



Science and Technology in Action: Thailand Case Study

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- **Climate Change Effect in Thailand**
- **S&T for Community Adaptation**
- **Example: Tropical Storm PABUK**
- **AHC: ASEAN Hydroinformatics Data Centre**



Water Allocation



River basin Planning



Stakeholder Participation



Pollution Control



Information Management



Economic & Financial Management



Water Security



Water & Climate Change

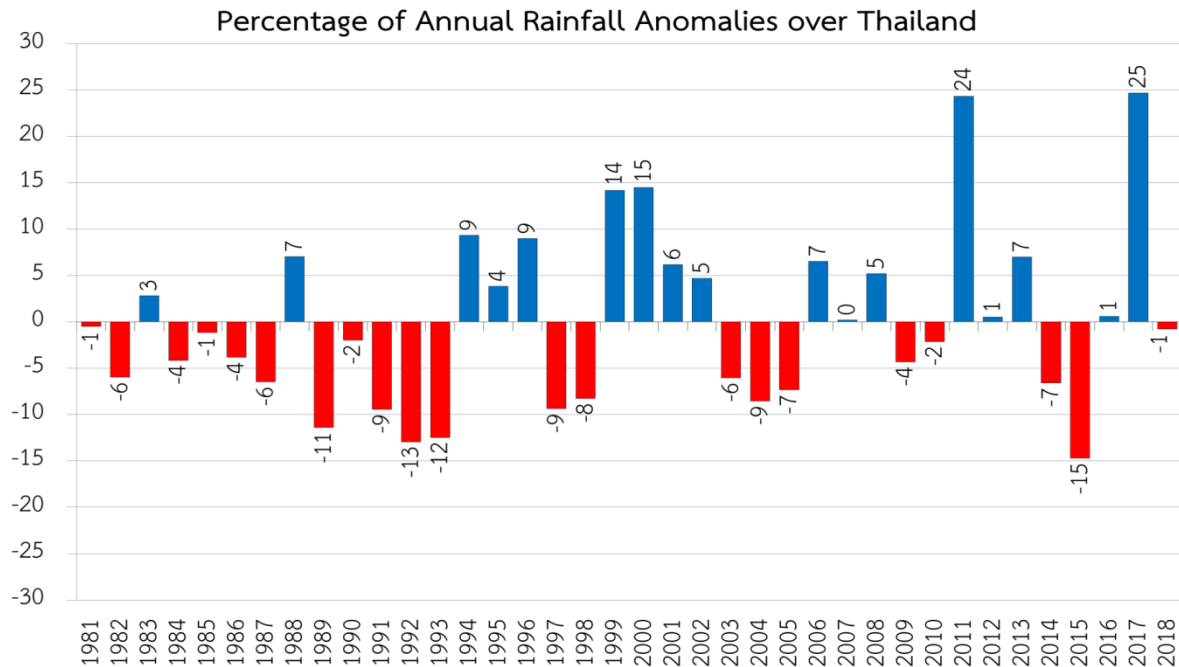


Climate Change Effect in Thailand

Percentage of Annual Rainfall Anomalies over Thailand

Thailand has experienced extreme climate from global climate change more frequently, which leads to flood and drought events.

30 Years
AVG. Rainfall
1981-2010
1,467 mm.

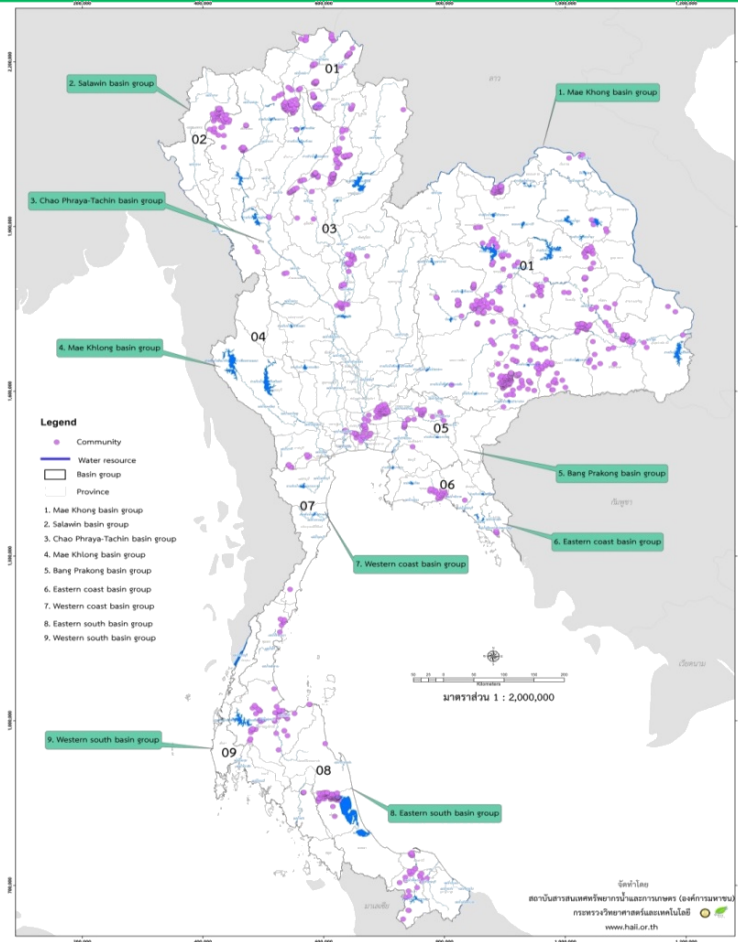




A weighted score from changing of extreme indices which included **R10mm**, **R20mm**, **R95PT**, **Rx1D**, **Rx3D**, and **Rx5D**.

