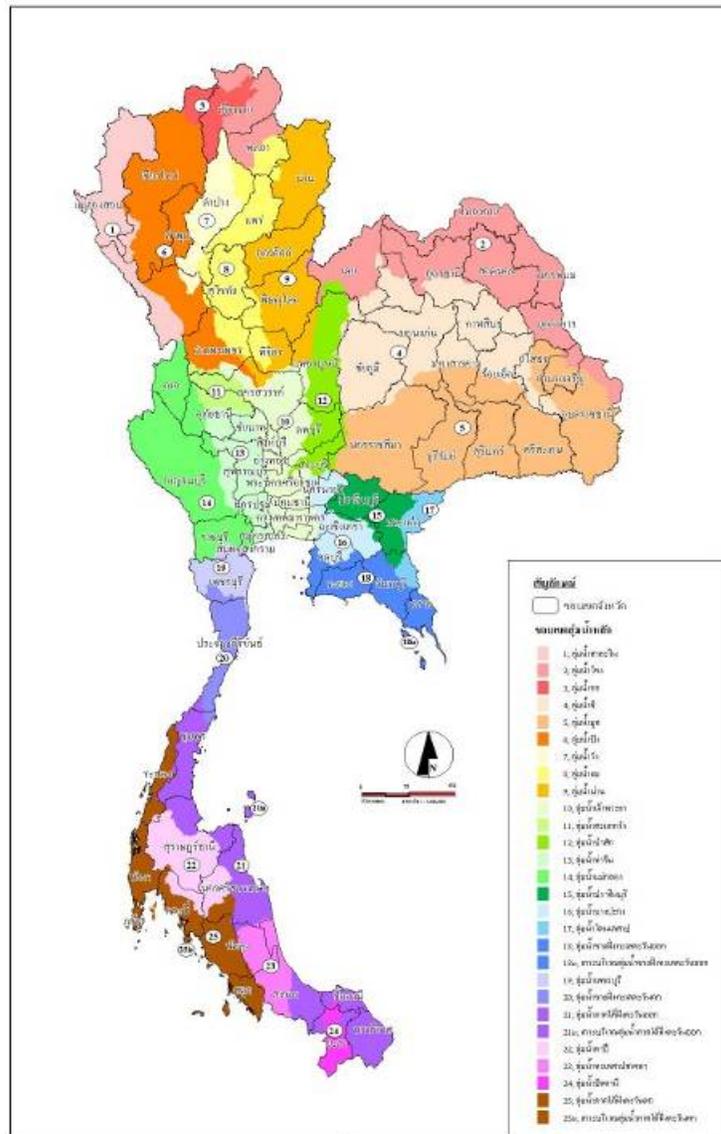


Action Plan toward Effective Flood Hazard Mapping in Thailand

JICA region-focused training course on flood hazard mapping

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A. The role of flood hazard maps to mitigation flood
damages in Thailand

The causes of floods, in general, may come from two main sources: nature and human intervention, as follows:

Natural causes

The main natural causes are overbank flow of the rivers, heavy rainfalls and tides.

Overbank flow : Floods in Thailand are also generally caused by overflow from the rivers, which results in widespread flooding. During the peak flood in 1995, the flow in the Chao Phraya River passing through Bangkok metropolis to the Gulf of

Thailand was much higher than the capacity of the Chao Phraya River and caused severe flooding in the Chao Phraya Delta and Bangkok metropolis.

Heavy rainfall : Heavy local rainfall is usually the main cause of inland floods, as it often exceeds the drainage capacity of the local areas or streams. For example, several tropical cyclones passed through Thailand and caused heavy rains in 1995, including the depression storm.

Influence of tides : Tidal fluctuation at the river mouth has often affected the drainage of river floods into the Gulf of Thailand. This effect prolongs the period of flooding, especially in the coastal provinces of the Chao Phraya River basin, Samut Prakan, Bangkok metropolis and Samut Sakhon.

Man-made causes

The most common man-made causes in Thailand are deforestation, uncoordinated urban development, over-abstraction of groundwater, and destruction of flood embankments.

Deforestation : This is the most significant man-made cause that increases flood peak from rainfall and reduces the lag time between rainfall and run-off. In a deforested area, surface run-off and peak flood discharge tend to be higher, since there are no trees to obstruct the flow. Moreover, the rapid run-off will

increase erosion of soil surface particles, resulting in higher turbidity and more serious sedimentation. This results in reducing function of the river and water sources.

Uncoordinated development : In urban development, most of the surface areas are covered with houses, roads or paved surface having lower water absorption and rainfall tends to convert almost immediately into run-off flowing into the drainage system. This phenomenon is in contrast to that in rural areas, where rainfall can be retained by vegetation cover and absorbed by soil. Many kind of development in delta area have related to creating higher flood risk for example protection of urban and high-value farm will reduce space of flood inundation accordingly such as orchards, aquaculture, etc. Construction of roads and railways will also obstruct flow especially for inland flow. Housing construction in public areas along river or canal banks is another example of action that reduces the stream cross-section and thus its flow capacity. Uncontrolled dumping of sewage and garbage may obstruct the flow and cause situation in the drainage streams. As a consequence, uncoordinated development in many parts of the country has resulted in decrease in drainage efficiency both inland and river courses.

