ROYAL IRRIGATION DEPARTMENT THAILAND

Dr.THANET SOMBOON
Director of Water Watch and Monitoring System For Warning Center

TOPIC

- **IRRIGATION WATER MANAGEMENT**
  - Overview of Irrigation Systems in Thailand
  - Water Management in Dry Season
  - Water Management in Rainy Season
  - Outcomes and performance of irrigation system modernization
  - Joint Management Committee for Irrigation (JMC)
  - Participatory Irrigation Management (PIM) Project

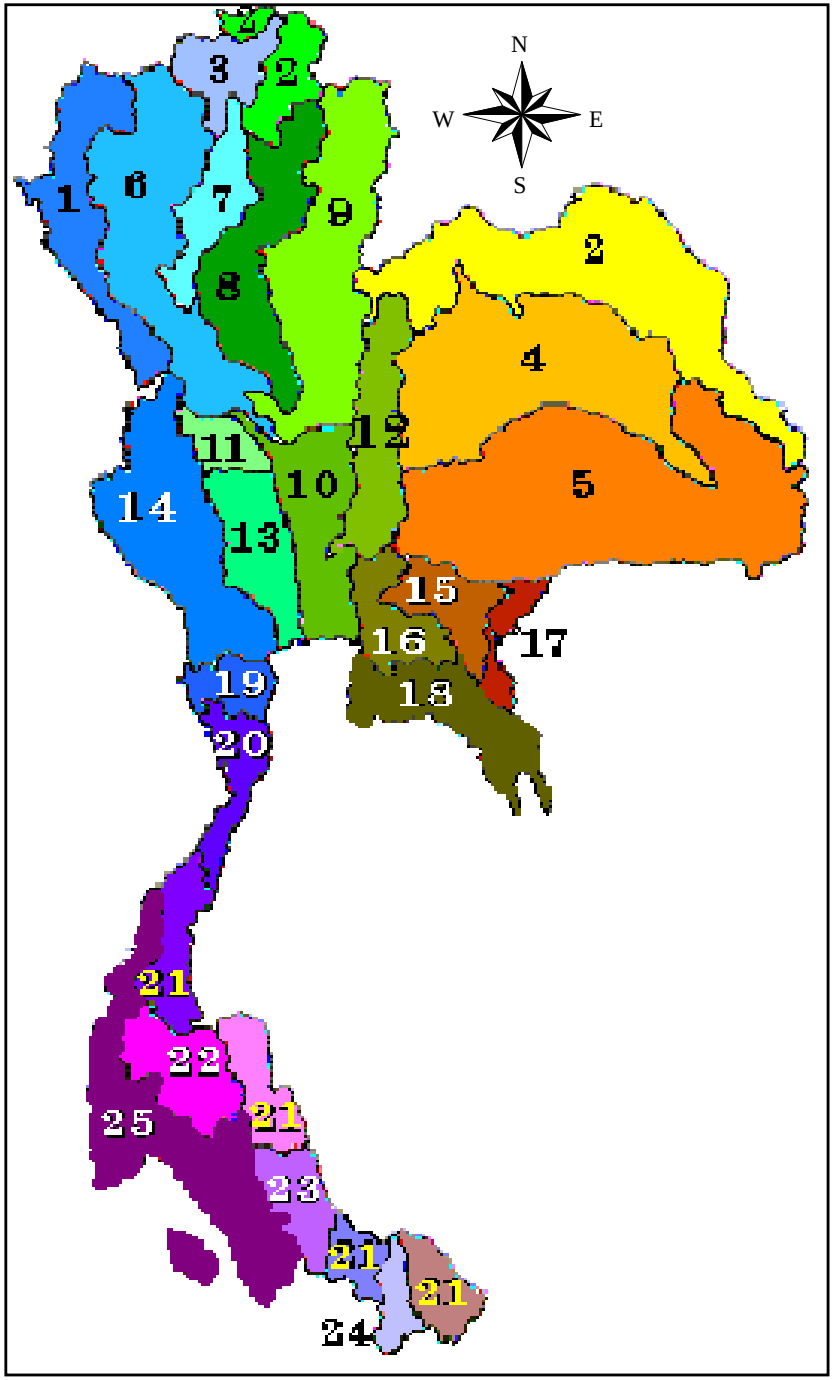
- **SMART WATER OPERATION CENTER : SWOC**

Overview of Irrigation Systems in Thailand

About Thailand

- Thailand is located in Southeast Asia region
- Country area **51,312,000 hectares**
- Agriculture area base on land-use data **23,877,800 hectares (46.5% of country area)**
- Paddy field area **8,930,006 hectares (37.4% of agricultural land area)**
- Irrigated paddy field area **2,792,000 hectares (31.3% of paddy field area)**

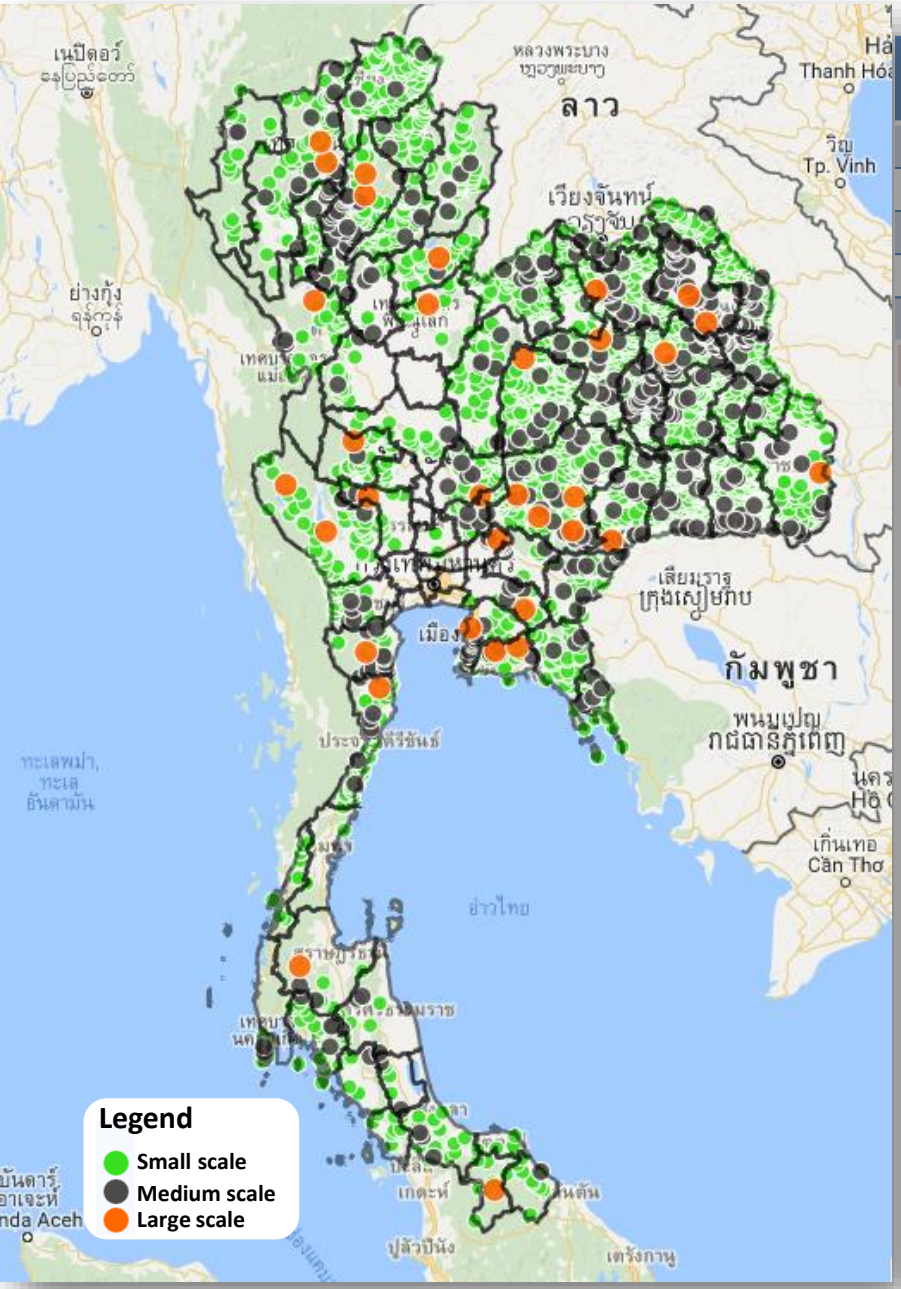
Source: Office of Agricultural Economics



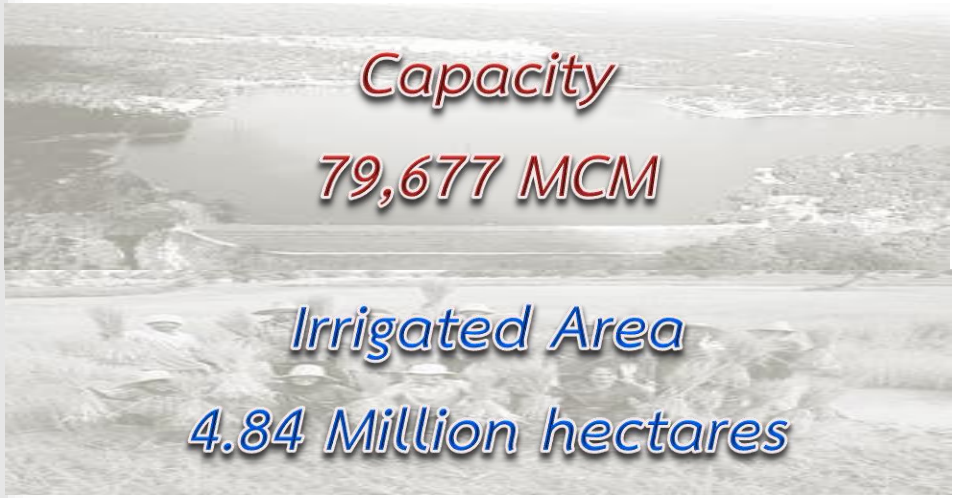
Main River Basins of Thailand

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

Irrigation Facilities in Thailand



Project	Number of Project	Capacity (MCM)	Irrigable Area (M.ha)
Large scale	94	73,217	2.87
Medium Scale	671	4,219	1.05
Small Scale	13,842	1,790	0.18
Pumping station	2,557	1	0.72
Monkey cheek	223	451	0.01
Total	17,387	79,677	4.84



