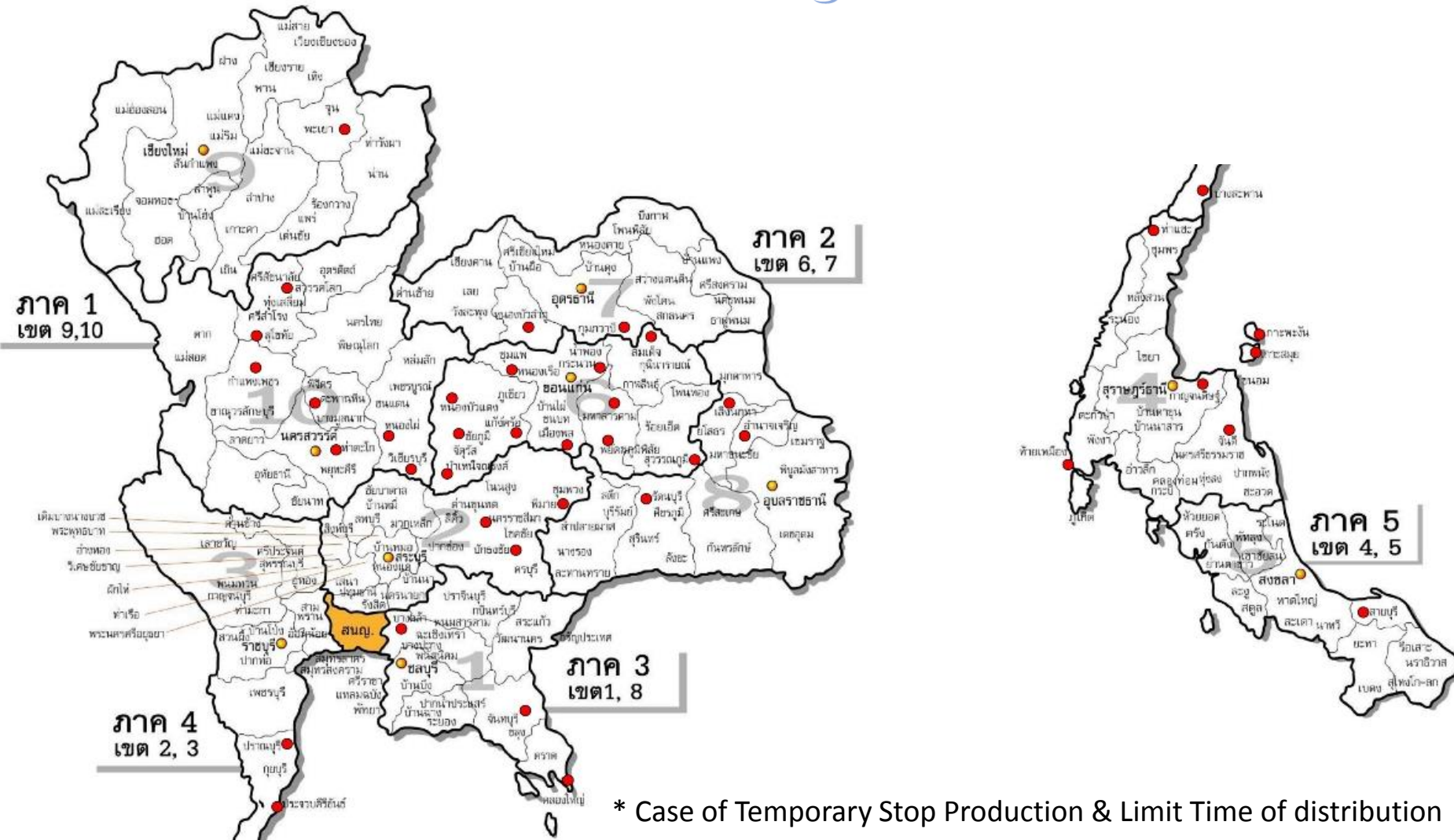
# PWA Critical Water Problems



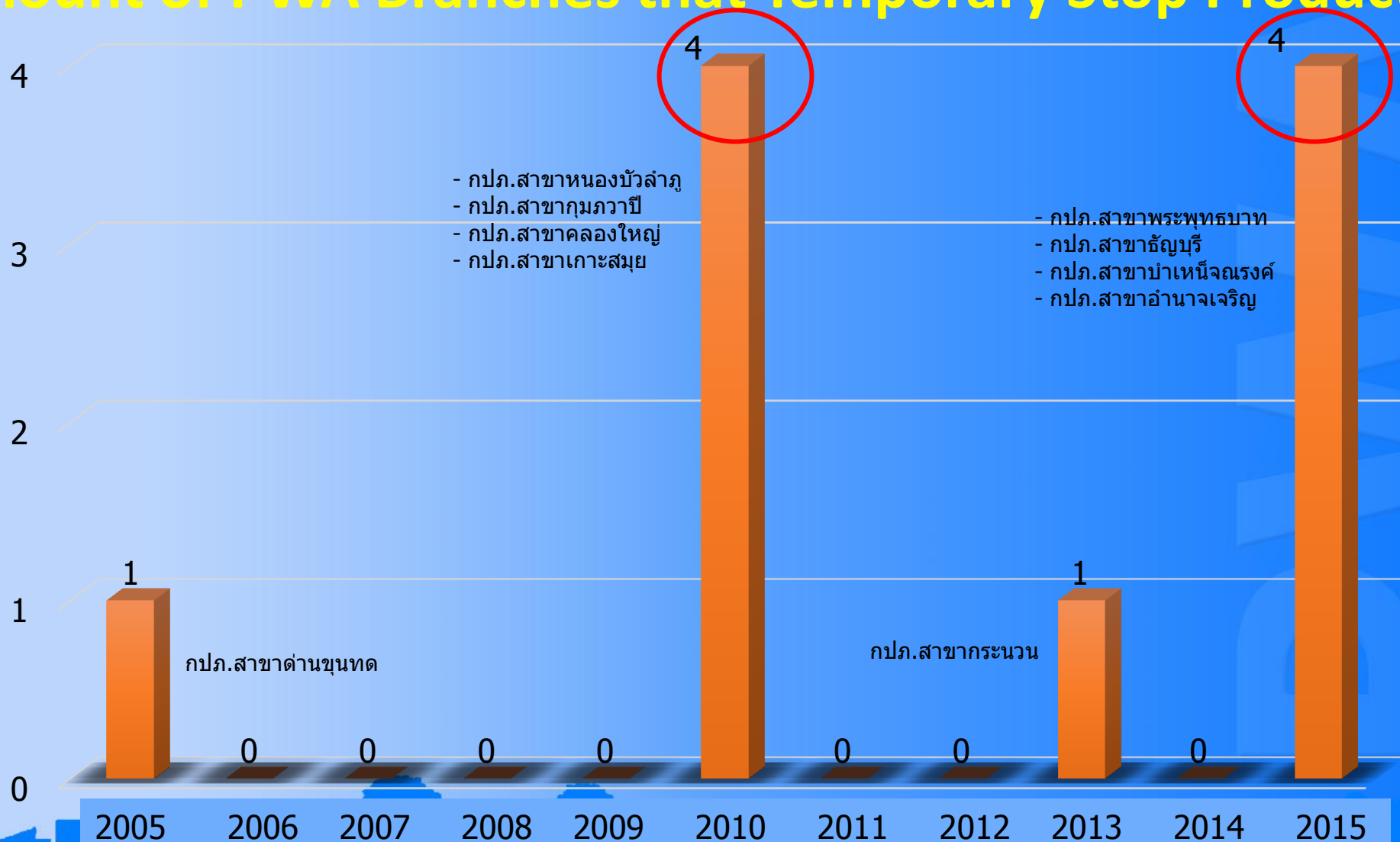
## Causes

1. PWA has only a few raw water sources of its own.
2. Raw water shortage in dry season / Climate changes.
3. Not much PWA water data for analysis problems.
4. Much higher demand for water in major cities. (scenery town)
5. Problems of contaminated raw water sources.
6. Water fight among water users.
7. No specific law for water supply management.
8. Limited investment budget.
9. There is overlapping government agencies responsible for water sources .