Destruction of flood embankments : There have been cases in which inhabitants living in areas outside the protection

of flood embankments destroyed those embankments in the hope of reducing the flood-water level in their areas. Protection of these embankments was difficult, although there are government agencies responsible for the maintenance and monitoring of the embankments. These events resulted in abrupt flooding of the protected residential areas.

Over-abstraction of groundwater : Pumping of groundwater is one of the main causes for land subsidence, which has resulted in deeper flooding and longer waterlogging. The Government agencies concerned are trying to limit the pumping of groundwater and this effort has been emphasized in the Bangkok metropolitan Area.

The outline of the present countermeasures for mitigating flood damages in Thailand.

Flood control and management has become an important component of water resource infrastructure development. The post-World War II up to the 1980s marked the massive water infrastructure development in the kingdom aimed at flow regime regulation and water conservation (ESCAP 1999). Water resources projects have been a major public investments since 1961 (ESCAP 1999). Several large and small-scale water resources projects were constructed for power generation,

irrigation and flood mitigation nationwide. The Royal Irrigation Department has been mandated to protect agricultural areas with dikes. For example, a 300 km dyke has been constructed by the Royal Irrigation Department along the Chao Phraya River to protect irrigated areas from Nakhom Sawan to Bangkok (ESCAP 1999). Flood mitigation is one rationale for medium to large scale water infrastructure projects in the Mae Nam Ping Basin in Northern Thailand.

In Thailand economic activities and prosperity is concentrated in the Chao Phraya River basin, particularly the Greater Bangkok Metropolitan Area, and few other urban and industrial enclaves. The government invested in flood control infrastructures to control flooding in these urban centers. Since the beginning of the Eighth National Economic and Social Development Plan (1997-2001), the government has allocated necessary budget to various agencies concerned to implement various flood control measures, such as the construction of flood control systems, multi-purpose reservoirs and other hydraulic works, aiming at reducing the magnitude of flooding. For example, as a response of the catastrophic flood in Hat Yai in 2000, the Hat Yai municipality with the support of the national government has made considerable investment in flood mitigation schemes, which include the construction of levees,

drainage canals, water diversion channels and pumping stations. The Eighth National Economic and Social Development Plan calls for the establishment of institutions to solve flood problems through the formulations of policies and action plan. These institutions would coordinate the implementation of the action plan so as to ensure effective flood management in conformity with the law and complementary of the activities of all departments concerned working toward the same goals and preventing conflicts.

At the present, there are two types of countermeasures to reduce flood damages in Thailand:

Structural measures

Government organizations responsible for flood control and mitigation have proposed many flood control projects. However a few projects are completed due to lack of the budget. The examples of structural-measure projects are dam constructions, weir constructions, embankment and levee constructions, etc.

The evidence of the effectiveness of structural measures was on 1995 flood. Due to the severe damage caused by flooding in Bangkok in 1980, several measures were implemented for flood protection. Flood protection works for the Bangkok Metropolis included the construction of embankments, improvement of drainage canals, and provision of drainage

pumps, dikes and zoning. The effect of the project was studied and a diversion canal was built to discharge excess flow directly to the sea, together with preventing tidal effects by building a sea barrier. It is effectively protect the city core of Bangkok from major flooding in 1995.

Nonstructural measures

Many nonstructural measures, e.g. rainfall and flood forecasting, flood warning, and historical flood maps are implemented. However, the implementation are not well enough due to lack of modern instruments such as the real time rainfall and runoff recorder, the coordination between concerned organizations is not good enough, and the attitude of the people in flood plain to countermeasures.

I thing Flood Hazard Maps will be useful in Thailand because FHM consist of the necessary information on inundation area and evacuation point in an easy to understand way in order to enable people to evacuate safely and smoothly in emergency situations from the flood disasters are anticipated to occur due to extreme rainfall events. In my country we have flooding almost in the central area and north path of country

especially in the north path flash flood all way occur on the upper path. If we can make FHM in that path we can announce to the people the know disaster from flood will occur and the people that know where is the evacuation center and which one is suitable or not far from their house.

B.The allocation of roles in making flood hazard maps in Thailand.

In Thailand, after re-organization, we have 2 mainly organization responsible in case of flooding. One is Royal Irrigation Department (RID) another is Department of water resources (DWR). Those organizations have different responsible target area. RID involve in the irrigation area or midstream. DWR involve in the upstream and downstream. In my opinion both of them should be hold the main responsibility for making inundation area maps.

In Thailand, Central Government should be hold the main responsibility because the government has made considerable investment in flood mitigation schemes, which include the construction of levees, drainage canals, water diversion channels and pumping stations by use stakeholder who have authority about the raw data and make flood hazard map for distribute this map for the people who live in the flooding area.

The most important thing is the budget because this map should be more detail and easy to understand should be use more budget than normal map.