Source: 2014 Annual Irrigation Project Report, Royal Irrigation Department

Usage of water in Thailand

Purpose of water usage
20,566 MCM

Irrigated water
12,654 MCM
(62%)

Industrial water
242 MCM
(1%)

Living (drinking) water
1,921 MCM
(9%)

Ecology system
5,749 MCM
(28%)

Note: Base year is dry season 2013

Mission of Royal Irrigation Department

1. Manage water resources in response to the potential of each river basin and to be ecological balanced
2. Manage water allocation to every stakeholder in equitable and sustainable manners
3. Encourage people to intensively participate in water management and development at all levels
4. Prevent and mitigate water hazards

Water Management in Dry Season

(1) Estimate supplies water and water demands

(2) The priority of water allocation for different sectors

1) For consumption, water works

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

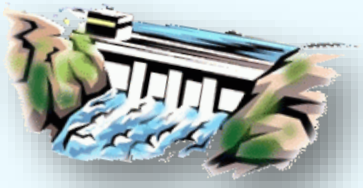
Water Management in Rainy Season

Rainy Season Water Management Plan

(1) for wet-season crop cultivation

(2) for flood prevention and mitigation

Water Management for flood control



Upstream - Store the water

Manage the water in reservoirs

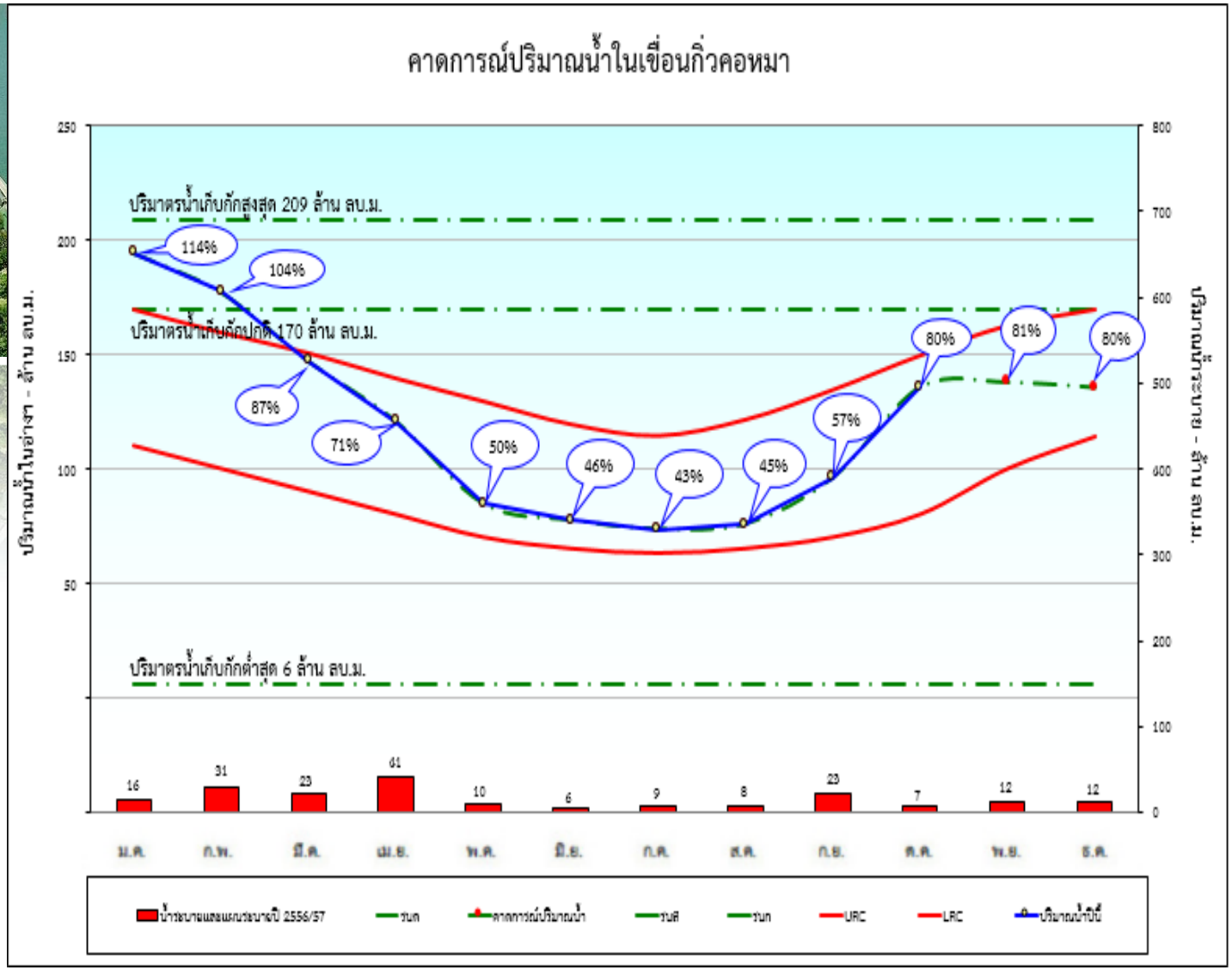
Midstream - Retard the water

Manage the water in rivers and flood plains

Downstream - Speed up the drainage of water to the sea

Manage the water in downstream area

Management of Water in reservoirs

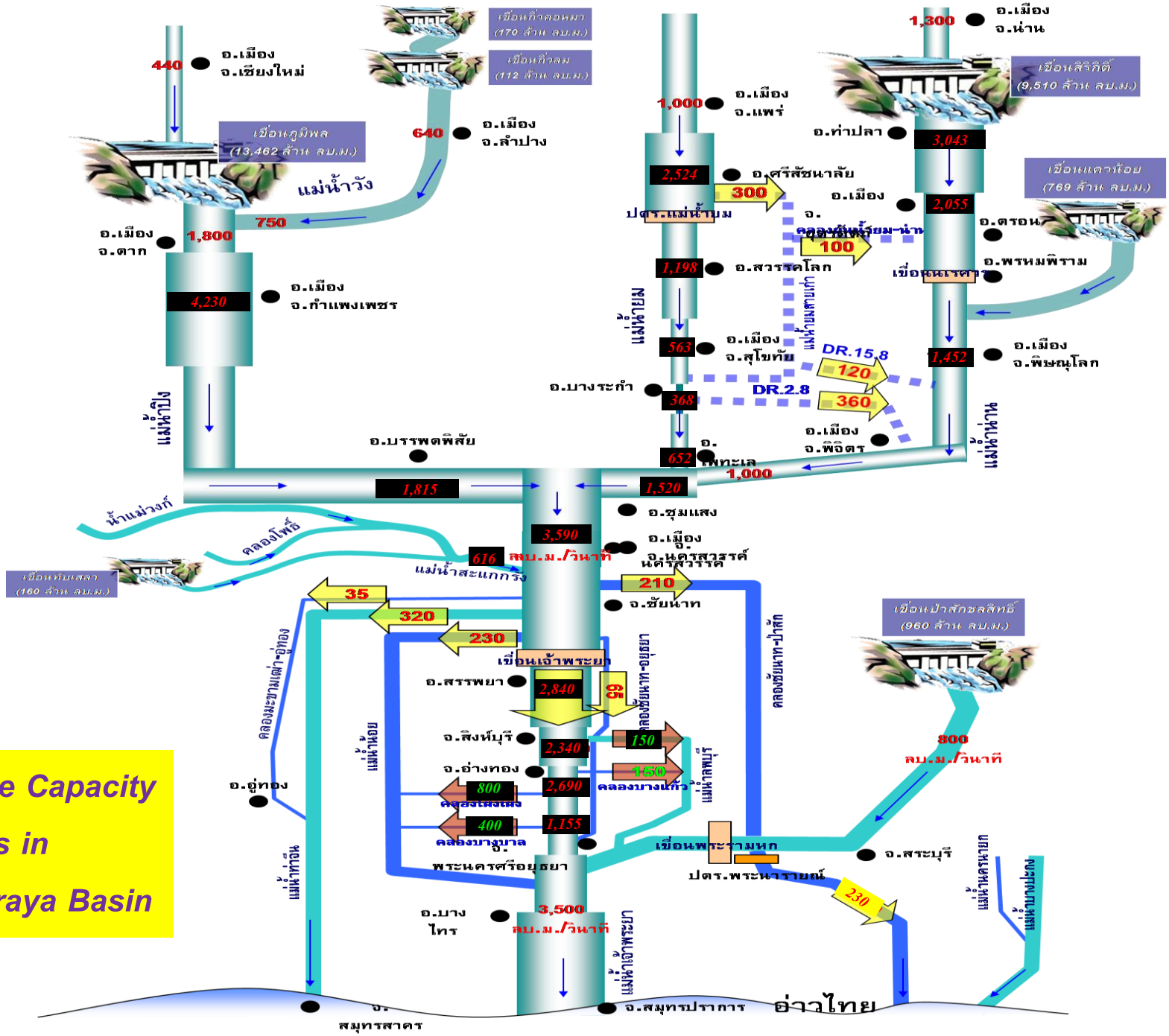


Management of Water in Rivers and Flood Plains

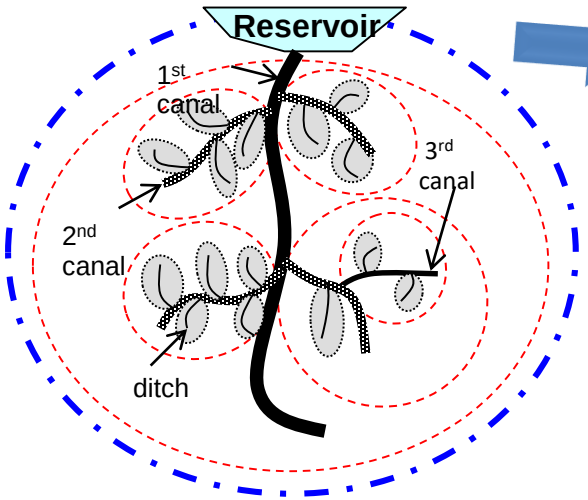
Midstream Area

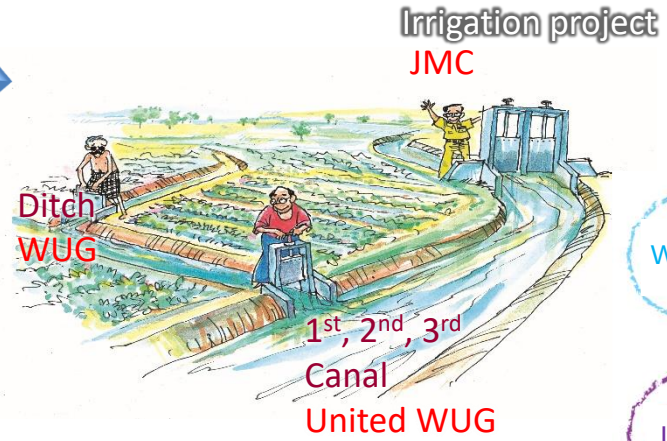
- Control the discharge in rivers
- Flood Observation and Forecasting
- Adjustment of cropping pattern and water allocation plan for agricultural sector

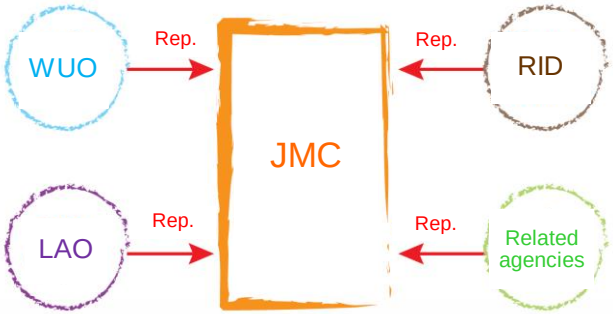
Discharge Capacity of Rivers in Chao Phraya Basin



Joint Management Committee for Irrigation (JMC)







Legend:
- WUG area
- United WUG area
- JMC area

Roles of JMC

- **To operate and maintenance an irrigation system**
  - To schedule water delivery plan and maintenance
  - To identify water delivery pattern and maintenance
  - To distribute water information regarding water allocation and maintenance

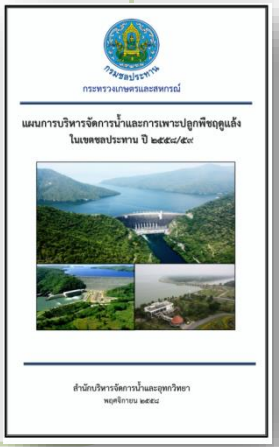