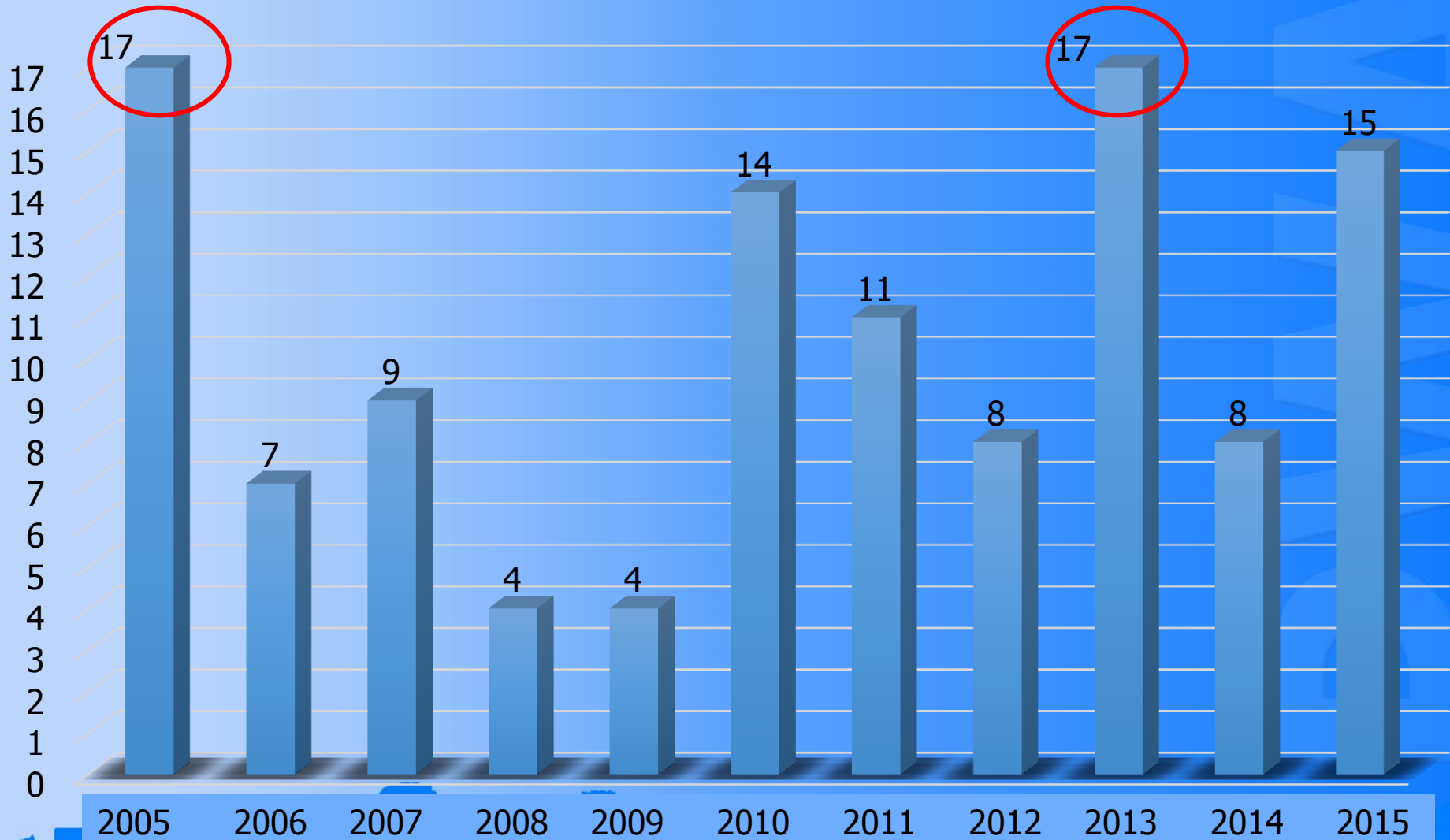
### PWA Statistical Data of Critical Drought Event in 2007-2014



