PILOT BASINS IN FLOOD AND DROUGHT MANAGEMENT TOOLS PROJECT: CHAO PHRAYA BASIN

The Chao Phraya Basin covers approximately 35% of Thailand's land area, is home to 40% of it's population and generates 66% of its Gross Domestic Product.

The Chao Phraya Basin is one of the 3 pilot basins in the Flood and Drought Management Tools Project (FDMT) which will be testing the decision support system (DSS) which provides information to integrate flood and drought information into planning.

The Chao Phraya Basin was selected as a pilot basin for a variety of reasons, including the recognition that it is in a rapidly developing region and is an important economic hub at the global level. Floods and droughts are a regular feature of the basin and cause significant economic losses, therefore investment in tools to manage these events are a priority.

Approximately 50% of the Chao Phraya basin population lives in the Bangkok Metropolitan Area, which generates 78.2% of the basin's share of GDP. The BMA and the Upper Ping sub basin have the highest concentration of formal employment and social services, such as health and education. Agricultural lands, which cover over 90% of the basin, are concentrated in the southern part of the basin.

Some of the key issues impacting social and economic development and environmental sustainability include:

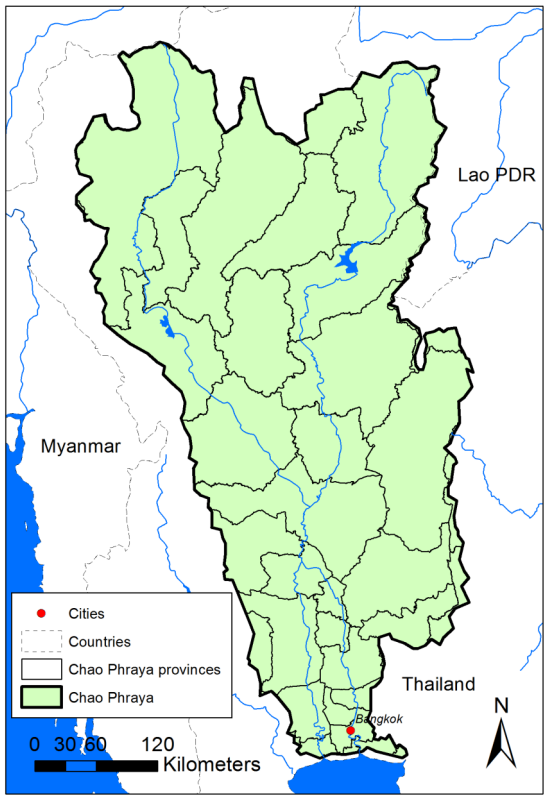
- ⇒ Soil erosion and sedimentation
- ⇒ Watershed degradation
- ⇒ Poor surface water quality
- ⇒ Increasing groundwater pollution
- ⇒ Frequent floods
- ⇒ Groundwater over-pumping
- ⇒ Low efficiency of water infrastructure
- ⇒ Limited human and institutional capacities
- ⇒ Forest encroachment for agricultural purposes
- ⇒ Canal pollution after flooding

Catchment area: 160,400 km^2

Population: 30,000,000

Urban population: 32%

Major urban areas (>100,000 people): Bangkok, Chiang Mai, Nonthaburi



The **Flood and Drought Management Tools (FDMT) project** is funded by the Global Environment Facility (GEF) International Waters (IW) and implemented by UNEP, with the International Water Association (IWA) and DHI as the executing agencies. The project is developing a computer software-based decision support system (DSS) which has tools to support planning from the transboundary basin to water utility level by including better information on floods and droughts. The project is being implemented from 2014 - 2018, and 3 pilot basins (Volta, Lake Victoria and Chao Phraya) have been identified for development and testing of the DSS.

Projects and initiatives of key relevance for the FDMT project

The Integrated Study on Hydro-Meteorological Prediction and Adaptation to Climate Change in Thailand (IMPAC-T) project, supported by the Science and Technology Research Partnership for Sustainable Development (SATREPS), aims to provide a scientific basis for climate adaptation strategies. The IMPAC-T project embraces a transdisciplinary approach to research that brings academia, operational agencies and funding agencies in Thailand together to enhance earth observations, understand climate change and develop integrated water resources models to predict future hydrological changes associated with social and climate changes.

The Development of Climate/Disaster Risk Assessment and Application of Risk Information in Development Planning in Thailand (THPRA) project, spanning from June 2015 to February 2016, will assess and quantify disaster risk for 2 pilot provinces of Chiang Rai and Songkhla. The project will first develop intensity maps of prevailing hazards in the selected provinces, collect data on the at-risk elements, study the vulnerability and finally derive the risk or possible impact of the hazards on those at-risk vulnerable elements. The project is supported by United Nations Development Programme (UNDP) and involve national agencies such as the National Economic and Social Development Board (NESDB) and Department of Disaster Prevention and Mitigation (DDPM).

Impact of Flood and Drought

Floods are a regular feature of the Chao Phraya basin and cause significant economic losses. Floods have been aggravated by different factors, such as the decline in flood retention areas and the confinement of flood plains due to increasing development, the rapid urbanisation in the vicinity of the river and the intensification of agriculture. The Thai government controls floods through the construction of multi-purpose reservoirs, dikes (diversions) and other flood control infrastructures which are expensive for the country and can still fail. This containment strategy has managed to reduce the extent of flooding, however, it has resulted in a higher overall flood risk as water reaches the flooding elevation more quickly.

Drought often occurs during the dry season, bringing serious problems such as salt water intrusion. Generally, rainwater and flows from dams keep saltwater from the Gulf of Thailand at bay, but during drought periods the saltwater creeps upstream, turning the Chao Phraya river brackish.

Future changes

Bangkok, Thailand's capital city and home to over 10 million people, has been sinking 10 centimeters annually due to the overpumping of groundwater for industrial use. The land subsidence, coupled with rising sea levels due to climate change, puts the city at risk of disappearing into the sea. Sea level rise will exacerbate freshwater constraints due to salinization of estuaries and groundwater supplies.

Stronger and bigger waves triggered by climate change, as well as upstream dams that deposit less sediment at river-mouth areas, are causing coastal erosion and consuming precious land.

Key stakeholders

ORGANISATIONS

Hydro and Agro Informatics Institute (HAII) - Focal point Office of Natural Resources, Environmental Policy & Planning (ONEP), Royal Irrigation Department (RID), Electricity Generating Authority of Thailand (EGAT), Thailand Meteorological Department (TMD)

WATER UTILITIES

Metropolitan Waterworks Authority (MWA) and the Provincial Waterworks Authority (PWA)

FDMT project in the basin

The project will focus on the Chao Phraya Basin, but will consider the inclusion of Bang Pakong basin on the recommendation of RID. The Bang Pakong basin has industrial areas affected by flooding, and upstream areas affected by drought.

The project will work with the Hydro and Agro Informatics Institute (HAII) at the basin level. HAII is the lead organisation for the Water Data Centre and has extensive experience with DSS, modelling and real time systems. They also have a key role in data integration in Thailand, which is part of what the DSS will aim to achieve.

Another key collaborator is the RID, which is responsible for the irrigation planning, and planning the dry season water allocation together with the Electricity Generating Authority of Thailand (EGAT).

Project website: http://fdmt.iwlearn.org/

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