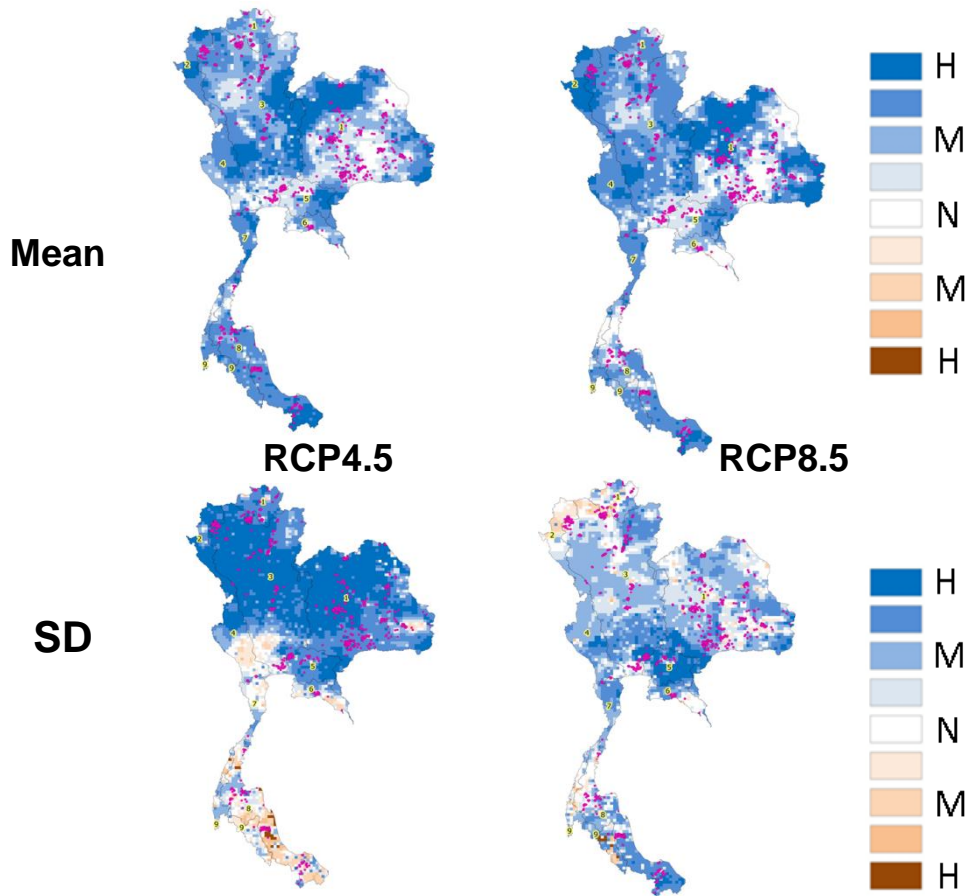


A weighted score from changing of extreme indices which included **CDD**, **SDII⁻¹** and **PRCPTOT⁻¹**.



Group	Basin Group	Total communities
G1	Mekong	641
G2	Salween	1
G3	Chao Phraya – Tha Chin	317
G4	Mae Khlong	4
G5	Bangpakong	37
G6	Eastern coast	29
G7	Western coast	4
G8	Eastern south	214
G9	Western south	11
Total		1,258

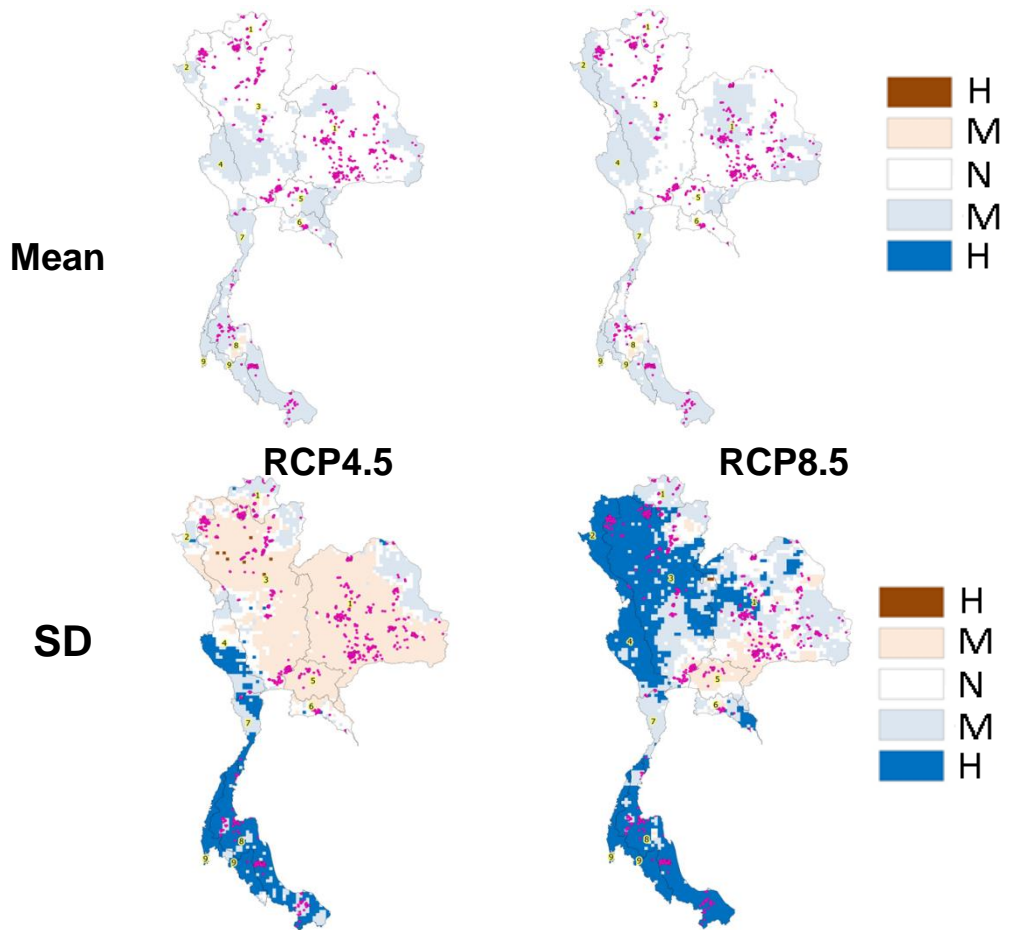
Flood Possibility Index (FPI)



890 communities are at high risk of flooding

(based on mean FPI >50%)

Drought Possibility Index (DPI)



950 communities are at medium risk of drought

(based on SD DPI >50%)



Thailand have **increased number of wet days** (higher CWD) and **shorter dry days** (lower CDD)



Frequency extreme indices reveal Thailand have **more heavy and very heavy rainfalls** (Rx5D)



Intensity extreme indices reveal Thailand have **higher intensity rainfall and more fluctuation.**



890 communities are at **high risk of flooding** in near future



950 communities are at **medium risk of drought** in near future



607 communities are at **risk of flood and drought** in near future



S&T for Community Adaptation

- S&T Adaptation for capacity building at community level



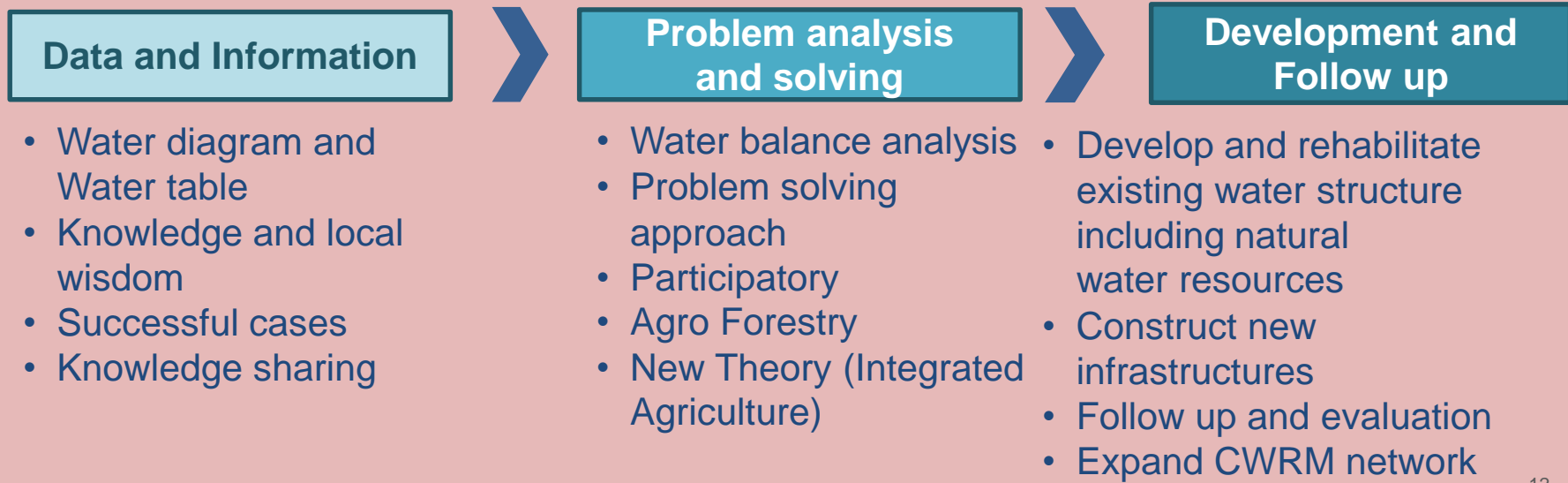
Comp	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Upland rice												
Cabbage												
Banana												
Spamach												
Rubber												
Cornfield												
Coffee												
Chayote												



