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# Building flood preparedness in community

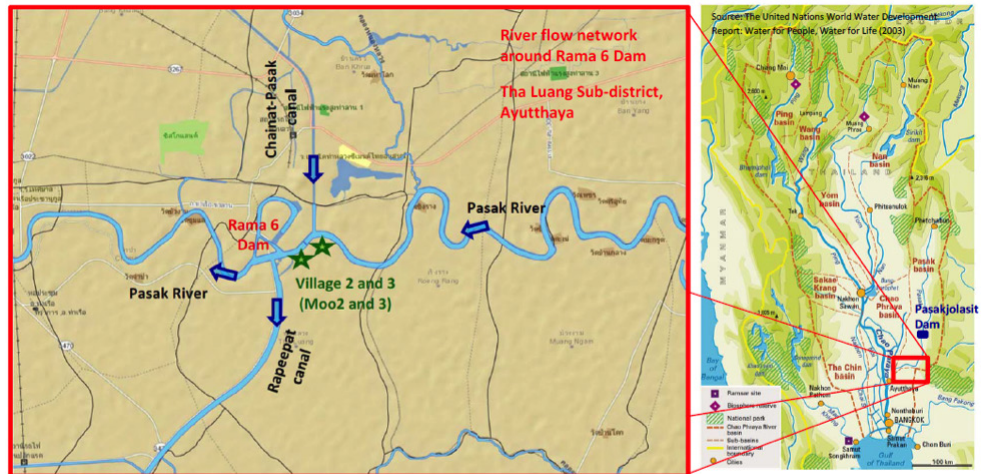
## Implementing early warning systems in Ayutthaya

### Case Study

23 March 2015

**Ayutthaya, Thailand** – This case study concerns the Program for Reduction of Vulnerability to Floods in Thailand implemented by the Asian Disaster Preparedness Center (ADPC) in collaboration with the Department of Disaster Prevention and Mitigation (DDPM) as a focal point on disaster risk reduction organization in Thailand and with the support of the United States Agency for International Development (USAID). Ayutthaya is a province situated in the lower part of Chao Phraya river basin severely affected by flood events every year and has consequently been selected as a pilot area as part of the project. This province lies in a floodplain that receives water from the Chao Phraya and Pasak Rivers making it vulnerable to flooding.

Tha Luang sub-district in Ayutthaya is the target area and is set in an agricultural area dominated by lush rice fields and irrigation canals. It is a small community only 10.73 sq. km. large, with 2511 people (according to the 2011 census) who are generally engaged in rice planting and industrial works. The pilot sites comprise two villages, Moo 2 and Moo 3, located around a gentle bend of Pasak River, one of the major rivers that feed into the famous Chao Phraya River. Along this river, water flows in from the northeast. The Chainat-Pasak man-made canal diverts water from the Chao Phraya River in the north to the Pasak River, upstream of Rama 6 Dam. Rapeepat canal, just upstream of Rama 6 Dam, transports water down to Pathumthani for irrigation purposes. Figure 1 displays the river flow network around the Rama 6 Dam. The two pilot villages (Moo 2 and Moo 3) are



**Figure 1.** River flow system in study area (Moo 2 and Moo 3) in Ayutthaya

situated at the confluence of the Chainat-Pasak canal and Pasak River and were severely affected by floods in 2010 and 2011 .

Prior to the Program's implementation, communities in the Tha Luang sub-district (Tambon) had the traditional perception that only hard measures such as flood walls could protect them from the occurrence of flood disasters. Furthermore, they did not see the benefits of being prepared for these types of disasters because they receive financial aid for recovery and support after any flood event. Capacity building exercises and improved early-warning systems that engaged these community members have not been done at this level. Thus, one of the main challenges of the project was to have the communities take a proactive approach in order to understand the benefits of preparedness to flood disasters , which would ultimately reduce the communities' overall vulnerability and avoid huge costs during the recovery phase.

### Building up flood preparedness for communities

Under this Program, stakeholders and flood management related agencies were brought together to assist the communities in assessing the gaps in Early Warning System (EWS) for the communities of Tha Luang Tambon in Ayutthaya Province. The activities implemented under this Program were designed to raise community awareness and preparedness around the four components of EWS as displayed in Figure 2.



