Good Practices
National Hydroinformatics and Climate Data Center (NHC)

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Weather 901
1996 - 1998

HII start the NHC project by integrating data from 12 agencies
2012

System Optimization
2014

2011
Thailand Great Flood

2013
Mobile App Website

2015 - 2019

- Big Data Research
- Link data from 37 agencies
- Mobile App V2.0

By Hydro – Informatics Institute (HII)
Thailand 2011 Flood Leads to the Establishment of NHC

Early warning and real time decision making

- **Flood sensorweb**
- **Forecast & modeling**
- **Networking & cluster**
- **Flash flood & landslide warning**
- **Reservoir networking**
- **Data warehouse**

Integration of technology for data analysis and flood management

5 tropical storms in 2011

Percentage of Annual Rainfall Anomalies over Thailand
Technologies for Water Management

1. Real-time monitoring system
   1.1 Telemetering station
   1.2 Weather radar
   1.3 Satellite

2. Modeling for water management
   2.1 Basin scale model
   2.2 Local scale model
   2.3 Urban scale model
   2.4 Storm surge model
National Hydroinformatics and Climate Data Center (NHC)

- From 2012 to Present
- Decision Support Information System
- Processing and analysis of water management information
- Data integration and exchange among water related agencies
- De Facto Standard flexible data format for monitoring, analysis and forecast of water situation
- Unified water management system for both normal and crisis situation
- Houses 400 data items  37 agencies
NHC and Other Operation Centers

Prime Minister Operation Centre (PMOC)

- Primary Data Acquisition and Analytical Reports

Committee on The Integration of National Hydroinformatics and Climate Database
Chairman: Minister, MOST
Secretariat: HII, EGA

- Data in Irrigation Area
- Water Quality Data
- Discharge Data
- Hydrodynamic model

Smart Water Operation Center (RID)
Pollution Control Department Operation Center
- Use data/model from NHC to develop pollution dispersion model

Water related Disasters Data Operation Center (DDPM)
- Preparing data to be linked to Water-related disaster and E-stock management to NHC

Electricity Generating Authority of Thailand (EGAT)
- Improve Reservoir inflow and release forecasting

Department Operation Center, Royal Rainmaking Department (DOC)
- Visualize spatial distribution & forecasting of rainfall

National Water Resources Committee
Office of the National Water Resources
Single Integrated Report
- Public Announcement
- Normal and Crisis Operation

Government Agencies
Distributed functions, Integrated use

Water Resource Management Center
Regional Level
Provincial Level
On process

Future Operation Centers
9 Aspects of Hydroinformatics for Water Resources Management

1. Short-, Medium- and Long-Range Weather Prediction
   TMD DRRAA HAI HD

2. Water Management in Irrigated Area
   RID EGAT

3. Water Management in Rainfed Area
   DWR DGR RID MD LDD

4. Water Management for Consumption and Industrial Use
   PWA MWA DLA DGR MOI EG AT RID DDPM

5. Ecosystem and Water Quality Preservation
   PCD DWR RID DDS PWA MWA MOI HD DMCR

6. Disaster Warning and Management
   DDPM NDWC DDS DMR

7. Water for Electricity Generation
   RID EGAT

8. Economic and Social Development Planning
   NSO BB NESDB DLA CDD OAE MOI

9. Infrastructure for Data Systems
   HAI EGA DPT GISTDA NIMT RTSD DOL NSTDA MD
Provincial Water Resources Management Operation Center

Management
Risk management during normal and crisis situation

Planning
Water resources development project and allocating the fiscal budget of water resources development

Monitoring & Evaluation
Project progress and expansion of successful project

Disaster Risk Reduction
Sustainable On Water Food Economic

4 OCs by Provincial Administration Organization
20 OCs by National Farmers Council

Pilot centers in Phrae, Sukhothai, Phayao, and Phichit provinces

Community Water Resources Management (CWRM)

S&T Adaptation for capacity building at community level

Community Network

- 24 Provincial Water Resource Management Center
- 60 Core Communities (1,573 villages)
- 18 Live Museums
Tropical Storm “PABUK”
Preparation – Monitoring – Analysis – Response
Disaster Preparedness at National and Provincial Level

Timeline of the Preparation

28 Dec 2018
- Report “Monitoring status” to PMOC, DDPM, ONWR, Provincial office, and Community network

25 Dec 2018
- Formation of Pabuk
- Report to ONWR

3 Jan 2019
Crisis Operation Center start operation

2 Jan 2019
- Emergency “Crisis Committee meeting” by ONWR
  Set up Crisis Operation Center at DDPM local office, Surat Thani province
- “Disaster Preparedness and Mitigation Headquater Meeting” by MOI
  HII underline the possibility of STORM SURGE (3 meters) and high tide (3 – 5 meters), Evacuation is needed
Disaster Preparedness at National and Provincial Level

Timeline of the Preparation (cont.)