C The “Action Plan” of making flood hazard maps in Thailand

Ping basin is my target river basin because Ping basin is one of eight sub-basins in Chao Phraya basin. Ping basin originated in Pee Pan Nam mountain range in Chiang Dao district, Chiang Mai province. The river flows from north to south passing Chiang Mai, Lamphun, Tak and joins Wang river in Tak province then passes along Kamphang Phet, Nakhon Sawan and then joins Nan river at Pak Nam Pho in Nakhon Sawan province. The total length is 740 km. Main tributaries are Mae Tang, Mae Ngad, Mae Kuang, Mae Khan, Mae Jaem and also the main river Mae Wang.

Changmai province is flooding because heavy rains occur in the upper ping basin area and the city sit on the lower area. The drainage system in this city was disturbed by housing and the roads block the flow of the water flow by rain. This city is the important city or can call main city in the north path of Thailand economic depend on the tourist or travel business if the flooding occur in the peak season its will be lose income.

In Changmai province, we have the data for flood forecast and rain gauge station for rain forecast. We have many raw data about this in daily data, incase of flood we have hourly data. This is the main important that I'm chosen Changmai province to make hazard map. And its also have flood inundation if we continues make FHM project its will be as soon as complete.

Propose your own "Action Plan" within the next five years.

Action Plan	Years				
	1	2	3	4	5
1.Learning of how to make the FHM	█				
2.Collection data	█	█			
3.Make inundation map		█	█		
4.Proposition and evaluation of anticipated inundation map			█		
5.Proposition of budget required for ground survey			█	█	
6.Ground survey				█	█
7.Composition of the FHM and publication of FHM					█

The following issues are the main problems found in making flood hazard maps in Thailand:

1. Lack of data

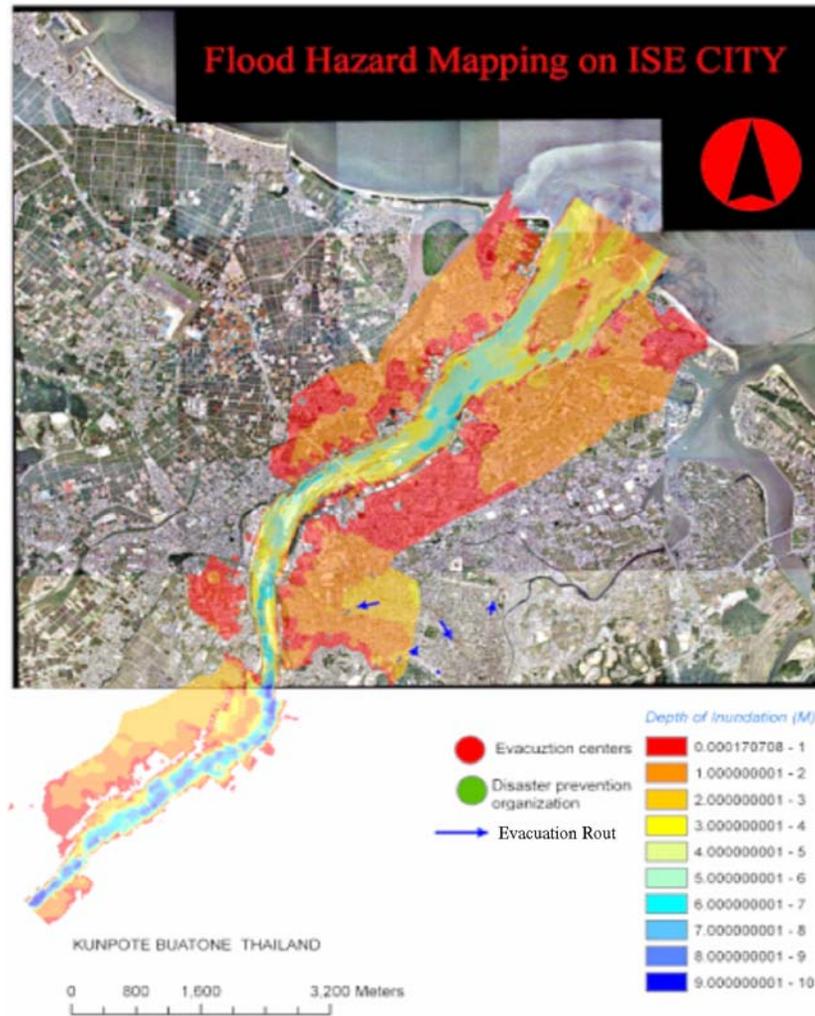
The topographic data of the area in Thailand is rarely available. Only in some specific area that has this data, e.g. the area that is planned to use as the construction site. Although it is available, in some area, it is not in the digital form. Thus, more works have to be done to convert the logical data into digital data and require more time to do so.

2. Lack of the budget

As mentioned before, many of flood protection and mitigation projects can not be implemented due to lack of the budget. Many projects are still in waiting list to be implemented. Hence, receiving the budget for making flood hazard maps is very difficult.

D My own Flood hazard map on Ise city

What is the improvement from the FHM on Ise City currently available.



conclusion

- Flood hazard map in Japan is more useful and easy to understand
- Flood hazard map is the tool for announce to people in flood area know how to when, where and how to evacuation.