Mechanism



Operation



Virtue Collaboration: Driven by Trust and Faith

Goals -> Community's Livelihood and Sustainability Development

Community's Roles

- Volunteer for community's benefit
- Understand and utilize information and data for management and planning
- Operate and take action the development plans

Partner and Friend

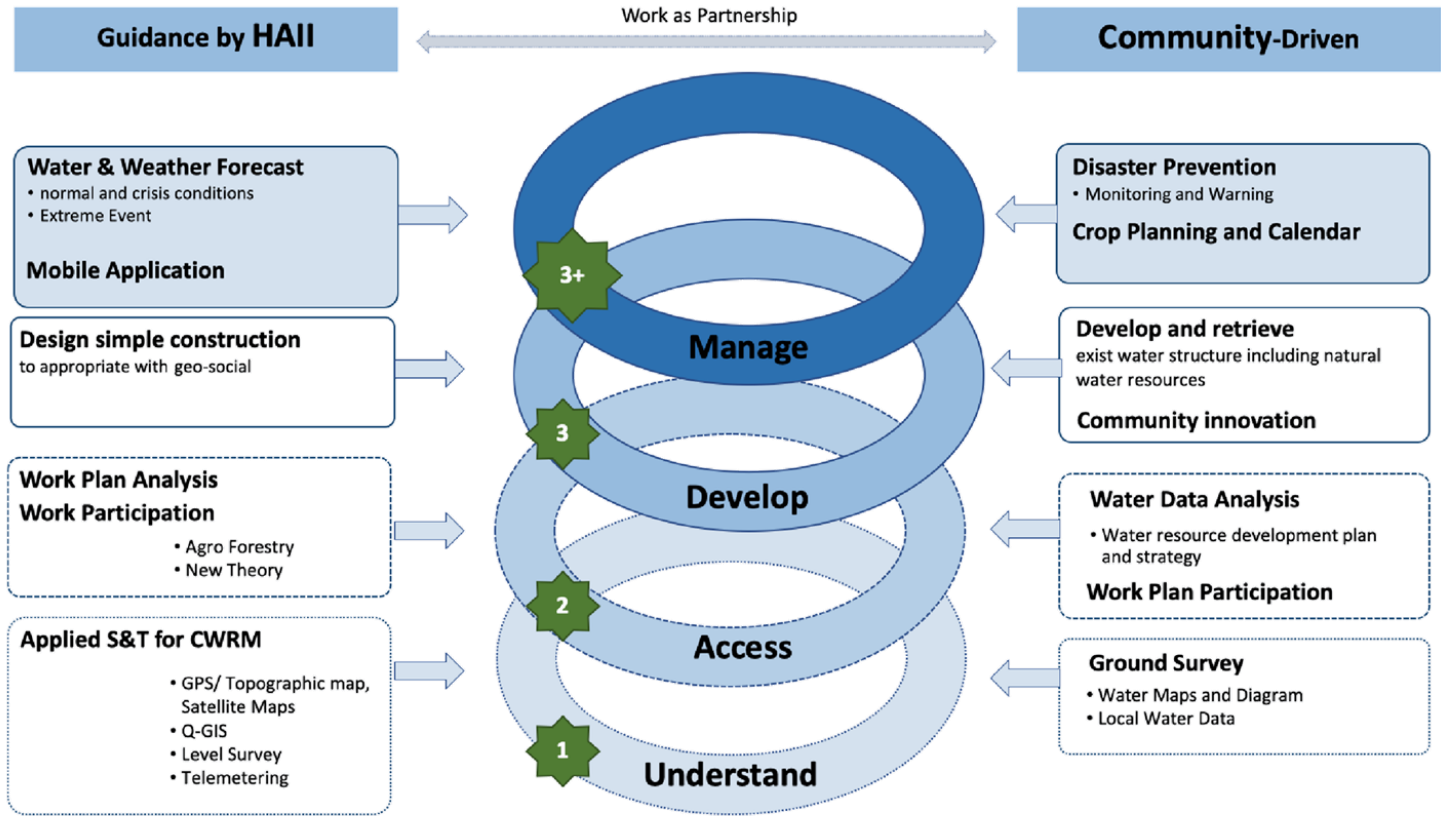
Learn
Do
Win

Together
Together
Together

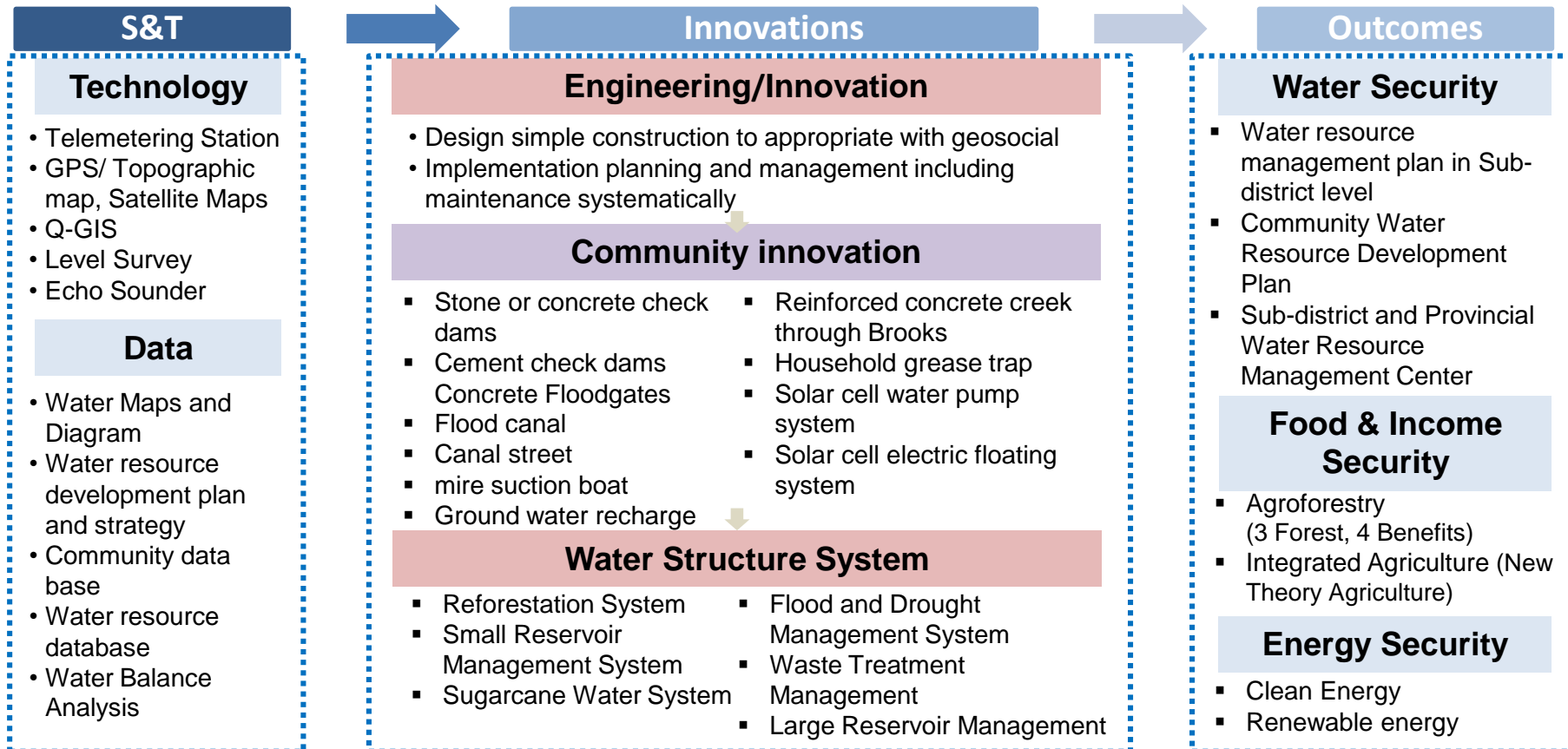
HAI's Roles

- Non-profit operation
- 2 ways communication
- Involve and participate with communities
- Provide information, data, tools, etc. for co-critical thinking and planning