## Amount of PWA Branches that Temporary Stop Production



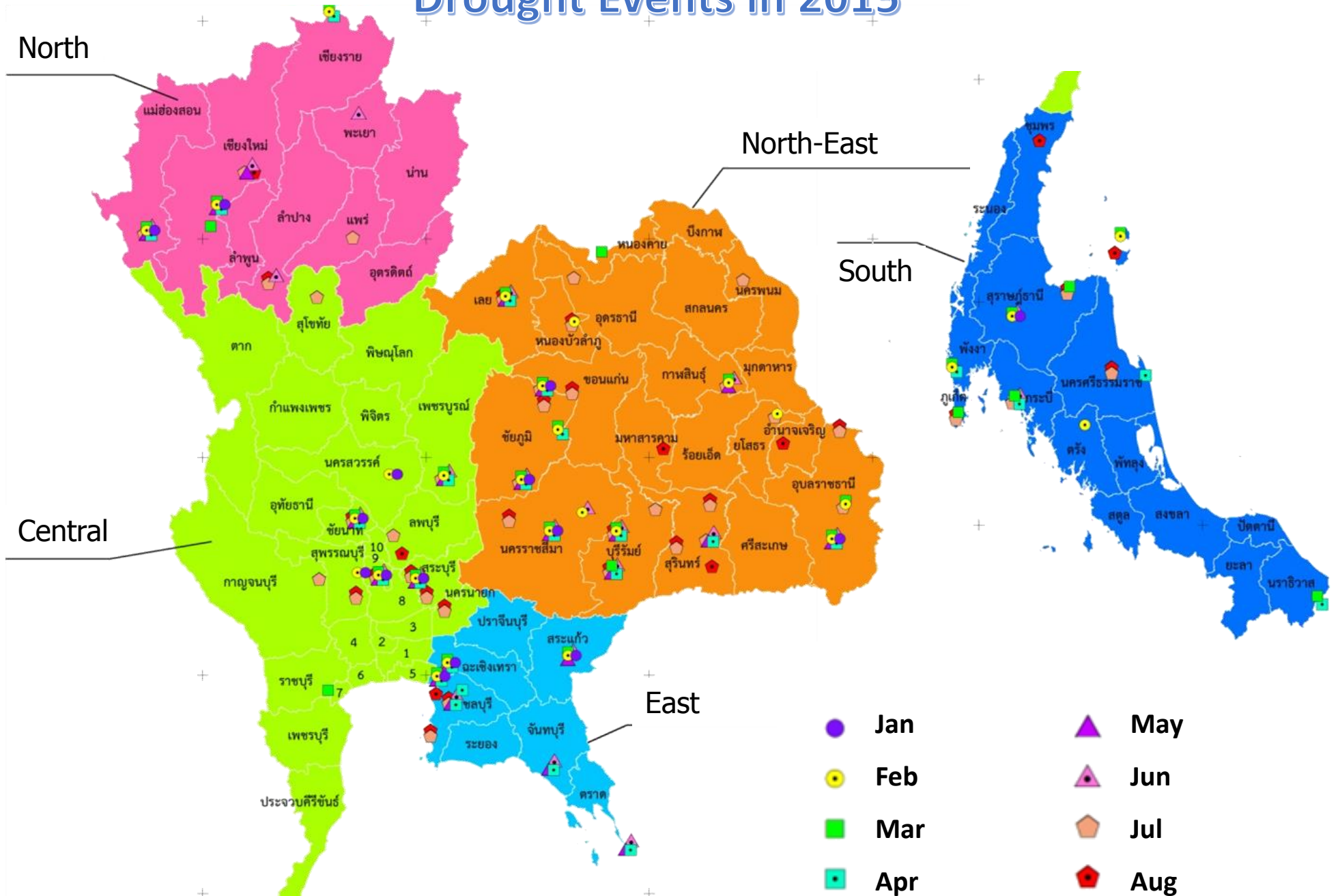
## Amount of PWA Branches that Limit Time of Distribution



