

# Article

## Hazards in Kanchanaburi, Thailand

Nguyen The Manh

Asian Institute of Technology (AIT), Thailand

[Email: nguyenthemanh4@gmail.com]

**Abstract:** Natural and man-made disasters, particularly fire and floods, have increased vulnerability and affected the livelihood of communities in Kanchanaburi Province, Thailand. A field study undertaken by students from the Asian Institute of Technology provides insights on disaster preparedness to these hazards in the Province. Disaster mitigation and prevention measures are critical for this community, to ensure their resilience to future events.

**Keywords:** Flood, drought, Kanchanaburi, vulnerability.

### INTRODUCTION

Kanchanaburi is Thailand's third largest of 76 provinces. It is located about 130 km west of Bangkok and covers an area of 19,480 km<sup>2</sup>. There are about 839,776 inhabitants living in the districts of Kanchanaburi Province (Figure 1), which borders Myanmar at the north-west. The Province covers the source valleys of the rivers Kwae Yai and Kwae Noi, which unite to form the Mae Klong River at Kanchanaburi City. Kanchanaburi Province constitutes the largest area of the Mae Klong river basin (19,414.25 square kilometers or 57.30% of total basin area). There are two big dams in the Province that provide water supply for irrigation in this drought-prone area. Agriculture is an important sector and the largest source of employment of rural population in the Kanchanaburi Province. Sugarcane is a major economic crop while rice and fruit are important for food security. Kanchanaburi has rich forestland, but it has been degraded over the years. The Province is experiencing many environmental issues, rapid land use changes, agricultural expansion and increased population pressures as well as poverty (Santiphop, 2009). Deforestation and rapid expansion of agricultural land have been linked to problems of soil erosion and the runoff of surface water causing loss of topsoil.



### APPROACH

The field study in Kanchanaburi Province was conducted over 3 days by a group of 24 students under the supervision of a lecturer from the Asian Institute of Technology. The focus was on fire and floods, which are the most common disaster events in the Province. Primary information collected from leaders and officers involved in Community Based Disaster Risk Reduction (CBDRR) was supplemented with reports and other publications on hazards and disasters in the Province. The practice of villagers as well as disaster drills conducted in communes, schools and the Mahidol University Campus, located in this province were also observed, to get an insight on disaster preparedness.

### FIRE HAZARDS

Fire is the most common hazard in Kanchanaburi Province especially during dry periods. They pose a threat to the economy of the Province which depends on agriculture, especially sugarcane crop. The fires also emit black smoke that affect the visibility for motorists travelling in the Province. They also cause a health threat especially to children and the elderly. Various programs are conducted by the local level government to reduce the level of vulnerability to fires.

At the village level, the provincial health office has provided a good early warning system and preparedness for the hazard. The early warning helps villagers to be better prepared and have improved understanding of evacuation points. They also contribute to reduce breathing problems in places covered by smoke, which can be life-threatening. The community is advised to wear masks to protect themselves from the smoke or, if there are no masks, to cover their noses with a piece of cloth soaked in water. The early warning and guidance have helped the community living in forest areas to respond quickly and reduce their vulnerability. Unfortunately, forest communities are not able to protect their domestic animals. Wild animals are also affected. It was reported that forest fires and extreme dry weather have displaced more than 500 monkeys in the Wang Po of Sai Yoke District, forcing them to seek new shelter and food.

At the school level, Mahidol University provides assistance in conducting fire drills for children, since it is a frequent hazard. When the fire alarm is struck, students have to form a line inside the classroom with the teacher making the head-count. They have to vacate their classroom and make their way to a designated evacuation site. Children are well-organized and this shows the commitment of the university in promoting safety during fires. Furthermore, at this level, the willingness and support of the school principal plays a crucial role in the safety of children whereby all teachers actively participate in the process. Leaders play a pivotal role because of the trust bestowed by the students and teachers. The awareness programs in schools focus on providing a good understanding of evacuation procedures to reduce the vulnerability of students but there are no proper maps to ensure continuous training for new students and outsiders (Figure 2).



Figure 2: Rudimentary sketches are used to train students on evacuation procedures as there are no proper maps and this hampers continuous training for new students and outsiders.

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## FLOOD HAZARDS

Weather-related hazards, namely droughts and floods, are the biggest threat in Thailand. At its highest intensity, such events can cause complete devastation including wiping out entire villages. Kanchanaburi Province has experienced both floods and droughts. Projection of future climate under different climate scenarios in the Kanchanaburi Province suggest that the recent trend towards increased precipitation and temperature will continue, hence requiring proactive approach for development of adaptation strategies for agricultural water management (Monprapussorn, 2014). The presence of steep slopes contributes to frequent flash floods during the monsoon season. Kanchanaburi is also prone to effects from cyclones that move from the Indian Ocean to the Bay of Bengal and western Thailand.