Development of Community Water Resource Management System



S&T into Actions: Community Water Resource Management (CWRM)





Provincial Water Resource Management Center



Core Communities (1,573 villages)



Live Museums

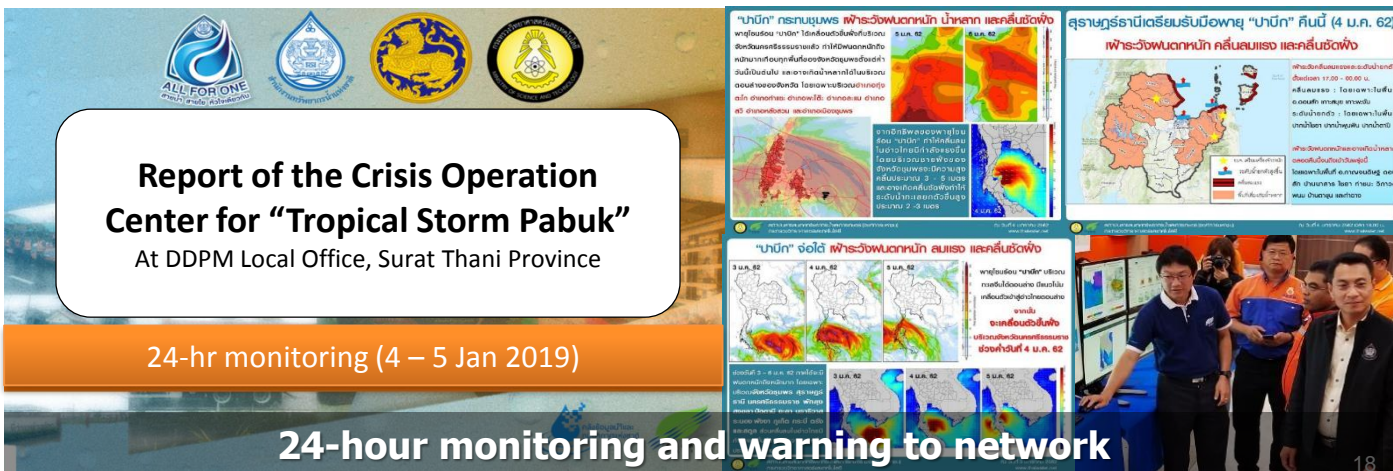


Tropical Storm “PABUK”

Preparation – Monitoring –
Analysis – Response

- 1 National and Local Response
- 2 Community Response
- 3 Technology and Monitoring System

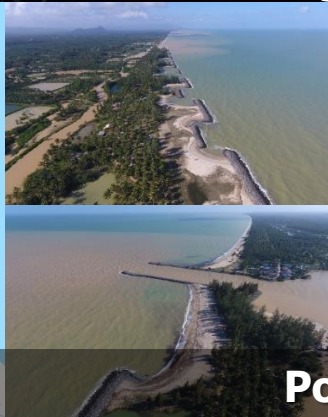
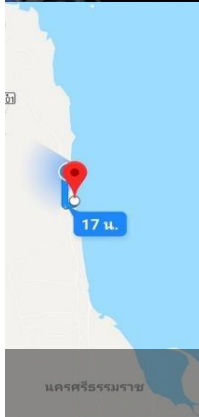
**Crisis Operation
Center at DPPM
local office,
Surat Thani
province**



Crisis Operation Center at DPPM local office, Surat Thani province (cont.)