- **To run any related activities, i.e. agricultural extension promotion, agricultural credit, and marketing of agricultural products**

Committee for Dry Season Crop Planning

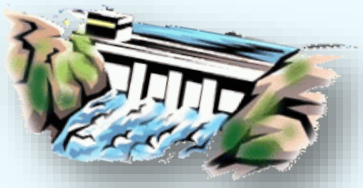
To promote efficiency in crop-areas during dry season through integrated information among all agencies related to agriculture water sector

The Roles :

- Set up the plan, target area, and measures for dry season crop.
- Observe and report the actual dry season crop planting.
- Monitor, evaluate, and control the actual dry season crop planting to be in accordance with the plan.
- Announce the related information in dry season to concerned officers, farmers and public.
- Periodically report the actual situation of dry season crop planting to the committee members until the end of dry season crop harvesting.



Outcomes and performance of irrigation system modernization



Upstream - Store the water

Manage the water in reservoirs

Midstream - Retard the water

Manage the water in rivers and flood plains

Downstream - Speed up the drainage of water to the sea

Manage the water in downstream area

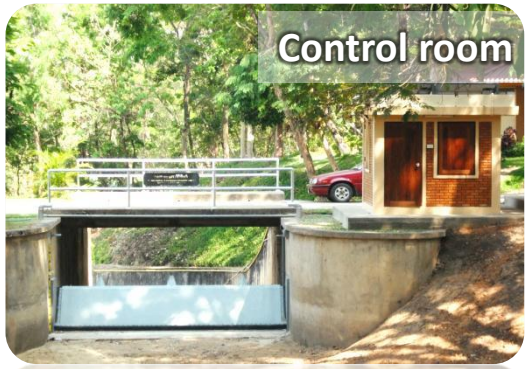
The Flap Gate Weir Type II for Flood Problem Solution

Located : Ban Ton Pao, San Kamphaeng district, Chaing Mai province.

Developed by Mae Kung Operation and Maintenance Office, Chaing Mai Province

Air Vent-Staff Gauge

Flap Gate Weir Control system



Infrastructure Project

Mini-Aquatic Weed Harvester

Weed problems is an over abundance of nutrients in our waters. Office of Research and Development of Royal Irrigation Department of Thailand has been developed Mini-Aquatic Weed Harvester for control this problem.

Mini-Aquatic Weed Harvester has been harvesting at a rate of 1.3 Rai/hour and the cost per Rai was 154 Baht.

* 1 hectare = 6.25 rai

Infrastructure Project

Agricultural Map for Adaptive Management: Agri-Map

Agri-Map

- Type of plant
- Soil/Water resources/plant suitability map for cropping
- Production Factor
- Irrigated area/ Non-Irrigated area
- Surface/ groundwater resources
- Cropping Pattern
- Cropping Requirement
- Others

Agricultural Map for Adaptive Management

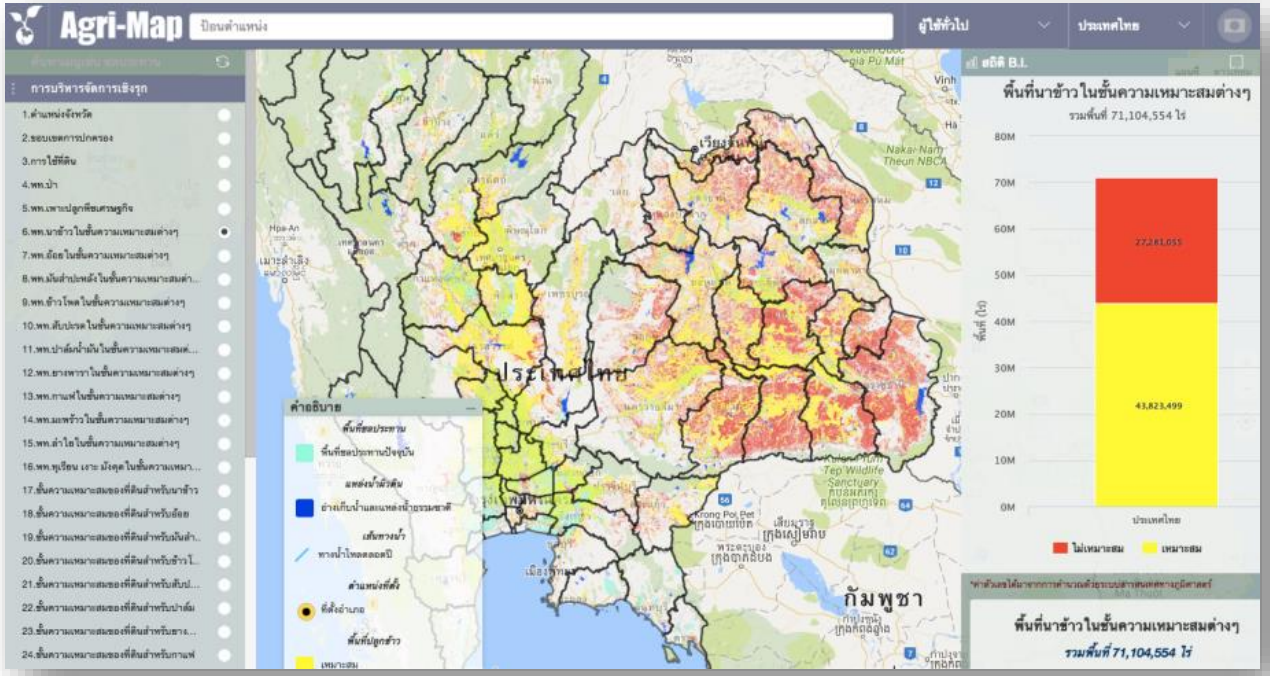
Marketing Plan | Logistic

Production by province	Balancing resources of Province	Balancing production of Province	Balancing demand of markets

