Proposal of “ASEAN Hydroinformatics and Climate Data Center”
- Data integration
- Modelling and analyzing
- Sharing of good practices

Through Capacity Building programs

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”

Propose for setting up “ASEAN Hydroinformatics and Climate Data Center” to support for the use of S&T for DRR and Water Management

ASEAN COST 71
Siem Reap, Cambodia

ASEAN COST 72
22 – 25 May 2017
Brunei

ASEAN NEXT
8 Mar 2017
Bangkok, Thailand

Workshop on Establishing ASEAN Hydroinformatics and Climate Data Center
1. **S&T Implementation**
   - Strategic data sharing and management for Hydroinformatics
     - Data (acquisition, quality, integration, sharing)
     - Tools (monitoring, models, NWP, DSS) during normal and crisis situation
     - ICT infrastructures

2. **Capacity building**
   - Identify organization involved within the country (roles and responsibilities)
   - S&T transfer, knowledges and experience sharing on water accounting and auditing

3. **Good practices**
   - Community Water Resource Management (CWRM)
   - Climate change adaptations

4. **Collaboration network**
   - Identify focal point from AMS
   - Cross-sector
   - International
   - Small projects
Development of National Hydroinformatics and Climate Data Center
THAILAND
Thailand 2011 Flood

**Early warning and real time decision making**

<table>
<thead>
<tr>
<th>Flood sensorweb</th>
<th>Forecast &amp; modeling</th>
<th>Networking &amp; cluster</th>
<th>Flash flood &amp; landslide warning</th>
<th>Reservoir networking</th>
<th>Data warehouse</th>
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</thead>
</table>

**Integration of technology for data analysis and flood management**

5 tropical storms in 2011:
1. Haikui (June)
2. Nock-Ten (July)
3. Nesat (September)
4. Hainang (September)
5. Nalgae (October)

**48-years avg. rainfall = 1,374 mm**
2011 rainfall = 1,824 mm
2011: 32% above average

Flash flood & landslide warning
Reservoir networking
Data warehouse

Early warning and real time decision making

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

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Early warning and real time decision making
Main Function of NHC

Forecasting and Warning

1. Monitoring System for Water and Flood Situation
2. Hydroinformatics and Climate Data System
3. Forecasting System for Water Management
   - Short, Medium and Long range Weather Forecast
   - Water Balance: Chance for Flood and Drought
   - Structure/Dam/Dyke/Weir/Water gate/ Pump Management

4. Normal Management
   - Crisis Management
   - Development and Adaptation

Hydro and Agro Informatics Institute
- 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
Current Status of NHC’s Data linkage

2012-2015

13 agencies

2016

+21 agencies

Houses 388 data items from 34 agencies since 2012
Management Plans during Normal and Crisis Situation

Operation and Data Usage Agencies

- TMD
- RID
- DWR
- EGAT
- PWA
- MOST
- DPT
- RTN
- BMA
- NDWC
- DDPM
- LAOs
- NESDB
- BB
- University/Research Institute

Normal

- Set water management plan
- Warning and Situation Management
- Business Intelligence
- Decision Support System
- Analysis and Forecast
- Monitor and surveillance

Crisis

- Warning and Situation Management
- Development direction for stability
- Estimate risk and future trend
- Analyze facts and problems

Develop / Maintenance

- Set development direction for stability
- Estimate risk and future trend
- Analyze facts and problems

Infrastructures (Hardware / Software / Security / Data Center)

- Meteorology
- Hydrology
- Public Utility
- Tools
- Measurement Index
- Economy/Investment/Projects
- Standards/Rules/Criteria
- NHC
- Base Map
- Shape File

Framework of “Data for DSS” Master Plan, 2015
Operation during **Normal Situation**

Chao Praya River Basin

Water Balance

Observation Data
Provincial Water Management Operation Center

Using area specific information to monitor and manage water situation locally

Phrae
http://nhc.in.th/phrae.html

Sukhothai
http://nhc.in.th/sukhothai.html

Phayao
http://nhc.in.th/phayao.html

Phichit
http://nhc.in.th/phichit.html
Development of Community Water Resource Management System

To solve flood and drought problems and cope with climate change adaptation

**S&T Application**
- Apply S&T for community survey
- Identify problems and solutions
- Water balance analysis
- Area-based analysis

**Engineering/Innovation**
- Simple infrastructure design suitable for the socio-geographical condition
- Systematically plan the work process, management and maintenance
- Local innovation

**Sustainable Agriculture**
- 3 forests, 4 benefits
- Integrated agriculture
- Water quality management

**Success**
- Self-sufficiency
- Food security
- Expand the success to other communities

Hydro and Agro Informatics Institute
Operation during Crisis Situation

Chao Praya River Basin

Precipitation Forecasting & Storm Tracking

Runoff Forecasting

Water Level Forecasting
Emergency Mobile Data Center to support water management operation during Crisis

- 24 hours situation monitoring
- Identifying risk area and promptly issuing warning
- Effective and prompt situation management planning
- Preventing and alleviating damages and impacts from flooding into households and economically critical areas
Thailand Flood in Dec 2016 – Jan 2017: Southern Region

Online Rainfall and WL Monitoring

January Precipitation (mm) Nakhon Si Thammarat Province

Record-break Maximum Daily Rainfall since 1984
615.6 mm (January 5th, 2017)

Average Rainfall: 139 mm

Source: TMD (Nakhon Si Thammarat Agromet)

Flooded areas in Dec 2016

Source: TMD (Nakhon Si Thammarat Agromet)
Emergency Operation Center

Emergency Operation Units