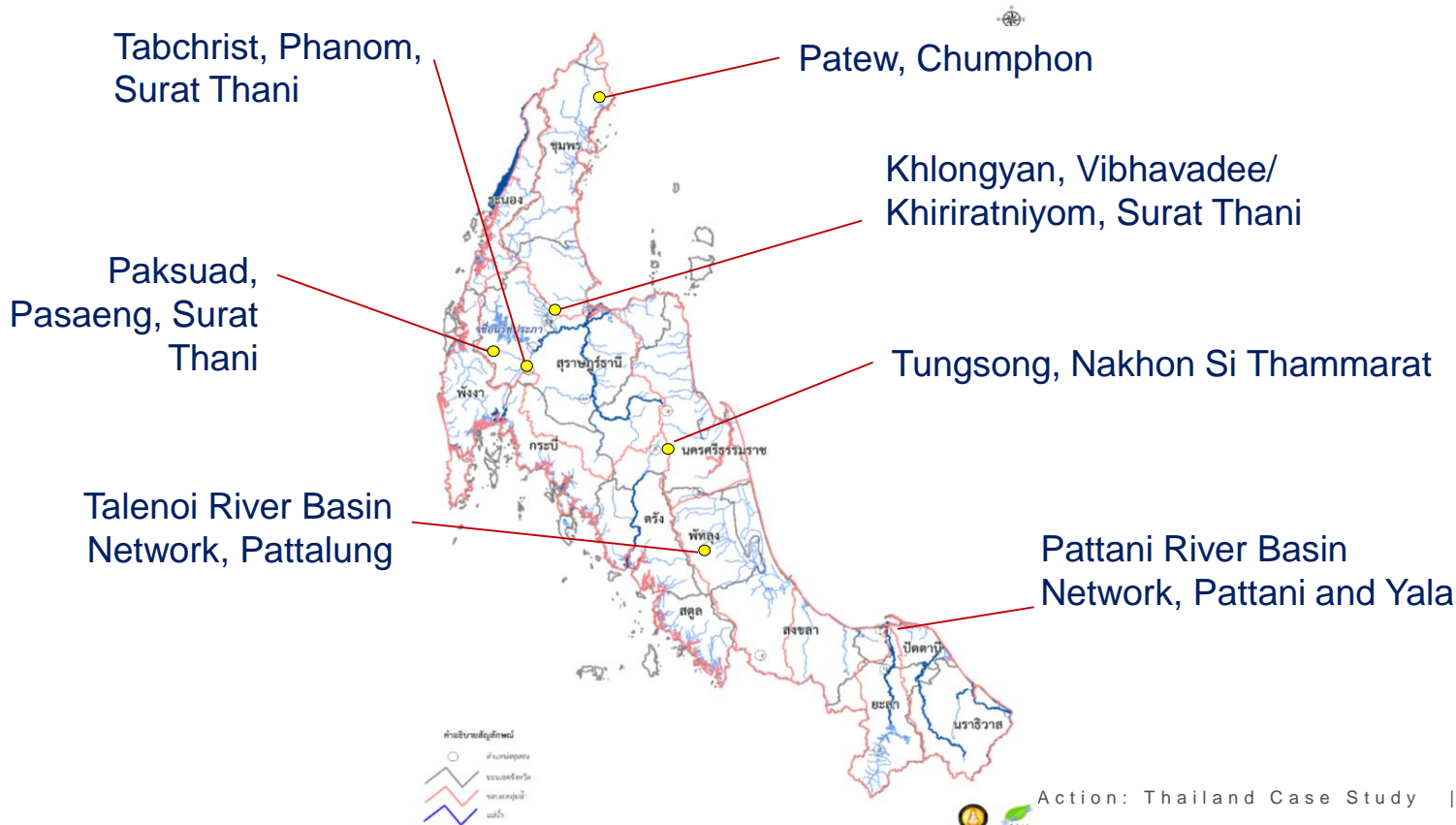
Meeting for Monitoring report



Post-disaster survey



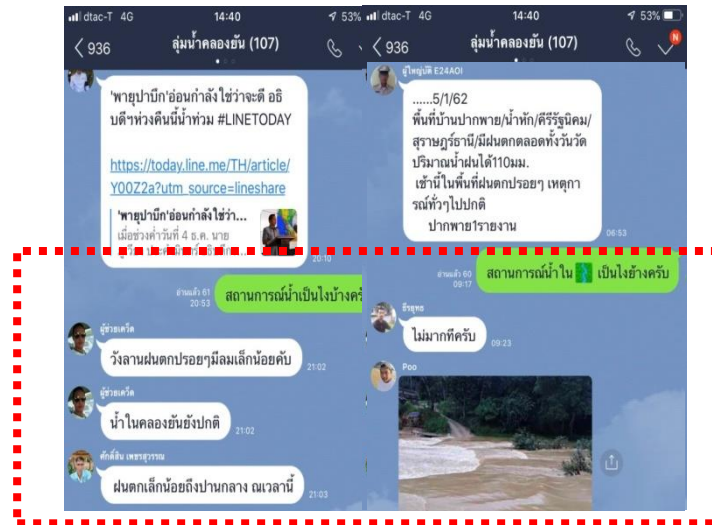
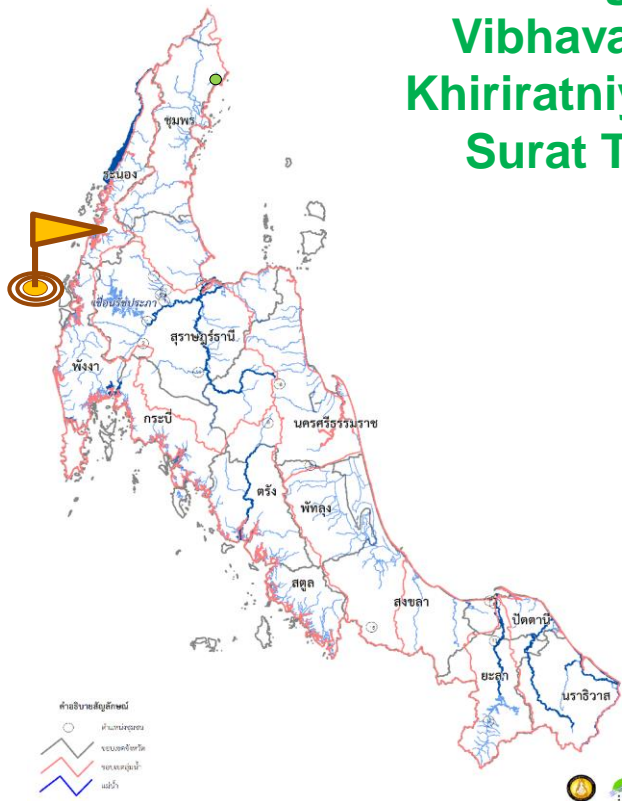
7 Communities prepare for Tropical Storm Pabuk



2 Disaster Preparedness at Community Level

Khlongyan, Vibhavadee/ Khiriratniyom, Surat Thani

2 Jan 2019 – Community monitored water situation via 1) radio communication 2) Khlongyan LINE network 3) telephone

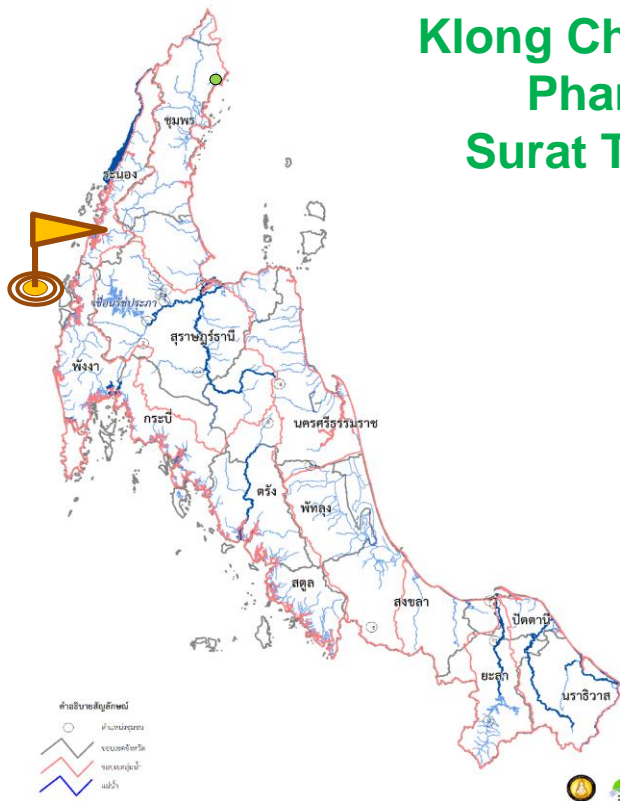


Prepared radio communication network

Inform of preparation and emergency contact number



Tabchrist, Klong Chaun, Phanom, Surat Thani

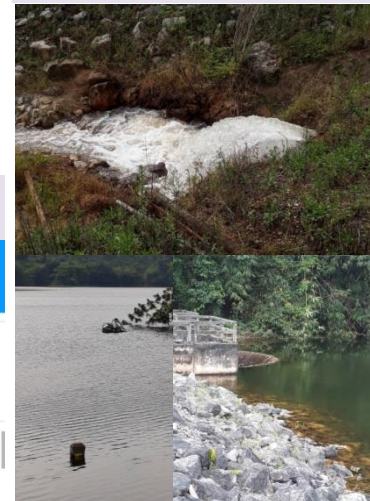


2 Jan 2019 – Community monitor water level in Klong Bangsainuan Reservoir and found water level is 100% reserved. Therefore, the community drain water off to prepare for heavy rainfall from Tropical Storm Pabuk.