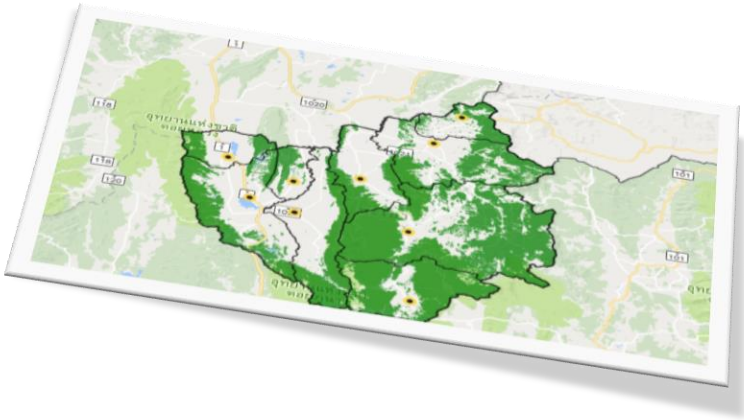
Non-Infrastructure Project

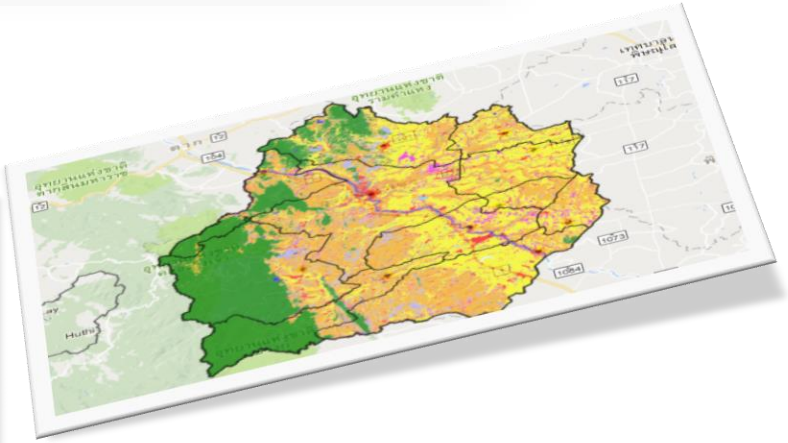
Agricultural Map for Adaptive Management: Agri-Map Online

http://agri-map-online.moac.go.th/

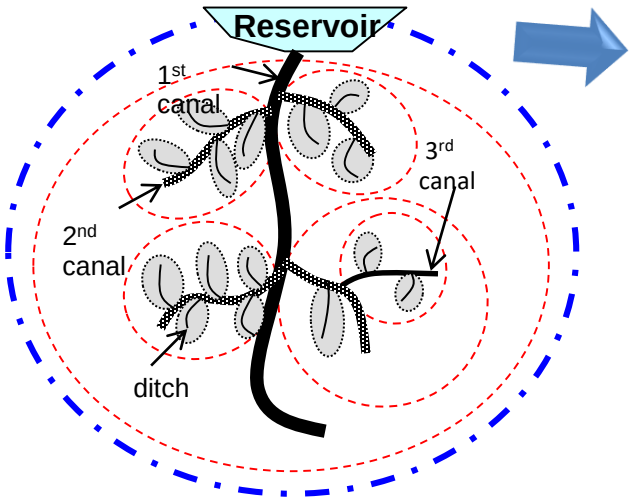


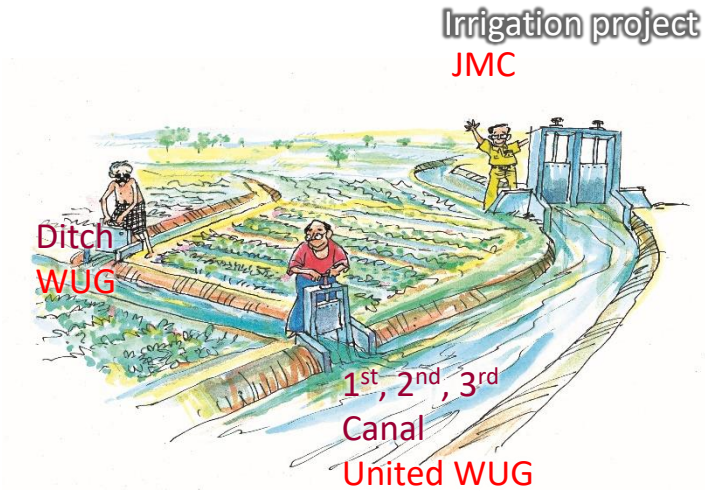
- S1 Good
- S2 Moderate
- S3 Poor
- N Very poor



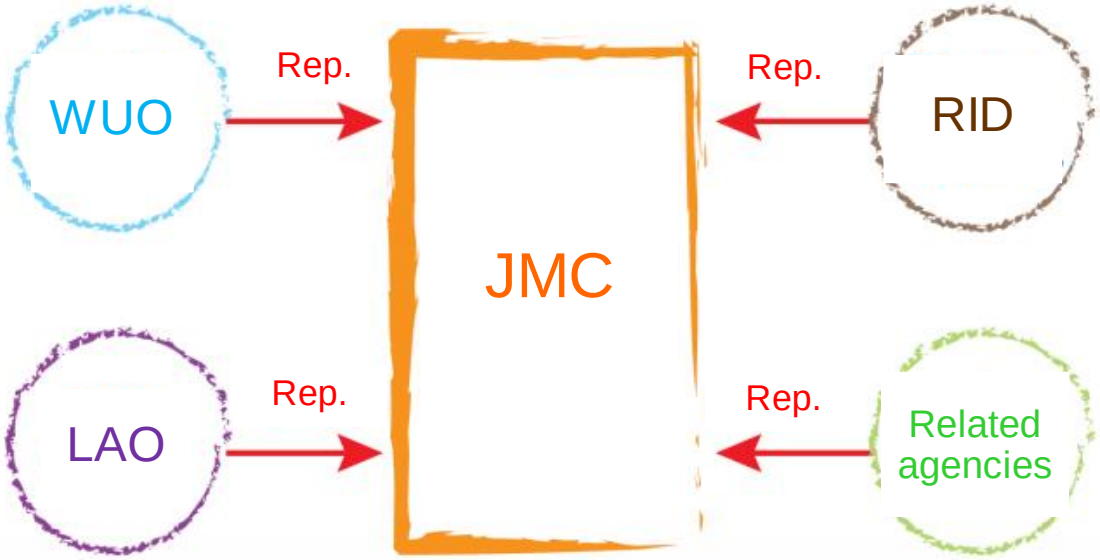


Participatory Irrigation Management (PIM) Project





There are 226 JMCs that have already been established



Best Practice: The Krasiew Operation & Maintenance Project

Located in Suphan Buri province of Thailand

Retention capacity of 240 mcm

Photo source: http://pantip.com/topic/33809332

Problems of Krasiew Operation & Maintenance project in the past

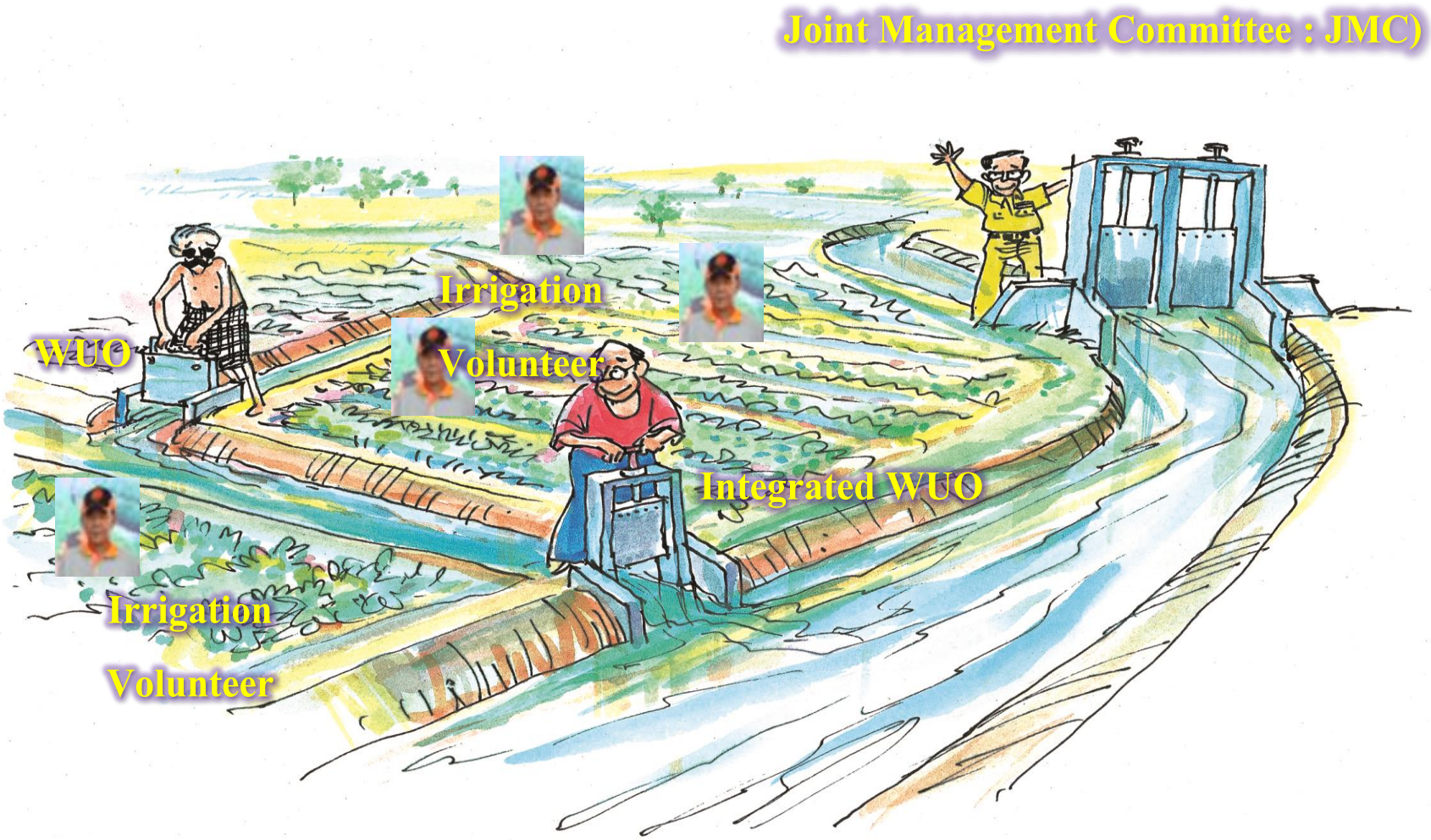
Operation and maintenance of irrigation facilities were mainly done by irrigation officers