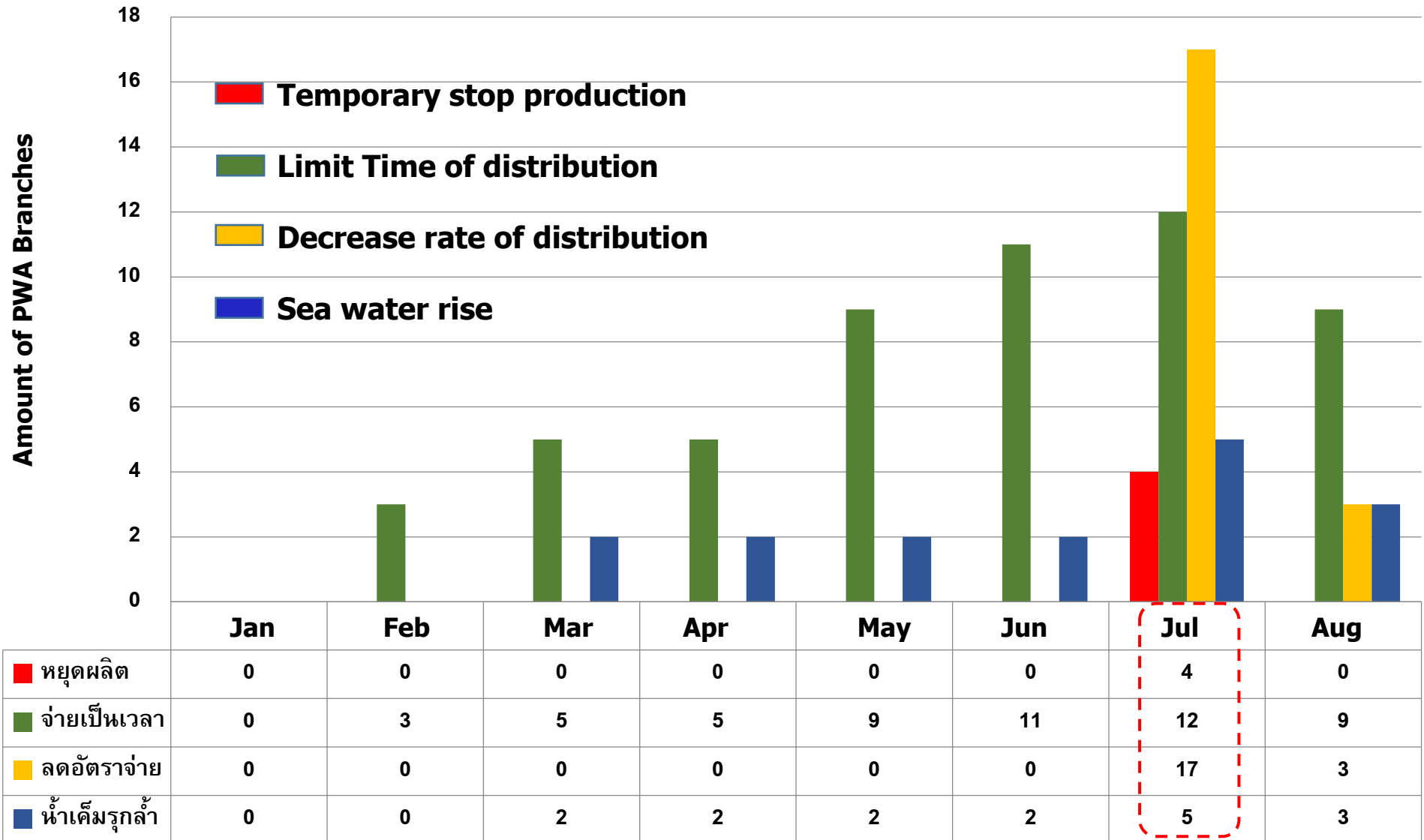
# Drought Events in 2015



# Drought Events in 2015



## Drought Event in 2015





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## Examples of PWA Branches





- ❖ Pak Thong Chai Branch
- ❖ Nakhon Ratchasima Province
- ❖ Lam Phra Phloeng Canal





- ❖ Prachuap Khiri Khan Branch
- ❖ Prachuap Khiri Khan Province
- ❖ Khlong Bueng Dam





- ❖ Tha Tako Branch
- ❖ Nakhon Sawan Province
- ❖ PWA Ponds

# การประปาส่วนภูมิภาค

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- ❖ Thanya Buri Branch
- ❖ Pathum Thani Province
- ❖ Irrigation Canal

## WATER MANAGEMENT

- ❖ Short Term Plan
- ❖ Long Term Plan

# Short-term Water Management Plan



1. Reformation new program for distribution
2. Searching for new sources of water : Groundwater, other surface water
3. Excavation for more storage
4. By using water supply carry truck from nearby branches or other government agencies