**Figure 2.** The four components of early warning system

Various activities implemented at the community level aim to raise awareness on the importance of non-structural measures, such as training and capacity building. Communities were instructed on the various options for flood mitigation, prevention and preparedness.. By doing so, the initial perception of community members regarding hard structural measures as the only option for protection can be changed. The activities performed over four components of EWS are described below:

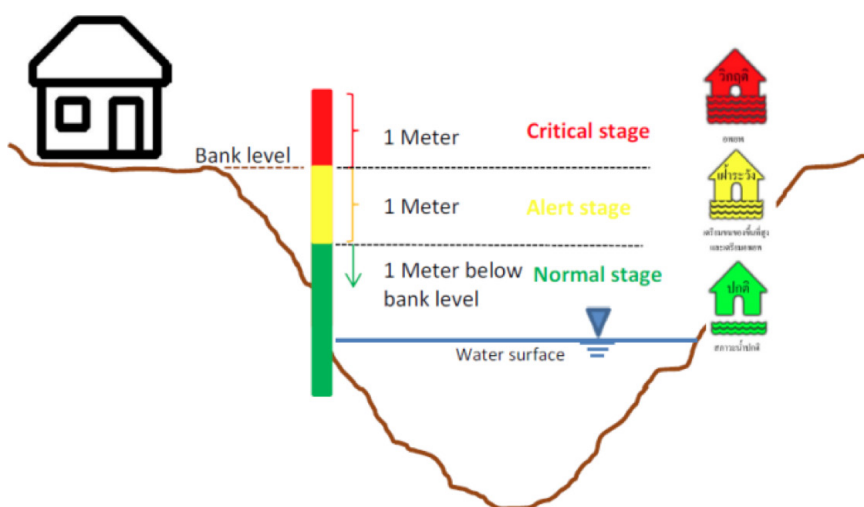
**1. Risk Knowledge:** This component refers to stakeholders' understanding of the characteristics of the hazard and potential disaster impacts, such as high and low flood risk areas and a flood occurrence mechanism. Risk assessments and risk maps also help to motivate and raise awareness on EWS.

ADPC conducted Community-Based Disaster Risk Management (CBDRM) training sessions for Moo 2 and Moo 3 in order to educate both the local government (Tha Luang Tambon Administrative Organization (TAO)) and the villagers about participatory risk assessment. The sessions focused on understanding how to use the outputs of the risk assessment for flood mitigation and preparedness planning for early warning purposes.

Risk assessment is a very important step and should be done periodically to account for change. The outputs from the risk assessment included: 1) flood hazard map demarcating low-, medium- and high-risk areas with evacuation routes (Figure 3); 2) a seasonal calendar showing the months when floods are likely to happen; 3) a risk matrix prioritizing the hazards that need to be addressed; and 4) a capacity assessment of the disaster preparedness system already in place and the skills set of the people involved.



**Figure 3.** Flood hazard map of Moo (village) 2 identifying high and medium flood-prone areas



**Figure 4.** Staff gauge installation with color codes at Wat Hua Hun (temple) which is used to monitor the water level of Moo 2 and Moo 3.

**2. Monitoring and Prediction:** Continuous monitoring of hazard parameters and precursors is necessary to generate accurate warnings in time. The system must have components that enable it to reliably monitor and forecast local rainfall, stream flow within river and irrigation channels, and predict the likelihood of flooding.

Previously, the villagers monitored the water situation by running to the river bank in front of their houses in order to check the water level every hour. The Program strengthened the monitoring system of the communities by installing the staff gauge with different hazard levels in term of color code (Figure 4) and by providing training to the Disaster Management Committees of Moo 2 and Moo 3 on how to monitor hourly water levels at the upstream level through the following website: [http://www.thaiwater.net/wl\\_summary.php](http://www.thaiwater.net/wl_summary.php) (Figure 5). Knowing the water level at the upstream station approximately 6.5 hours prior to when flood waters would reach the villages helps the communities in predicting the water level at Moo 2 and Moo 3. This makes them better prepared for potential flood events by having enough time to warn the vulnerable houses along the Pasak River and to lift their belongings to higher floors. Involving the communities in the monitoring process is strategic for ensuring that EWS is sustainable and inclusive.