Problems of Krasiew Operation & Maintenance project in the past

Irrigation facilities were destroyed due to the lacked senses of ownership of the irrigation system

Frequently demonstration of farmers

To solve the problems, JMC was employed



Operation and maintenance of irrigation facilities are based on the collaboration between irrigation officers and water users

The Krasiew Operation & Maintenance Project: Awards of success

BETTER MANAGEMENT — BETTER PUBLIC SERVICE

23 June 2011

United Nations Public Service Award 2nd Place Winner

Fostering Participation in Public Policy-Making Decisions through Innovative Mechanisms Category

This certificate is given in recognition of the contribution of

Royal Irrigation Department
Thailand

towards improving the effectiveness, efficiency and quality of public service.

Sha Zukang
Under-Secretary-General for Economic and Social Affairs

- The Excellence Award, the 2010 Thailand Quality Public Service Awards by OPDC
- Category: Innovative public service
- The 2nd Place Winner, the 2011 United Nations Public Service Awards by UN, "Participatory Irrigation Management by Civil Society Committee and WUO: The Krasiew O&M Office"
- Category 3: Fostering participation in policy-making decisions through innovative mechanisms

Best Practice: The Mae Yom Operation & Maintenance Project

Problems of Mae Yom Operation & Maintenance project in the past

Water shortage in dry season

Conflict over water resource

Frequently demonstration of farmers

Irrigation facilities were destroyed

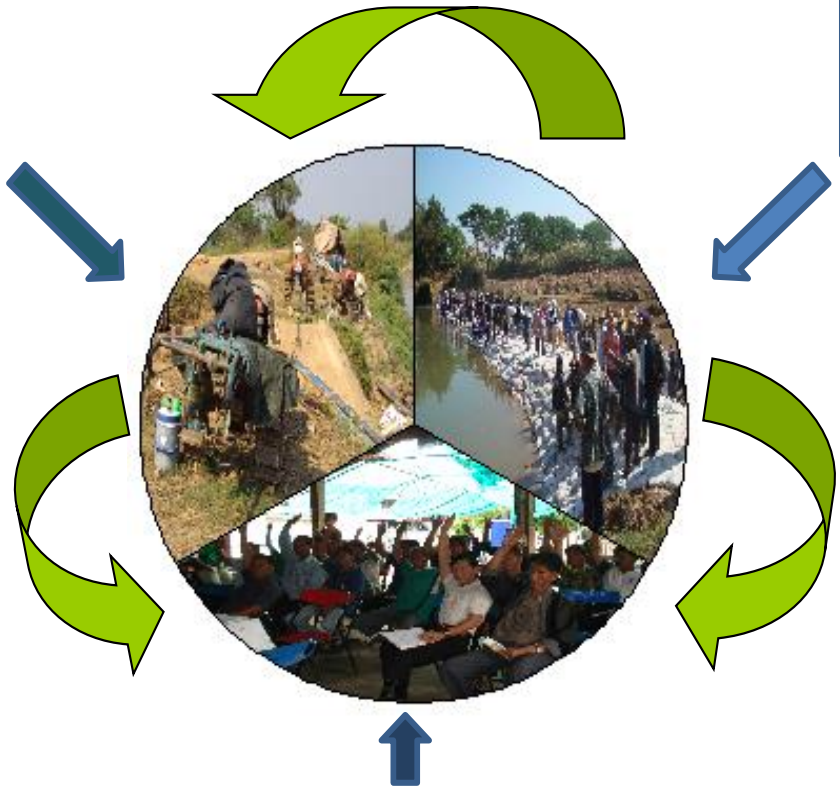
The three-coherent task mechanisms was employed

3rd Task : Acting upon agreement and supervision

- RID
- LAOs
- Provincial agricultural Officers
- Farmers & WUGs

1st Task : Water subsidy for agriculture

- RID (The Royal Irrigation Department)
- LAOs (Local administrative organizations)
- PPDRC (Phrae Province Disaster Relief Committee)
- Provincial agricultural Officers



2nd Task : Participatory irrigation management

- RID
- LAOs
- Provincial agricultural Officers
- Farmers & WUGs

The Mae Yom Operation & Maintenance: Awards of success

- The Excellence Award, the 2011 Thailand Quality Public Service Awards by OPDC
- Category: Innovative public service
- The 1st Place Winner, the 2012 United Nations Public Service Awards by UN, "Integrated Drought Prevention and Mitigation"
- Category 3: Fostering participation in policy-making decisions through innovative mechanisms

SMART WATER OPERATION CENTER : SWOC

SMART WATER OPERATION CENTER : SWOC

SWOC (Smart Water Operation Center) is responded from the government policy 4.0 (Thailand 4.0) which going to be the (RID 4.0). It purposes to be the Single Command for monitoring the Weather and Rainfall, Analyzing the water situation, Watch and monitoring for warning the water situation, and then Public relations with speedy process. SWOC can support the Decision Making to government official with accuracy, quickly and sharply update.

To

SLOGAN OF SWOC "FAST"

SWOC
SMART WATER OPERATION CENTER

F : Fusion Database
Data center integration from various department

A : Accurate Technique
Correct according to academic principles

S : Speedy Process
Fast process

T : Targeted Solution
Achieve targeted results.