# Short-term Water Management Plan



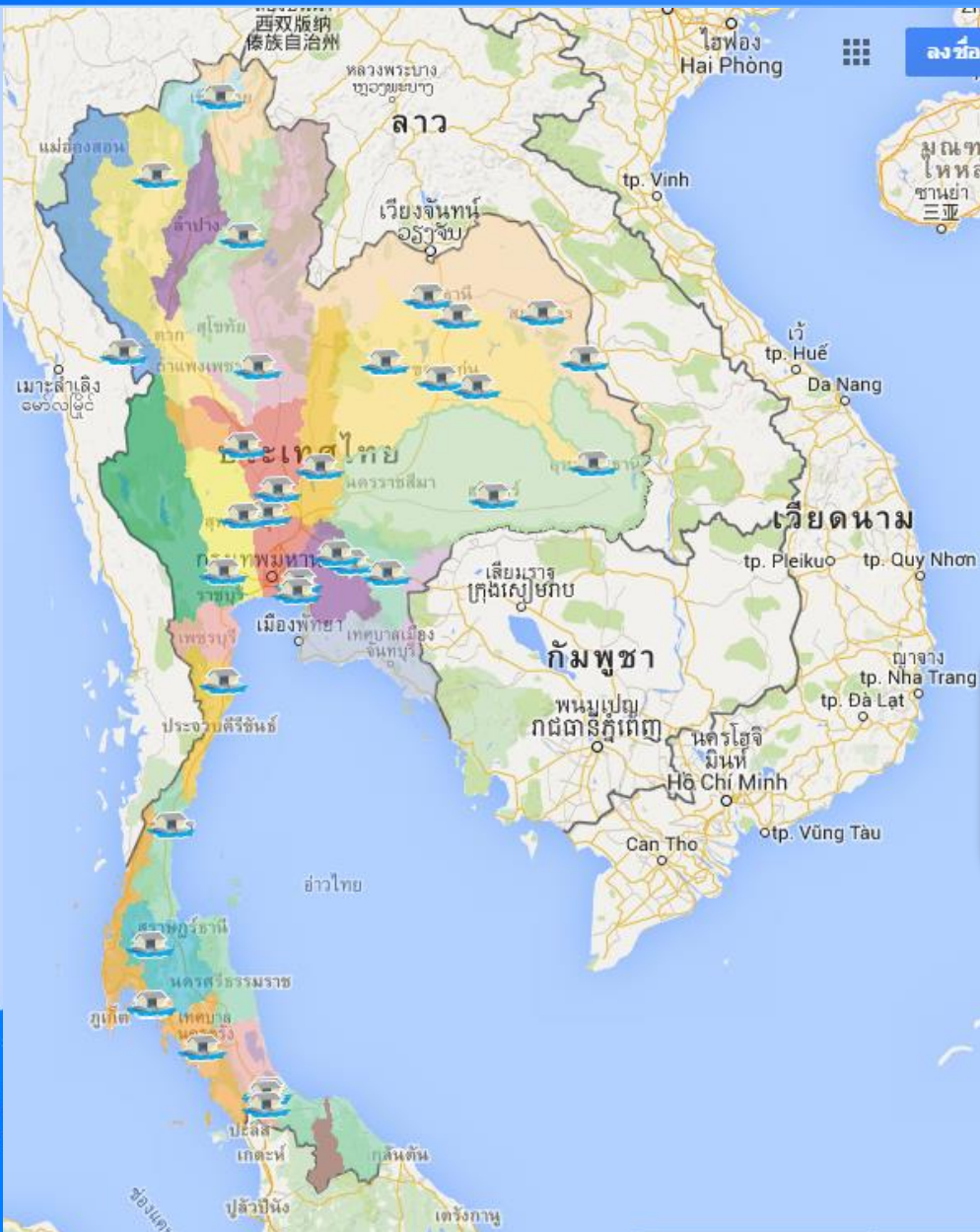
5. Build temporary weir to rise water level
6. Buy raw water from private sector
7. Cooperate with other government agencies to allow information for planning to mitigate water problems



# Long-term Water Management Plan

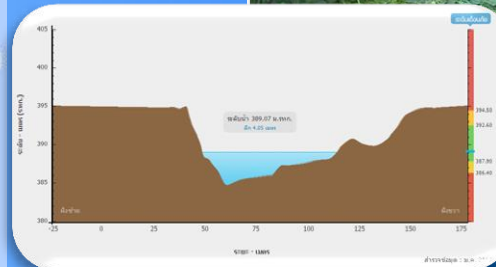
- ❖ Research and apply master plans on 25 river basins development
- ❖ Installation telemetering system at high risk raw water sources (quantity & quality)
- ❖ Sharing water resources data with other government agencies for integrate management
- ❖ New choice for conjunctive use of ground and surface water





## PWA Telemetry

- ❖ 30 Stations (2012-2014)
- ❖ 18 Main River Basins



# Thank You for Your Attention



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