Monitor rainfall in community

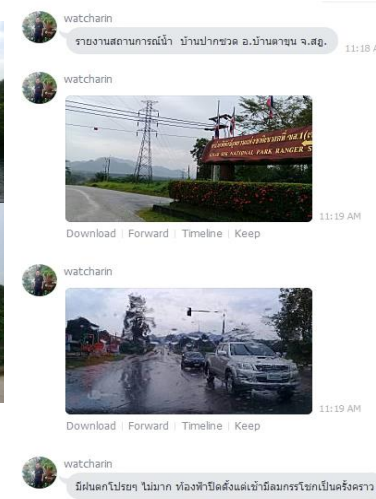


Drain water for heavy rainfall

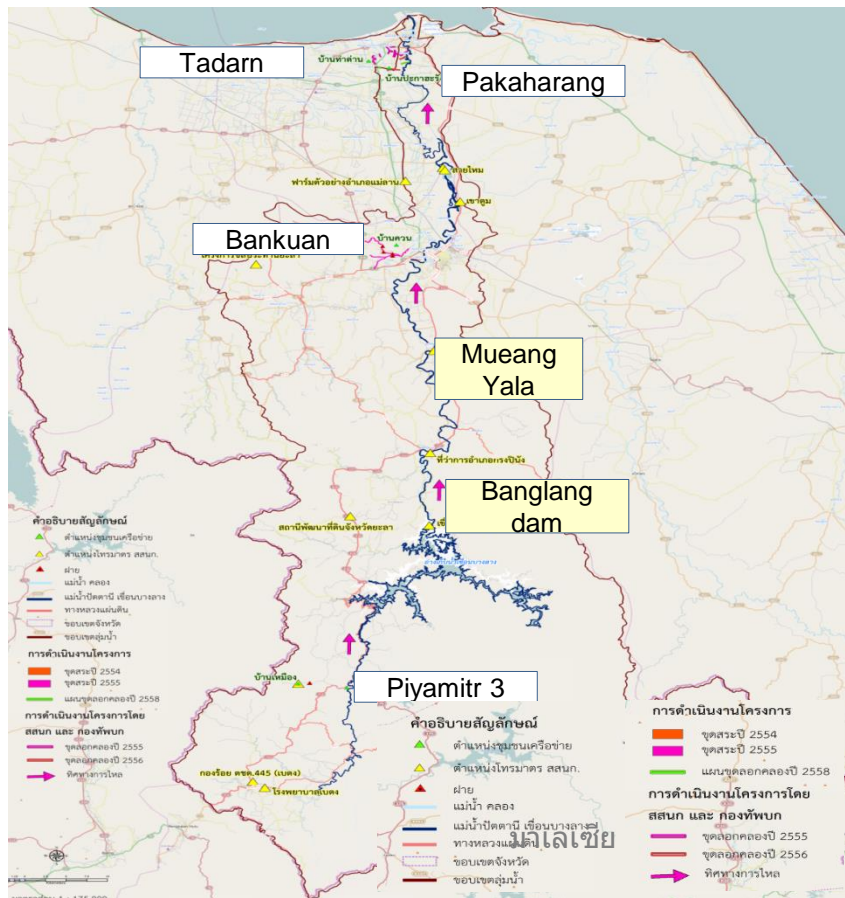


Paksuad, Pasaeng, Surat Thani

3 Jan 2019 – Community monitor by surveying local weirs and monitor water level in canals and report situation via community LINE network



2 Disaster Preparedness at Community Level



Pattani River Basin Network, Pattani and Yala Province

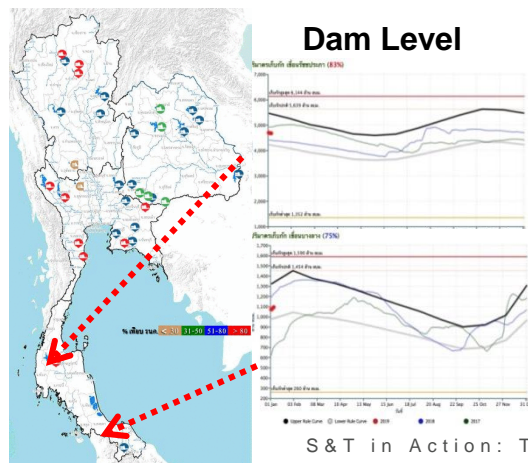
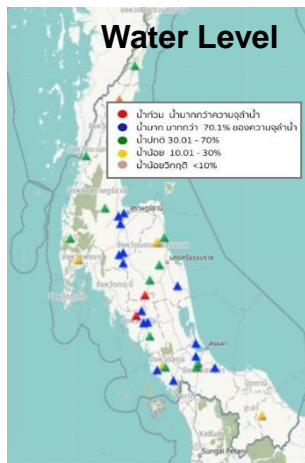
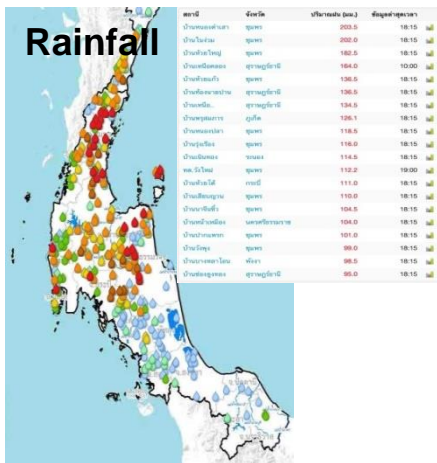
The Pattani River Basin Network has more than 940,000 acres of area, cover 15 districts in 2 provinces (Yala and Pattani). Pattani river has two tributaries, namely Yaha river and Klong Nongjik. 715,000 population live in the basin and make a living by farming and livestock.

Pattani River Basin face the problem of flood in the mid- and downstream area (17,500 acres) for more than 30 years.

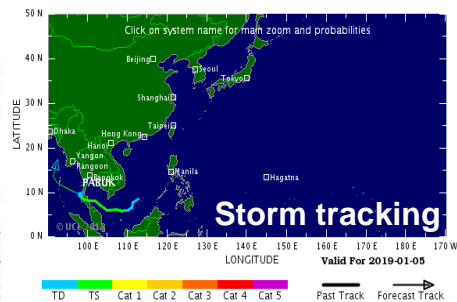
HAI collaborate with 4 local community networks on Community Water Resources Management (CWRM)

- Piyamitr 3, Betong, Yala
- Bankuan, Mueang, Yala
- Pakaharang, Mueang, Pattani
- Tadarn, Nongjik, Pattani

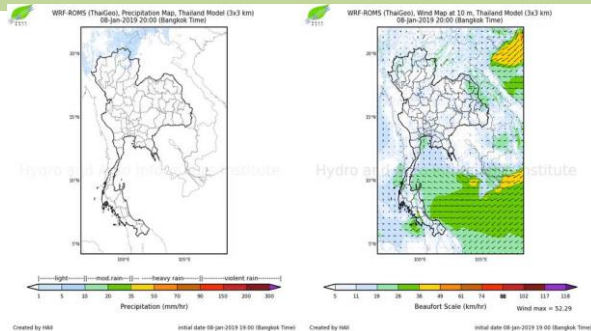
Map shows rehabilitated water structure by Pattani CWRM network, HAI, Military, and Utokapat Foundation



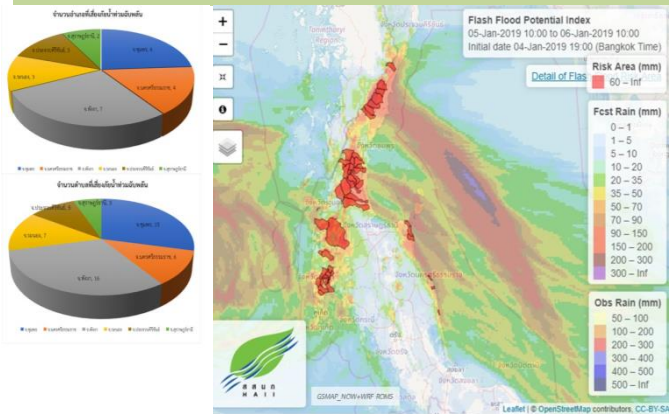
Monitoring System from National Hydroinformatics and Climate Data Center (NHC)