ROLE OF SMART WATER OPERATION CENTER

Sub-Committee To Monitor and Analyze Water Situation Trends

PROCESSING OF SWOC

Single Command

Report

กรมชลประทาน

ศูนย์ปฏิบัติการน้ำอัจฉริยะ
SWOC
SMART WATER OPERATION CENTER

Warning

Integretion

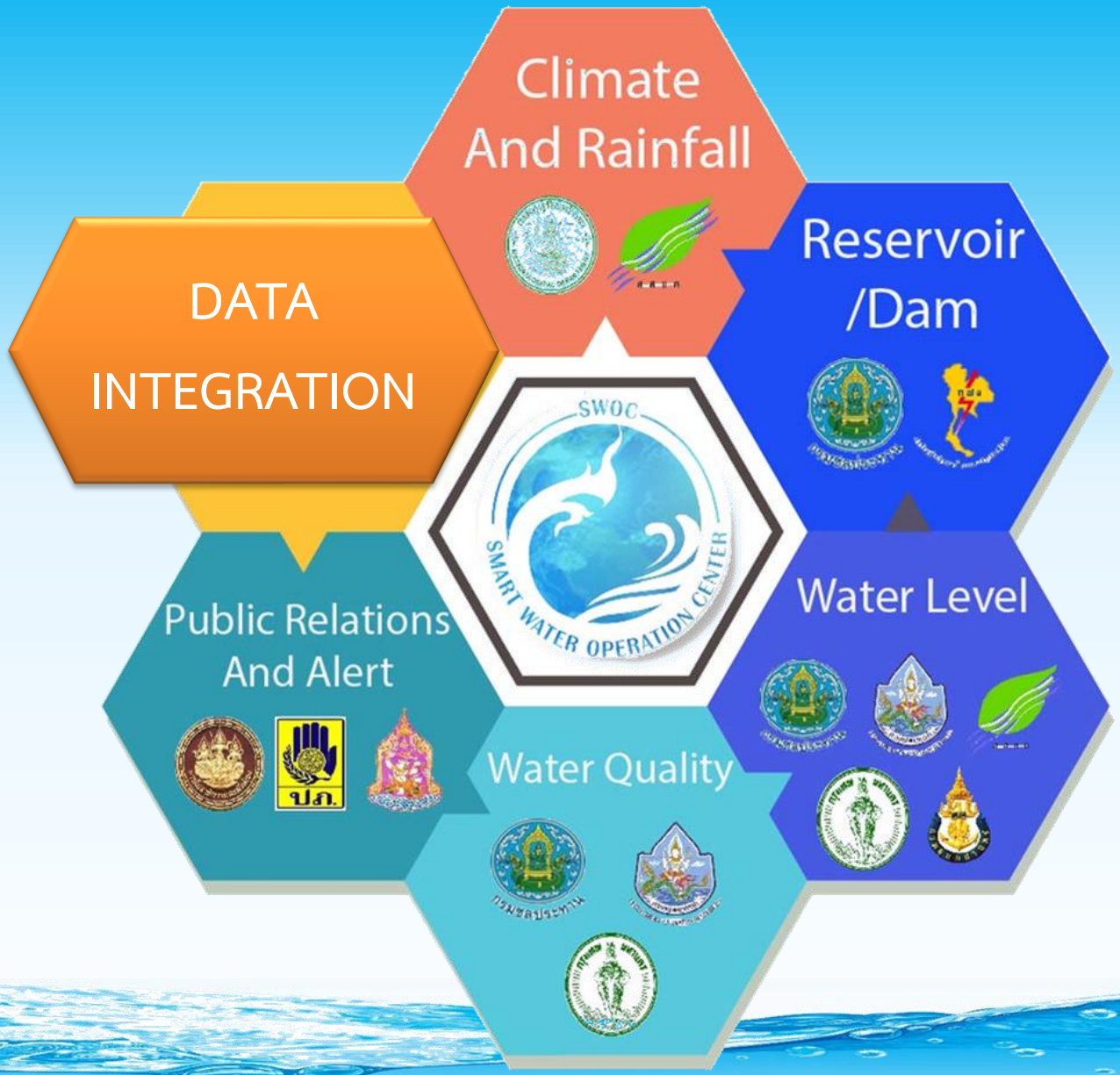
Ministry of Defense

Ministry of Interior

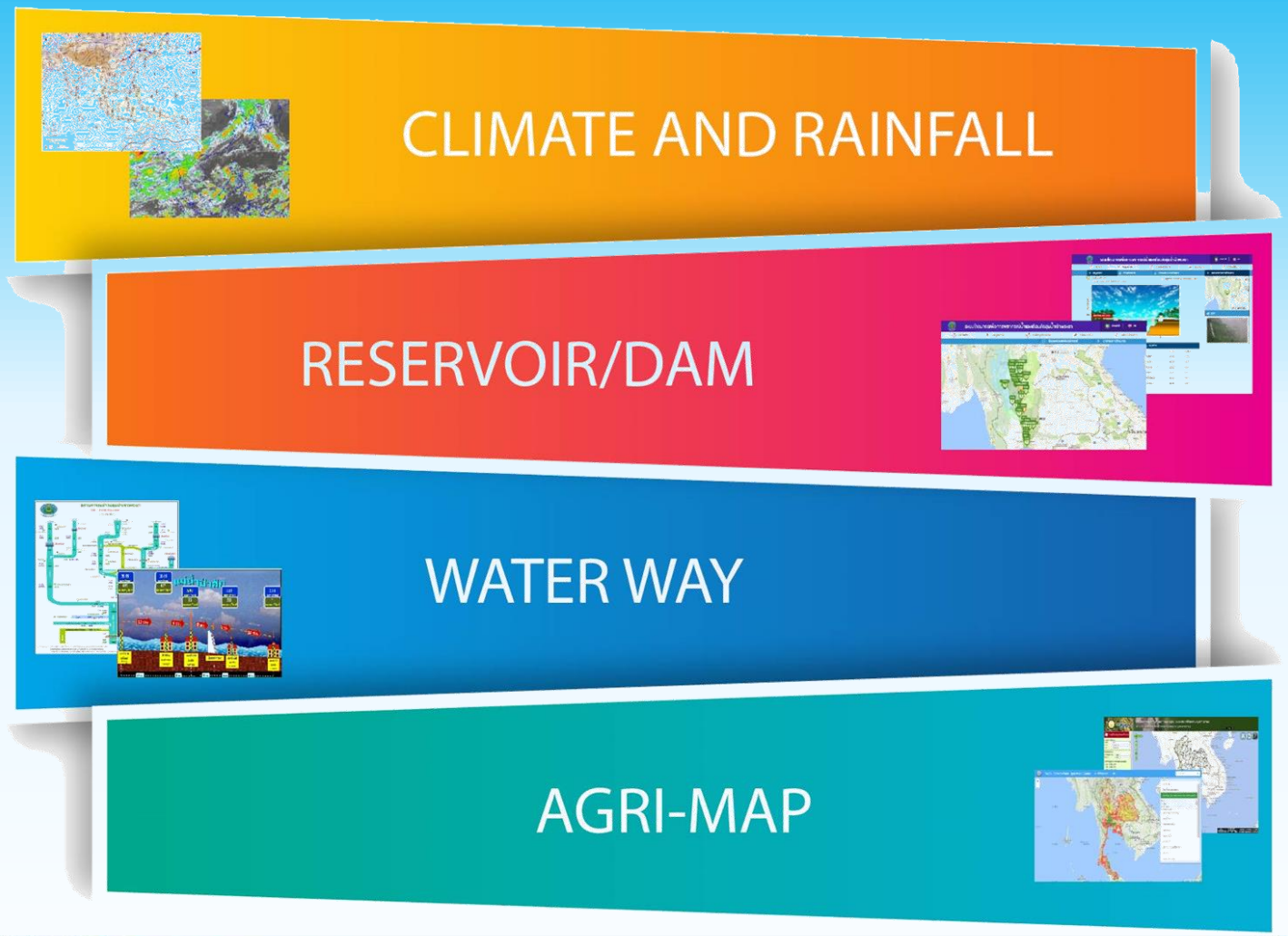
SMART WATER OPERATION CENTER : SWOC

The Assistant

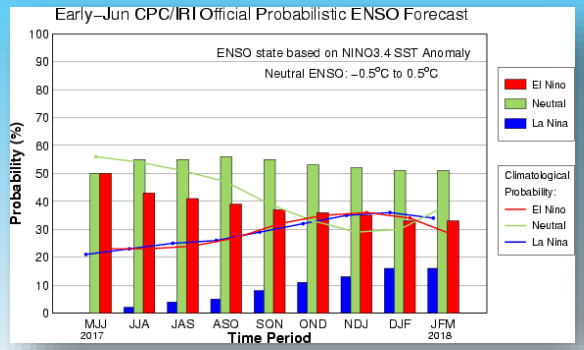
Data linkage

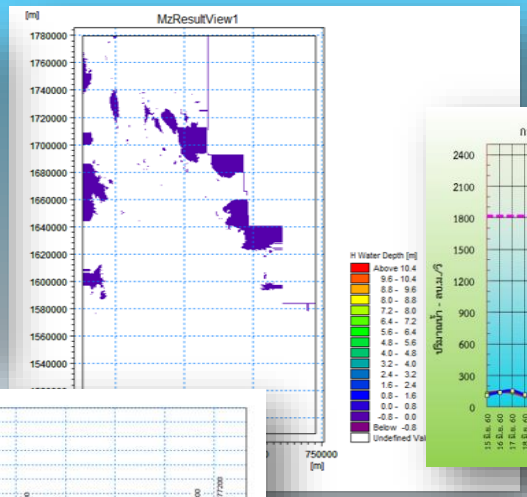


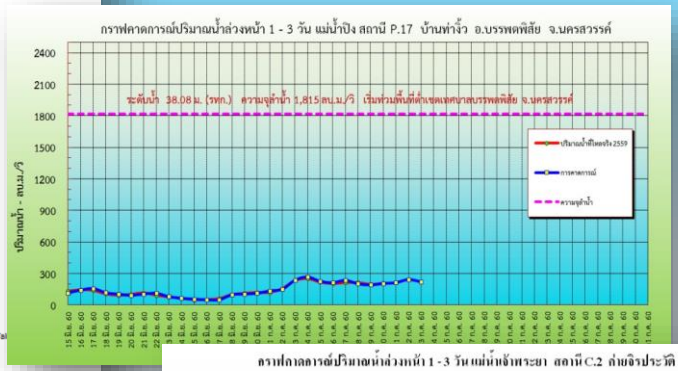
Data linkage

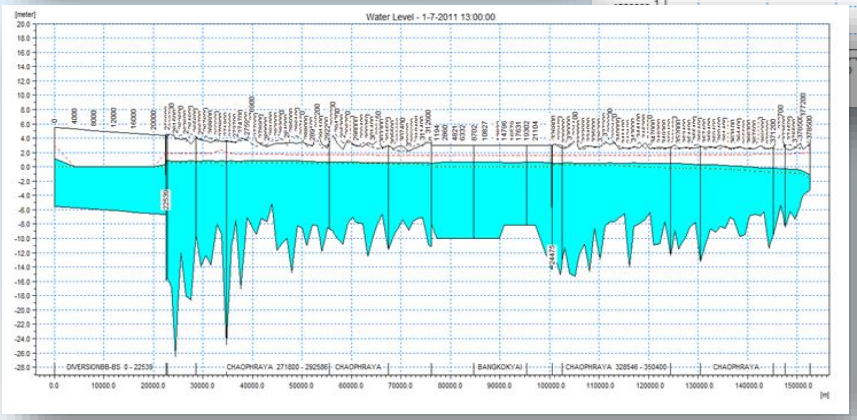


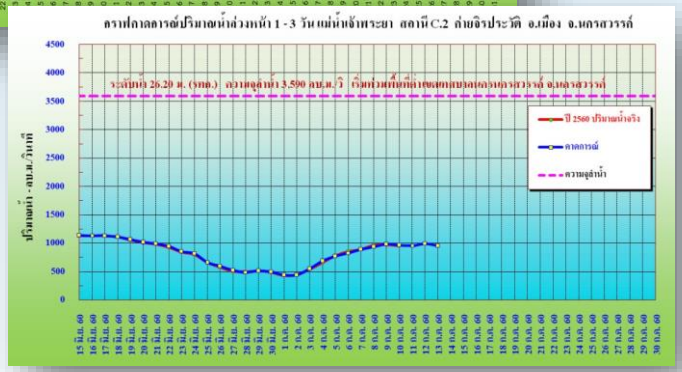
Water Situation Analysis and Forecasting