**3. Dissemination and Communication:** The system must be able to send out warning messages in a manner that is easy to understand, clear, and accessible for all groups at risk, including those with disabilities and/





**Figure 5.** Hourly water level of Saraburi station to monitor water situation at the upstream of village #2 and #3

or special needs. The communication system which is utilized to spread warning information must ensure transmission and reception by all people in medium- and high-risk areas.

A staff gauge was installed on the bank of the Pasak River with 3-color codes used for warning purposes. In addition, a flood warning board was installed in front of the Hua Hin Temple, allowing people walking around to clearly see the warning information. The Disaster Management Committees of the two villages have been trained to translate and disseminate the water level at the upstream (Saraburi) and at their villages (Moo 2 and Moo 3). During the critical period, assigned member of the Disaster Management Committees will monitor the situation every hour. The warning information will be directly communicated to the village chiefs, vulnerable villagers and local government for further actions.

**4. Public Awareness and Response Capability:** When the community members receive warning information, they must know how to respond to the warning. This requires systematic education and preparedness programmes. It is essential that disaster management plans are already in place and have been practiced and tested prior to the warning.

In July 2013, before the rainy season, DDPM, with support from APDC conducted a simulation exercise to test end-to-end flood EWS at community level. A tabletop exercise was realized, involving the Disaster Management Committees of the different villages but also villagers themselves to discuss various flood scenarios. Participants reviewed and discussed the actions they would take according to these diverse scenarios, assessing their response capability in an informal environment. The tabletop exercise was used to clarify roles and responsibilities and also to identify eventual needs to improve the existing early warning

system. A role-playing exercise was also conducted with different roles corresponding to vulnerable groups (e.g disabled, elderly people, children and women) given to participants randomly and the responses of the vulnerable groups were tested based on different flood scenarios. Scenarios included how to disseminate the warning information to the deaf and how to evacuate the physically disabled people in the villages. The role-playing exercise aimed to raise awareness on the vulnerable groups during the flood early warning processes. The exercises resulted in the assessment of gaps and challenges helpful to improve the flood emergency response plans and developing the Standard Operating Procedure (SOP) for flood early warning system.

## Addressing awareness and coordination

The diverse activities carried out under the Program were designed to increase flood risk management capabilities with a special focus on the early warning system improvement but also to raise public awareness and improve response effectiveness. Moreover, these activities (such as training sessions on EWS, flood simulation and role-playing exercises, etc.) provide opportunities for the different stakeholders, such as representatives from Royal Irrigation Department (RID), Tambon Administrative Organization, DDPM provincial office, Disaster Management Committees and the villagers of Moo 2 and Moo 3 to work together to increase coordination and cooperation among themselves. Connecting community members to the different authority levels (local and provincial) is essential to make them better prepared to flood disasters. The awareness has been gradually built up through the implementation of those activities. In addition, roles and responsibilities of concerned agencies were identified and documented in terms of Standard Operating Procedure (SOP) which could be used as a tool to ensure smooth collaboration among concerned agencies for better flood emergency management and better coordination.

## Quotation and feedback

“Before this project has come to our villages, I didn’t realize how to monitor and prepare for the potential floods” said Ms Samrua Katinsamit. “The project has been very useful for the village. Now I am aware of the water level and I know how to measure and get the water information from the staff gauge and flood warning board in the villages.” Ms. Samrua expressed her perception on flood early warning. ■

### Program for Reduction of Vulnerability to Floods in Thailand

#### Project Information:

The Asian Disaster Preparedness Center (ADPC) – supported by the U.S. Agency for International Development (USAID) initiated the Program for Reduction of Vulnerability to Floods in Thailand to enhance flood risk mitigation and management. The goal of the program is to promote sustainable development whilst enhancing Thailand’s resilience to floods and other associated natural hazards. It achieves this goal by strengthening the capacity for disaster risk management in Thailand and providing support for flood vulnerability reduction. The program works in partnership with Thailand’s Department of Disaster Prevention and Mitigation (DDPM) and other stakeholders and target provinces in the central and lower Chao Phraya River Basin, from Sukhothai to Samut Sakorn.

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