3 Jan 2019
Songkhla province prepare for high tide

4 Jan 2019
Tropical Storm Pabuk made landfall at Pak Phanang, Nakhon Si Thammarat

4 - 5 Jan 2019
- 24-hr monitoring
- Warning announcement to DDPM and community network (Tungsong and Mueang District) prepare for flash flood

5 Jan 2019
- Warning of storm effects to related agencies (MWA, PWA, BMA)
- Rise of water level in Chao Phraya river
- Salt water intrusion in Chao Phraya river

4 Jan 2019
Surat Thani Provincial Office prepare equipment and collaboration with Sub-district official

4 Jan 2019
Chumphon province evacuate and prepare for crisis

6 Jan 2019
- Situation resolve
- Crisis Operation Center at DPPM local office, Surat Thani province close
Disaster Preparedness at National and Provincial Level

Crisis Operation Center at DPPM local office, Surat Thani province

24-hour monitoring and warning to network
Disaster Preparedness at National and Provincial Level

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

Meeting for Monitoring report

Post-disaster survey
Disaster Preparedness at Provincial Level

4 Jan 2019 – HII summarize Pabuk situation with **Water Resource Management Center at Surat Thani Province.**

- Monitoring of High Tide area in 5 districts, Monitoring of High Water Level in 3 estuaries
- Monitoring of Flash Flood Risk in 9 districts
Disaster Preparedness at Community Level

7 Communities prepare for Tropical Storm Pabuk

- Paksuad, Pasaeng, Surat Thani
- Tabchrist, Phanom, Surat Thani
- Talenoi River Basin Network, Pattalung
- Pattani River Basin Network, Pattani and Yala
- Khlongyan, Vibhavadee/ Khiriratniyom, Surat Thani
- Tungsong, Nakhon Si Thammarat
- Patew, Chumphon
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.
Achievement

**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:**
- Area-based
- Horizontal collaboration
- Integrated work

**Communication with Media**
- Fast
- Precise
- Raise awareness
- No panic

Precise Weather Forecast to 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:
- Area-based
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Communication with Media:
- Fast
- Precise
- Raise awareness
- No panic
Top down VS Bottom Up approach
ASEAN Centre of hydroinformatics and related technologies for water, weather and disaster risk management.

www.aseanwater.net
ASEAN Hydroinformatics Data Centre

Agreement on setting up “ASEAN Hydroinformatics Data Centre (AHC)”

ASEAN COST 69
24 May 2015
Phuket, Thailand

Proposal of “ASEAN Hydroinformatics Data Centre
- Data integration
- Modelling and analyzing
- Sharing of good practices
Through Capacity Building programs

ASEAN COST 70
4 Oct 2015
Vientiane, Lao PDR

ASEAN Application of S&T in DRR Water Management Workshop
4 Apr 2016
Bangkok, Thailand

Workshop to identify country needs and implementation plan
I: Data System: Application for disaster management
II: Capacity Building: Empowering and supportive collaboration
III: Good Practice for adaptation

ASEAN – EU STI Days
10 – 12 May 2016
Hanoi, Vietnam

NEXUS Workshop: DSS for Water and Environment Management
- S&T for Sustainable Development
- Outcome of “ASEAN Application of S&T in DRR Water Management Workshop”

ASEAN COST 71
Siem Reap, Cambodia

Propose for setting up “ASEAN Hydroinformatics Data Centre (AHC)” to support for the use of S&T for DRR and Water Management

ASEAN COST 72
22 – 25 May 2017
Brunei

ASEAN COST 74
8 – 11 May 2018
Chiang Mai, Thailand

ASEAN – EU STI Days
10 – 12 May 2016
Hanoi, Vietnam

ASEAN NEXT
8 Mar 2017
Bangkok, Thailand

ASEAN NEXT
18 March 2019

Endorsement of AHC by ASEAN COSTI, report to SCMIT

AHC TOR endorsement

ASEAN COSTI

Endorsement of AHC by ASEAN COSTI, report to SCMIT

AHC TOR endorsement

Side meeting

ASEAN COSTI

Organized events by HAII

22
Structure of STI Cooperation in ASEAN

ASEAN Economic Community Council

AMMSTI (ASEAN Ministerial Meeting on Science, Technology, and Innovation)

ASEAN COSTI (ASEAN Committee on Science, Technology, and Innovation)

9 Sub-Committees

- Food Science and Technology
- Meteorology and Geophysics
- Sustainable Energy Research
- Space Technology and Application
- Material Science and Technology
- Microelectronics and Information Technology
- Biotechnology
- S&T Infrastructure and Resources Development
- Marine Science and Technology

ASEAN Hydroinformatics Data Centre (AHC)
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.
Our Members

- Cambodia
- Indonesia
- Lao PDR
- Malaysia
- Myanmar
- Philippines
- Singapore
- Thailand
- Vietnam
<table>
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<tr>
<th>Lead Member</th>
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Expected Outcome

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