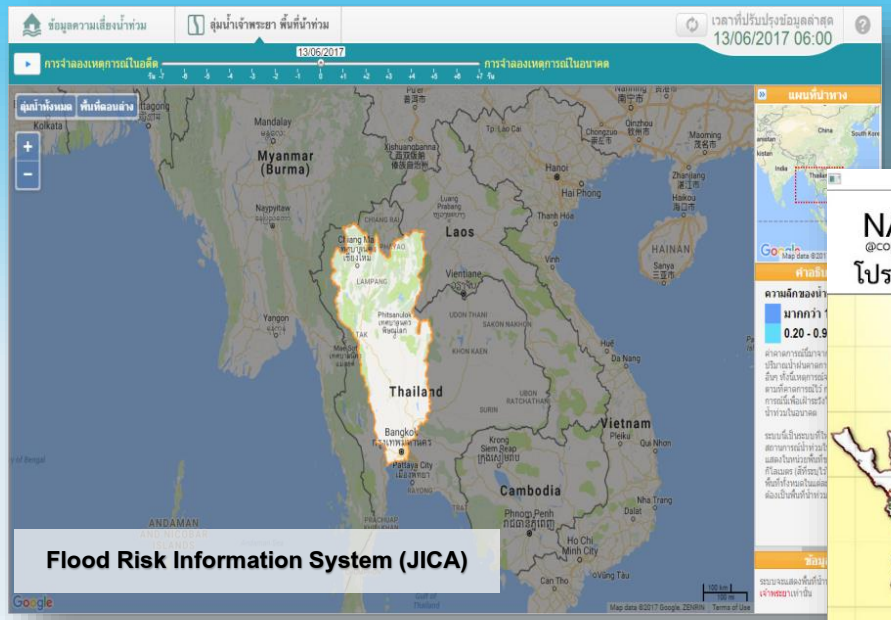






Using Mathematical model/artificial neural network

Water Situation Analysis and Forecasting



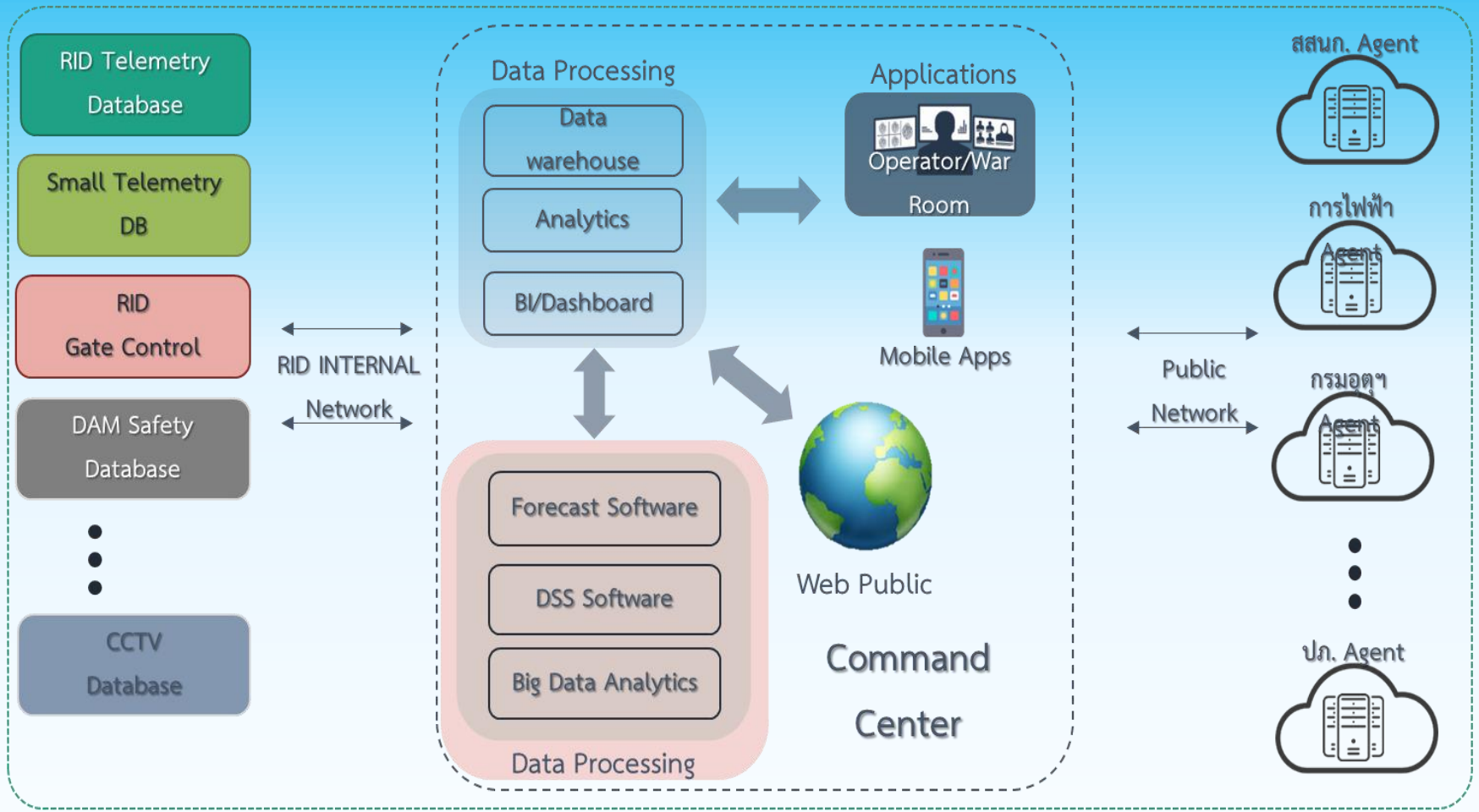
Flood Risk Information System (JICA)