Severe floods occurred in September–November 2017 affecting many districts including Mueang, Kanchanaburi, Sri Sawat, Dan Makham Tia, Nong Prue, Bo Phloi, Huai Krachao, and Sai Yok (Ongsomwang and Junkaew, 2017). Early warning systems have been installed to reduce the impacts of flash floods. Awareness programmes and training are also organized frequently in Kanchanaburi to enhance disaster preparedness (Figure 3). More investment in such activities could lead to enhanced community resilience.



Figure 3: Local communities prepare maps based on availability of material and information as well as their understanding of risk levels.

Traditional knowledge is also used for early warning in many communities. Flooding is triggered by heavy downfall so the behavior of clouds are used as an early warning. Early warning used in the community include bells and other markers placed along the river to detect the rise of critical levels of water during flooding. Electronic communication devices that are used for social networking also serve as a cheap and effective means for communicating early warning for disaster preparedness.

**Vulnerability of Communities Near Steep Forests:** Severe forest floods triggered by continuous rainfalls are most common in the Huai Krachao District (Figure 4). Tracts of farmland have been devastated in this district. During such an event, the local members help each other to move belongings to higher elevated areas, reflecting the high level of social capital in this community. Flooding cuts off the road linking Huai Krachao and Lao Khwan districts, causing inconvenience and disruption of daily activities. The Provincial Disaster Prevention and Mitigation Office does a quick assessment of the area to repair damages where necessary. Generally, the flood situation improves and the situation returns to normalcy within a few days if there is no more rain.

**Vulnerability of Communities Near Dams:** The Singran Dam in the Kanchanaburi Province plays an important role in reducing the impact of floods by storing excess rainwater in its reservoir to be used for irrigation purposes. The release of water from the dam is under the jurisdiction of the Royal Irrigation Department. The dam is maintained every two years to improve resilience of the structure. The dam authority has an advanced communication system to help to ensure early warning for communities in low lying areas (Figure 5). The communities who are living around the dam area are aware of

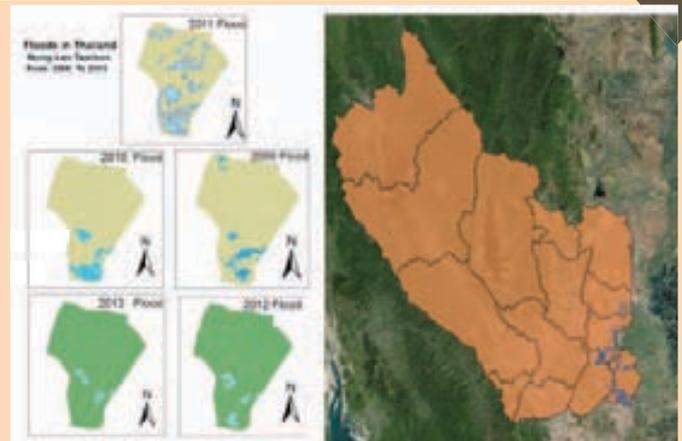


Figure 4: The extent of flooding in the Nong Lan Tambon varies over time but some regions experience persistent flooding and require investment in flood mitigation.



Figure 5: Advanced communication systems for early warning and community engagement by dam authorities play an important role to reduce the vulnerability of downstream populations that are exposed to flooding.

their exposure but the level of vulnerability was quite low because they have a good support from the Thai Government.

## CONCLUDING REMARKS

Fire and floods are the most common hazards in Kanchanaburi Province, Thailand. Fires pose a threat to the economy of the Province, which depends on agriculture, especially sugarcane. The fires also emit black smoke that affect the visibility for motorists and pose a health threat to children and the elderly. Floods, in particular forest floods triggered by continuous rainfalls are common and have devastated tracts of farmland in the Huai Krachao District. These communities have a high level of social capital and rely primarily on themselves during disaster events. Communities living downstream of dams are also exposed to floods, but have a higher level of resilience as they have good support from the authorities. Social capital in the form of institutions, networks of relationships between people and the associated norms and values in programs contribute to disaster preparedness in the Kanchanaburi Province. Community-based disaster risk reduction is an effective tool that can be further developed in this area. More investment is required to build resilience of the most vulnerable groups and exposed communities in the Province.

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