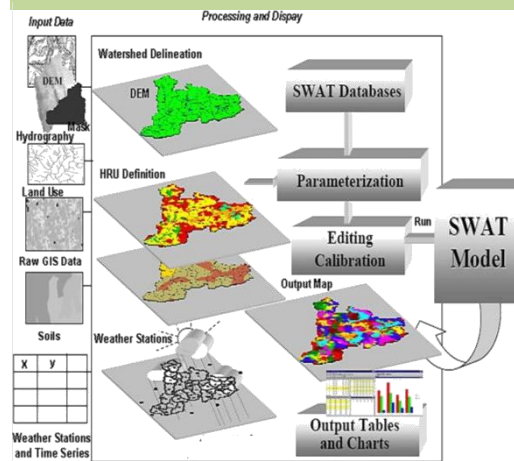
WRF-ROMS Model



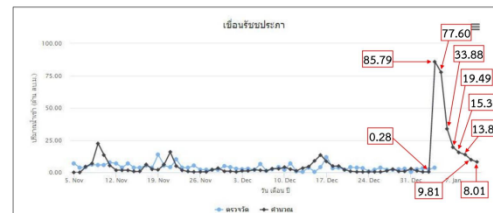
Flood Model



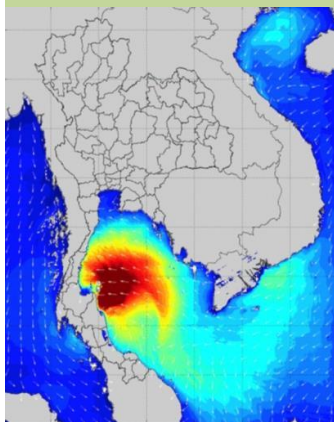
SWAT Model



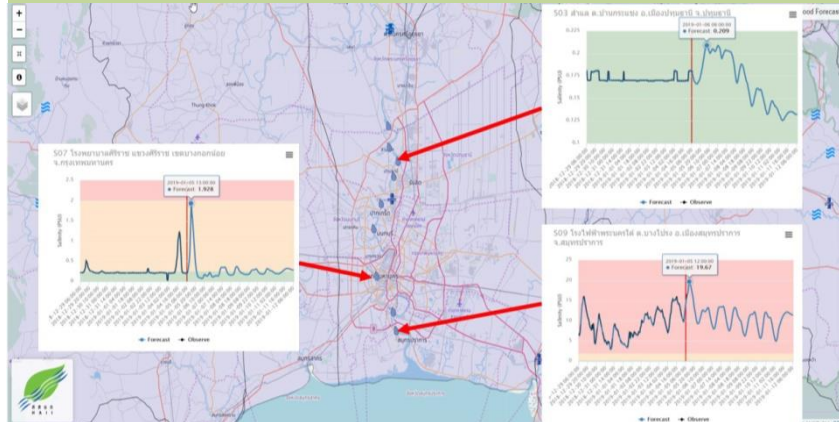
คาดการณ์ปริมาณน้ำไหลเข้าเขื่อนรัชชประภา
ระหว่างวันที่ 3 - 11 ม.ค. 2562



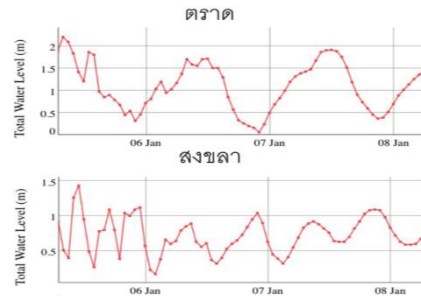
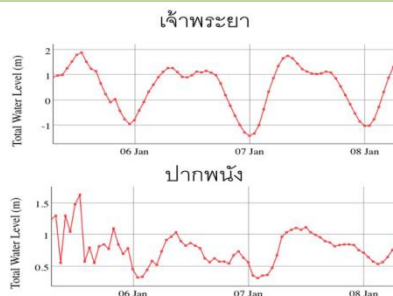
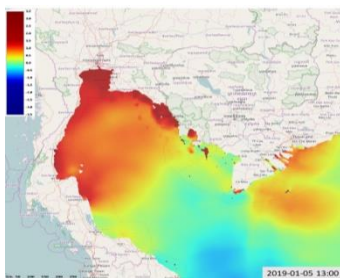
Ocean model



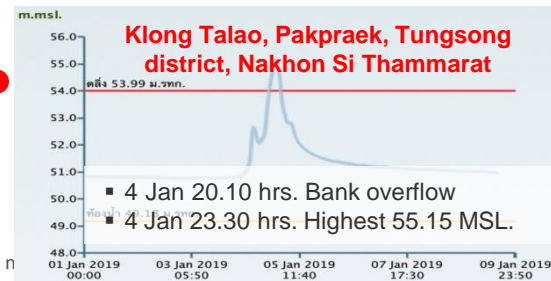
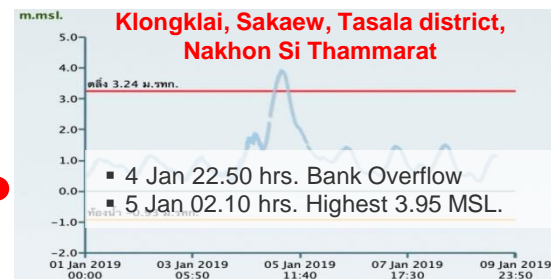
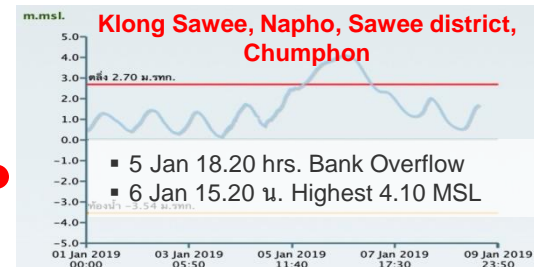
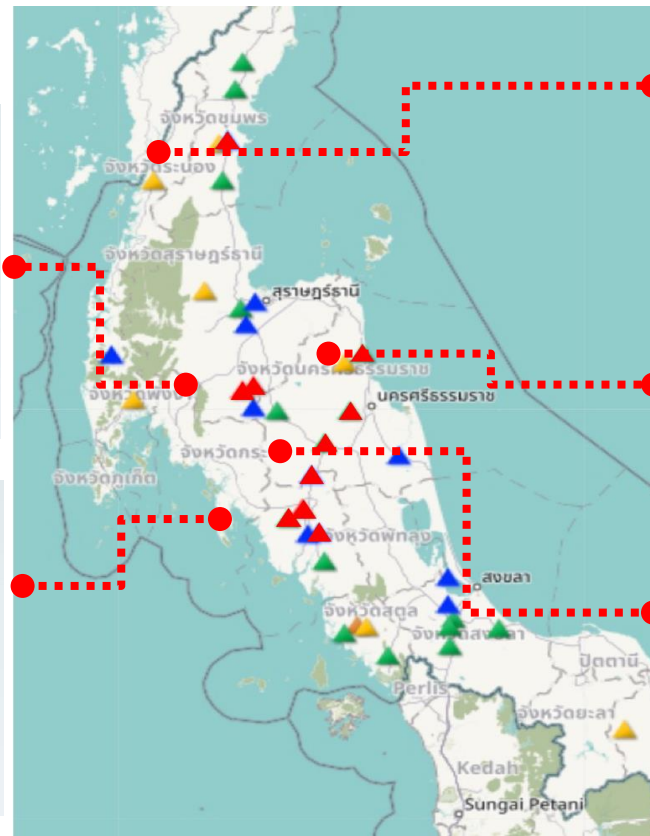
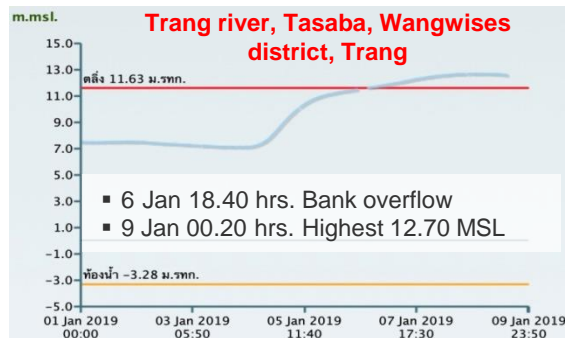
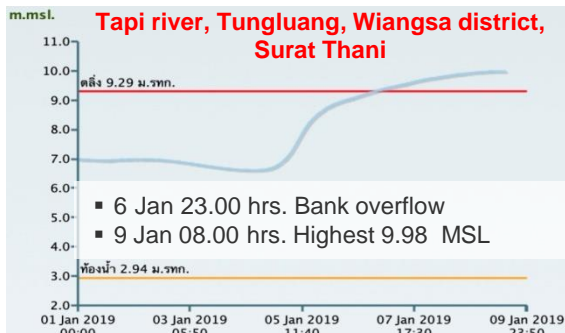
Salt water forecast in river