Flood Map

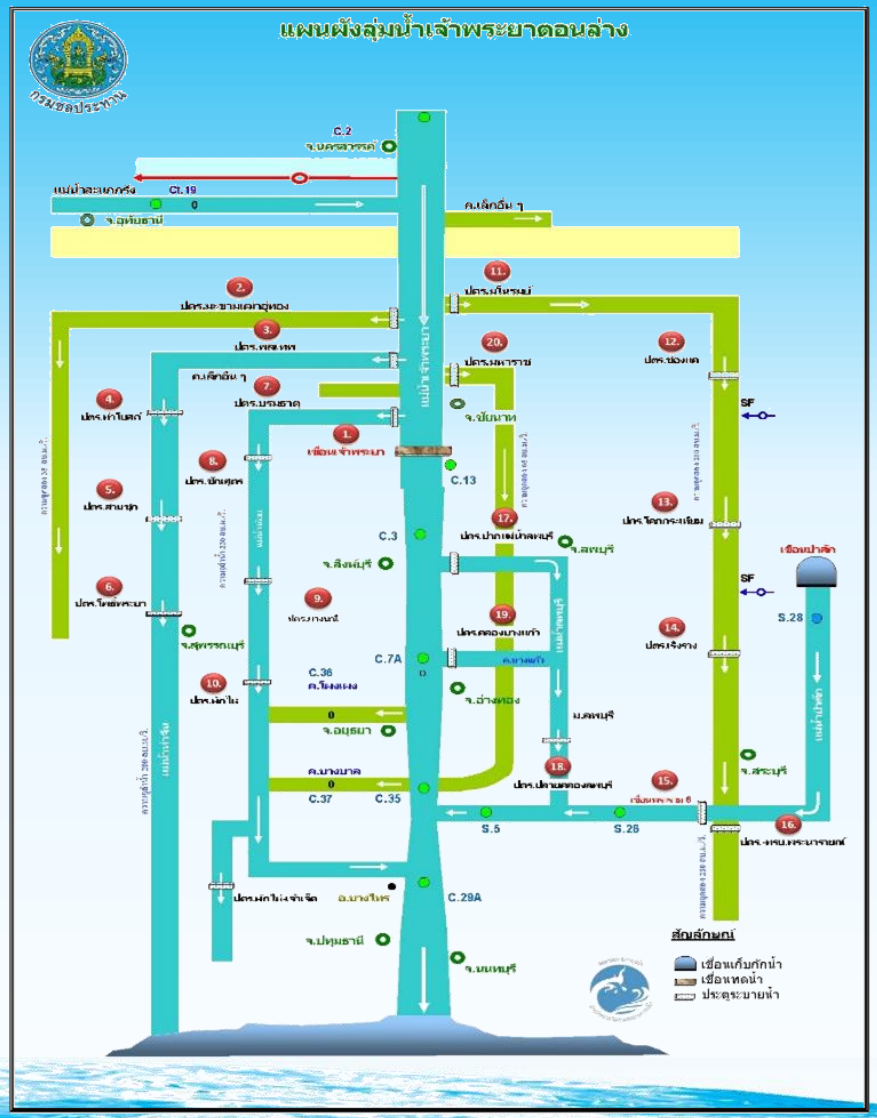
NARK4.0

Water Situation Analysis and Forecasting

Data Warehouse

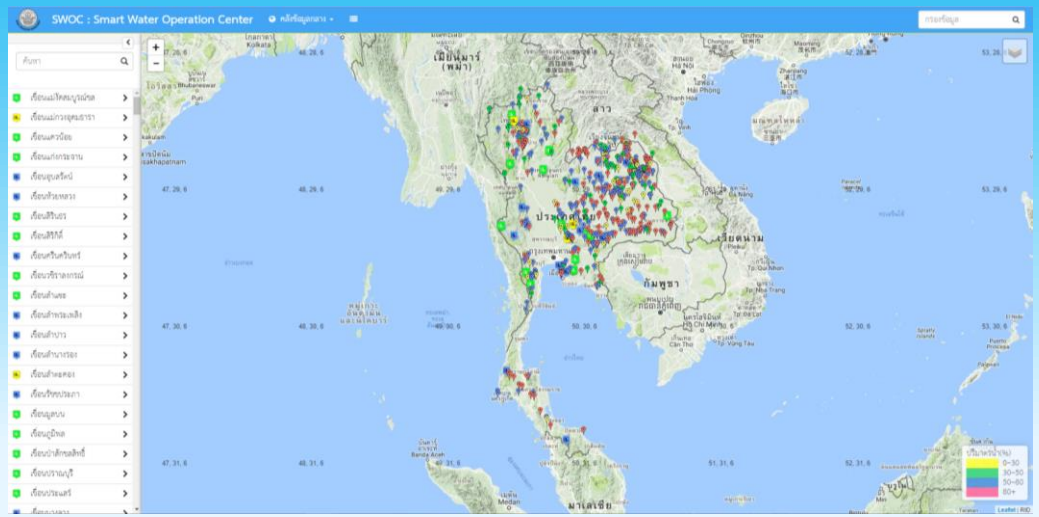


Information



ลำดับที่	อาคารชลประทาน
1	เขื่อนเจ้าพระยา
2	ประตูระบายน้ำคลองมะขามเฒ่า-อู่ทอง
3	ประตูระบายน้ำพลเทพ
4	ประตูระบายน้ำท่าโบสถ์
5	ประตูระบายน้ำชลมาร์คพิจารณ์
6	ประตูระบายน้ำโพธิ์พระยา
7	ประตูระบายน้ำบรมธาตุ
8	ประตูระบายน้ำบางระจัน
9	ประตูระบายน้ำยางมณี
10	ประตูระบายน้ำผักไห่
11	ประตูระบายน้ำมโนรมย์
12	ประตูระบายน้ำช่องแค
13	ประตูระบายน้ำโคกกระเทียม
14	ประตูระบายน้ำเริงราง
15	เขื่อนพระราม 6
16	ประตูระบายน้ำพระนารายณ์
17	ประตูระบายน้ำปากแม่น้ำลพบุรี
18	ประตูระบายน้ำปลายคลองลพบุรี
19	ประตูระบายน้ำคลองบางแก้ว
20	ประตูระบายน้ำมหาราช

Tool for monitoring water situation

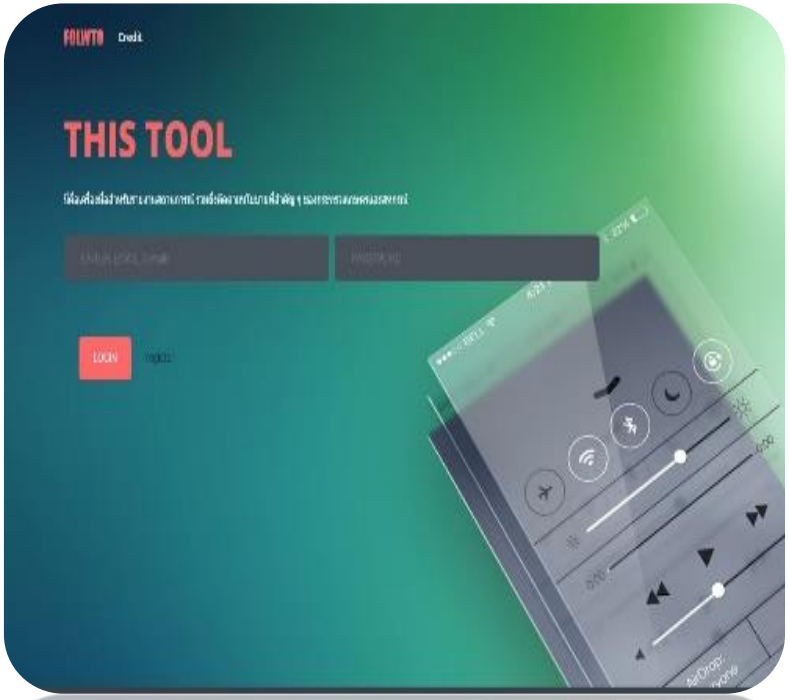


swoc.rid.go.th

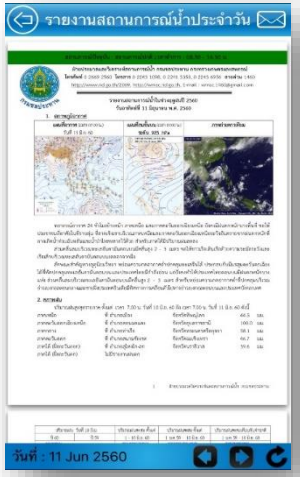
wmsc.rid.go.th

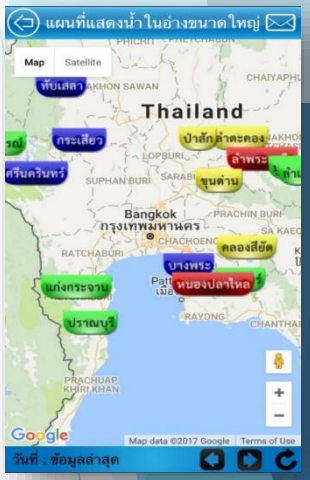
APPLICATION

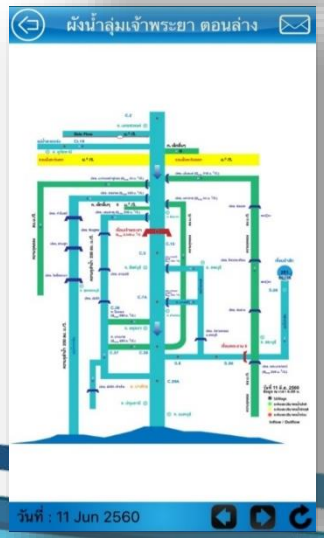
FLOWTO Application

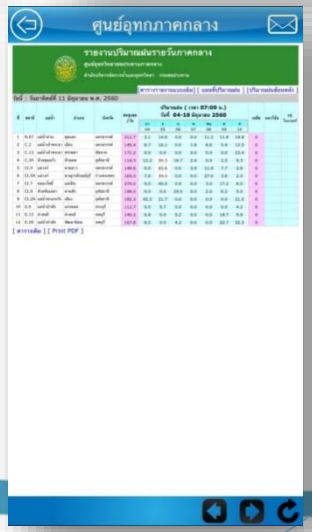


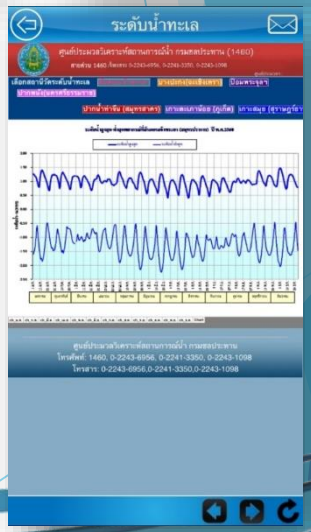
WMSC Application





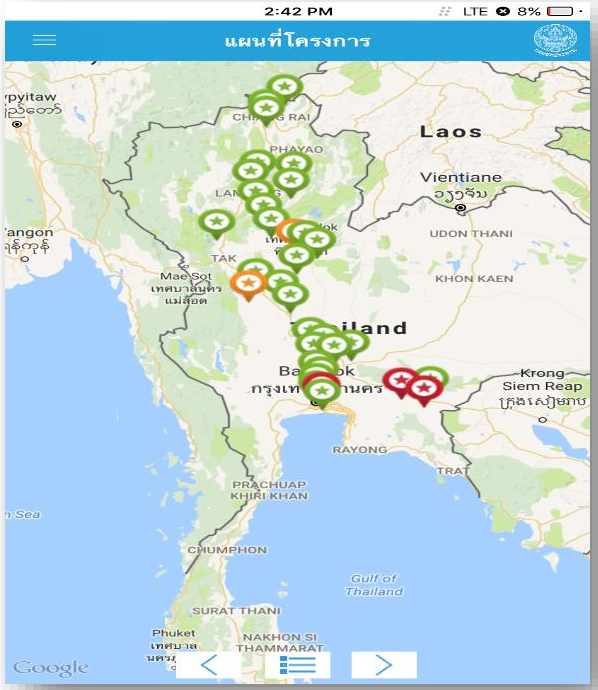




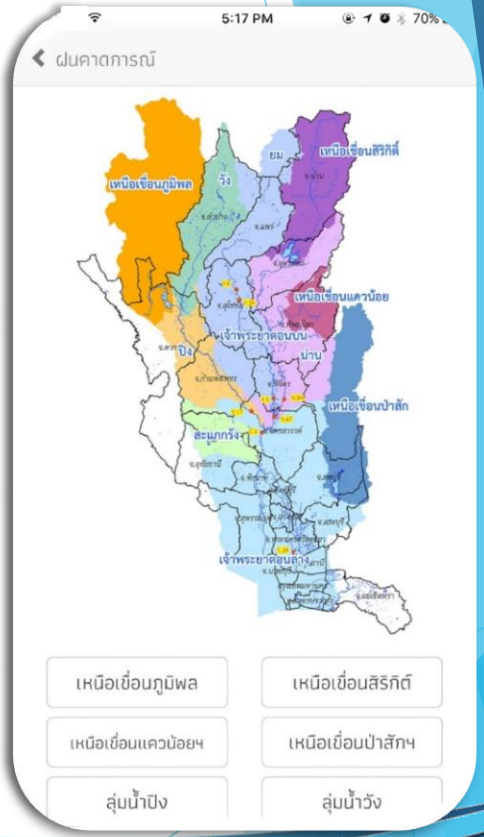


The WMSC is the applications for show the daily water situation report and collect database. This applications is easy to use by everyone for decision-making of water management by themself. Then we can use this App like sharply update for preparing from flood and drought.

CPY Monitor Application



Water SMART Application



กรมชลประทาน

The end.

Royal Irrigation Department