Impacts of extreme flood and drought on irrigation and drainage and their adaptation strategies in Thailand

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Content

1) Extreme floods and drought
2) Impacts to irrigation and drainage
3) Master Plan
4) Adaptation Strategies
5) Vulnerability assessment
6) Adaptation samples
7) Conclusions
### Case study: 2011 Thailand floods

Source: Flooding in Thailand in 2011 a) flooding at the outskirts of Bangkok b) Flooding at the Rojana Industrial Park, Ayutthaya, Thailand c) Flooding in Bangkok metropolitan area and d) inundated villages in Thailand
Changes

- Higher temperature
- Seasonal fluctuations
- Change in precipitation’s intensity & frequency
- Extreme events
- Sea level rise

Impacts

- More floods, droughts, land slides
- Possible coastal erosions/Bangkok sinking

Hydrograph change due to CC (Nan Basin)
National Climate Change Master Plan

- Adaptation
- Mitigation
- Research for better understandings
- Capacity building
- International cooperation

Strategies for Water sector

- Water data integration (water use, water footprint, climate change and water management)
- Participatory in policy and planning setup
- National water infrastructure master plan
- Water Efficiency and conservation schemes
- Capacity building for local administrative
- Land use planning
Adaptation schemes

- Flood and Drought
  (IWRM and damage risk reduction)
  --- dam operation, warning system
- Agriculture and food safety
  (Risk management, adaptive coping capacity)
  ---- agricultural zoning, water allocation conflict

National Water Management Strategies (2015-2026)
Vulnerability assessment

Climate variability

Exposure

Sensitivity

Potential Impact

Adaptive capacity

Vulnerability

Climate Change Scenarios

Precipitation change 2016-2045
Rainy days more than 90 mm

Generalized Monsoon Index (GMI)
Vulnerability Assessment (floods and drought)

Supply uncertainty
Climate change impact

Demand uncertainty
Future Thailand
New strategy

Risk management
Under future uncertainties
Expert meetings

- March 17, 2016
- June 6, 2016
- July 14, 2016

Future risk

(a) Precipitation change
(b) Agricultural growth

Drought Risk due to precipitation change and agricultural development
Future risk (cont)

(a) Precipitation change

Future risk due to precipitation change

(b) Flood area

Risk management
Under future uncertainties

Economic development

Structural M. Protection
- Reserved source
- Retention pond
Need planning

Structural M. 1st priority
- New water source
- Polder
Need investment

Monitoring
- Data access
- Education
Need monitoring

- Insurance
- Warning
Need adaptation
CC impacts towards Nan Basin and Central Plain

Effectiveness of adaptation measures
CC impact to an extensive irrigation project

Location plan with elevations, river network and province boundaries shown on the left panel. Irrigation structures shown on the right panel.

Water deficit area with no rotation (near future)
Water deficit with rotation (near future) (plus retention pond)

Adaptation Sample (Central)
Field questionnaire with farmers at Plaichumpol Irrigation Project

Adaptation sample (NE)
Field questionnaire with farmers at Lam Pao Irrigation Project

International cooperation
Conclusions

- Climate change gave impacts towards agriculture.
- More frequent floods and droughts found.
- Climate Change and National Water Management Master plan setup.
- Need risk management for implementation and capacity building (for both government officers and community)
- Adaptation samples of basin, project and community scales
- Need international cooperation for more information/knowledge sharing and risk sharing.

References-1

- ONEB, INDC submitted to UNFCC, Oct 2015.
References-2

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- Sucharit K., et.al., Impact Study of Climate Change and Variability, Vulnerability and Adaptation of Key Sectors, Progress Report to ONEB and UNEP, Sep 2016.