Storm surge model



PABUK's Effect on Water Level



Comparison of Tropical Storm PABUK (2019) vs HARRIET (1962)

HARRIET



- Wind speed 95 km/hr
- Landfall at Talumpuk, Pakpanang, Nakhon Si Thammarat
- **LOSSES: 911 people**
22,296 houses destroyed
50,775 houses damage

PABUK



- Wind speed 85 km/hr
- Landfall at Pakpanang, Nakhon Si Thammarat
- **LOSSES: 5 people**
405 houses destroyed
53,008 houses damage

Losses in Fisheries (PABUK 2019)

Nakhon Si Thammarat

- Fish pond 1,340 acres
- Marine animals 3,303 acres
- Cement tanks 8,427 sq.m.

Surat Thani

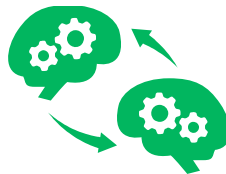
- Fish pond 48 acres
- Marine animals 23 acres
- Cement tanks 140 sq.m.



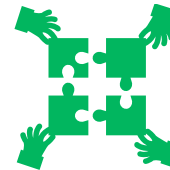
Precise Weather Forecast allow early preparation and evacuation of 31,665 people – **decrease losses of life**



Storm Surge Warning to prepare for salt water intrusion



Data support to governors and Disaster Preparedness and Mitigation Center Bureau 11 for **immediate response**



New working methodology:
 1) Area-based
 2) Horizontal collaboration
 3) Integrated work



Communication with Media

- Fast
- Precise
- Raise awareness
- No panic



From Country to Regional ASEAN Hydroinformatics Data Centre

AHIC

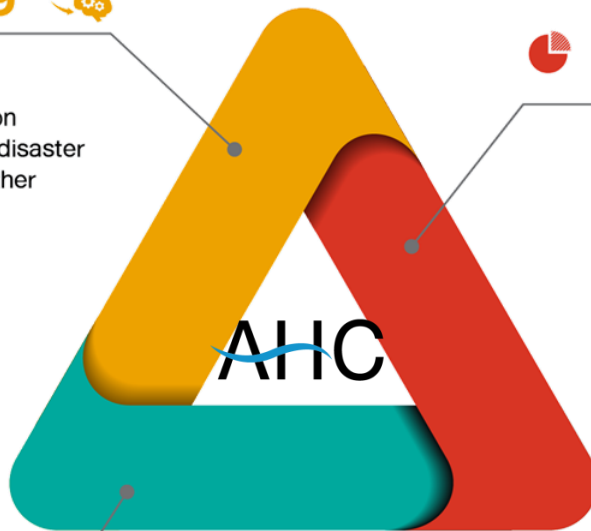
Knowledge Sharing

To create a platform for knowledge and information sharing on the role of science and technology for disaster risk reduction and learning from experiences of other countries for climate change adaptation



Technology Matching

To match and exchange technology that is applicable to other countries



Capacity Building

To build the capacity of the young water expert and young researcher in ASEAN countries





Regional collaboration on the data sharing and integration as learning-based platform



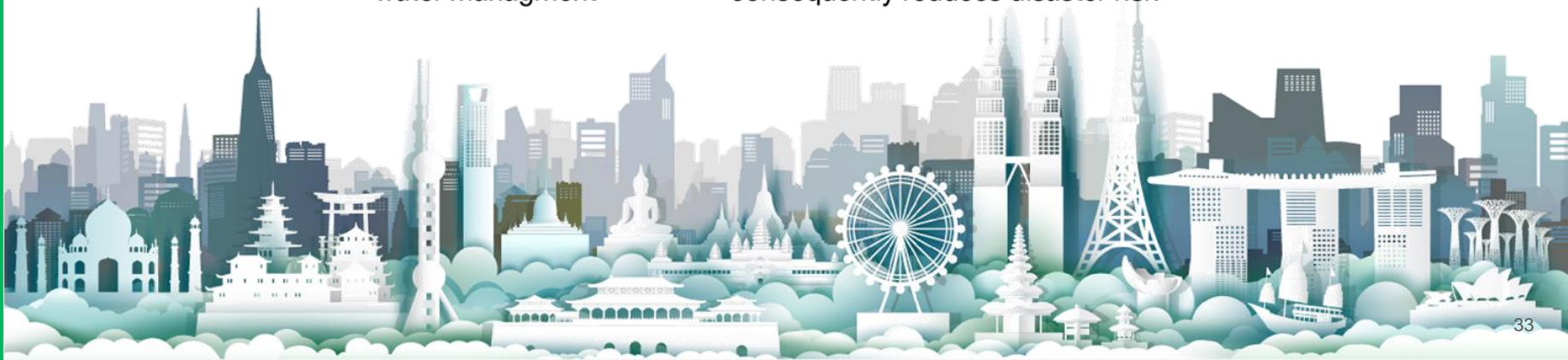
ASEAN connectivity by S&T for equitable use of water and weather information and efficient water management



Centralized database for both policy makers and practitioners to promptly respond to normal and crisis situations and consequently reduces disaster risk



Partnership for new knowledge and regional contribution to capacity building



An aerial photograph of Bangkok, Thailand, taken at sunset. The Chao Phraya River flows through the center of the image, reflecting the warm orange and yellow light of the setting sun. On the left bank, there are several large industrial buildings and a shipyard. On the right bank, a dense urban landscape is visible, featuring numerous high-rise apartment buildings and commercial structures. A prominent bridge with multiple lanes of traffic spans the river on the right side. The sky is filled with soft, wispy clouds, and the overall atmosphere is serene and picturesque.

Thank You

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