

*POLICY GUIDELINES ON DISASTER RISK REDUCTION FOR FLOOD PREVENTION  
AT KLONG YAN SUB-WATERSHED, SURATTHANI PROVINCE, THAILAND*

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*Abstract— The Fifth Assessment Report of the Intergovernmental Panel on Climate Change stated that observed and statistical data in long-term trends since the 20th century showed the average globally surface warming due to an increasing of greenhouse gas emissions into the atmosphere (IPCC AR5, 2013). It also reported that water is a vulnerable resource to the impacts of climate change. Thailand is one of South-east Asian countries that have been suffered from several extreme events resulting from climate change (UNESCAP, 2012). One consequence of changes is the severity and frequency of extreme events leading to flooding in all regions of Thailand. This research is aimed to study policy guidelines on disaster risk reduction for flood prevention at Klong Yan Sub-Watershed, Suratthani province of Thailand. The purposive sampling method was used to select stakeholder's involvement, which included local governmental officers, local community leaders, local wisdom scholars, non-profit organization and the network of watershed group. These groups were in-depth interviewed using a set of questionnaires. Data collection included both desk study of secondary data and in-depth interviews of primary data and data obtained were analyzed using descriptive method. The research results found that about 31 % of the respondents were familiar to the policy guidelines on disaster risk reduction such as a master plan of disaster prevention and mitigation. They viewed that the policy guidelines on disaster risk reduction is important to reduce losses and damages from floods. However, about 69 % of respondents did not familiar to the policy guidelines on disaster risk reduction. They viewed that effective policy implemented requires knowledge training and awareness raising, improving law and regulations, supportive infrastructures, building the communication system and early warning system, financial supports and creating collaboration among relevant stakeholders.*

*Keywords— Policy guidelines; Disaster risk reduction; Flood prevention; Klong Yan Sub-Watershed*

## I. INTRODUCTION

According to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR5), the rising of the average surface temperature was a result from human activity where greenhouse gas emissions is increasing into the atmosphere [1]. It is likely projected to be increasing temperature on the earth's surface in the range from 2<sup>0</sup> C to 4.5<sup>0</sup> C over the next 100 years. Additionally, evidences from the IPCC AR5 also reported that climate change is expected to dramatically impacts on environment, societies and economic activities in terms of natural disasters or extreme events.

Therefore, increasing temperature causes to change in the climate system, leading to the frequency and severity of adverse disasters. Moreover, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) pointed that urban expansion problems and increasing population led to unsuitable settlements in the floodplain land areas, making people vulnerable to the impact of flooding. [2]

Thailand is one of South-east Asian countries that have experienced from the impact of natural disaster. Floods still remain the top priority of severe disaster due to the impact of climate change [3]. In 2011, Thailand faced to severe flood which 64 out of 77 provinces were affected; the number of death toll raised to 1,026 people and the total economic damage loss of about 1.44 billion Bath or US\$ 45.7 billion. [4]

Surat Thani Province is located in the southern region of Thailand, facing with floods, and still continue facing such problems due to the impact of climate change. In 2018, the Department of Disaster Prevention and Mitigation reported that there were approximately affected 80,267 households and economic damage was around 900 million Baht in Surat Thani Province [5]. Meanwhile, the Klong Yan Sub-Watershed which is at Surat Thani Province was one of the severely affected areas.

The research is aimed to study the policy guideline on disaster risk reduction in the area of Klong Yan Sub-Watershed, Surat Thani Province in order to reduce the risk to floods.

## II. MATERIALS AND METHODS

### A. The study area

The study areas as shown in Figure 1, were Vibhavadee District and Kirirat Nikom District, Surat Thani Province, Thailand because these areas are the most affected from floods in Klong Yan Sub-Watershed. [6]

Vibhavadee District is located in the mid-area of the Klong Yan Sub-Watershed at the latitude 9<sup>0</sup> 14'20" N and the longitude 98<sup>0</sup> 58' 44" E. This district is covered 5435.30 square kilometer and comprising of 2 sub-district, namely Takuk Nuea and Takuk Yai. While Kirirat Nikom District is located in the downstream of the Klong Yan Sub-Watershed at the latitude 9<sup>0</sup> 1'48" N and the longitudes 98<sup>0</sup> 57' 12" E of the total area

13473.70 square kilometer that composed of 8 sub-district, including Tha Khoanon, Ban Yong, Nam Hak, Kapao, Tha Kradan, Yan Yoo, Tham Singkhon and Ban Thamniap [7][8]. The topography of Vibhavadee District and Kirirat Nikom District is high plains and isolated hills. There is the Klong Yan River flowing from the north to the south. It joins with the Phum Duang River and then flows to the sea at the Pak Nam Tapee. (Figure. 1).

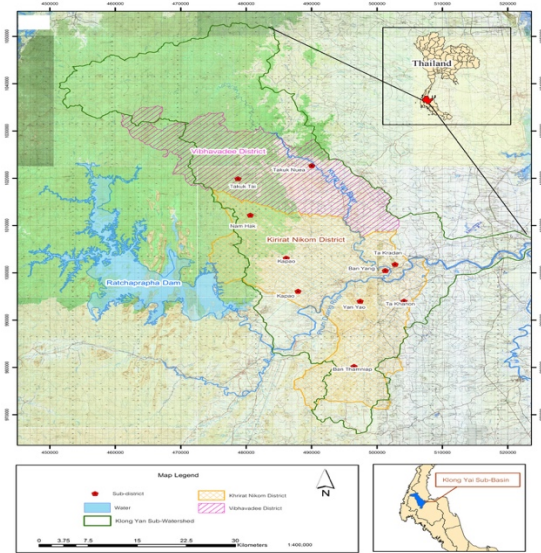


Figure 1. The geography of Kirirat Nikom and Vibhavadee Districts  
Source: The Royal Thai Survey Department, 2015

### B. Research methodology

The quantitative and qualitative methods were conducted by this research. Respondents of the study were applied by using the purposive sampling method in order to select stakeholder's involvement. The number of respondents were 29 including governmental officials, local leaders, local wisdom scholars, non-profit organization, the network of watershed groups. Data were collected by using a set of questionnaires for an in-depth interviews and were analyzed by using descriptive research method.

### III. RESULTS AND DISCUSSION

Based on the National Disaster Prevention and Mitigation Plan in 2015, there have been guidelines to develop system of disaster prevention, preparation and potential formation to manage the remaining disaster through educating activities and some measures. In this regard, this plan has embraced the relevant global frameworks for action based on the Sendai Framework for Disaster Risk Reduction 2015 – 2030. [4]

The strategies for guidelines consist of disaster risk reduction, emergency management, build back better and safer,

and international cooperation on disaster management as shown in Figure 2. The details are as follows;

1. Disaster risk reduction is the action to respond before disaster occurrence in order to avoid or reduce negative effects from related disasters through the analysis of the factors and impacts of the disaster under measures or actions. Therefore, this action is the guidelines to avoid the impact of the disaster through disaster prevention, mitigation and strengthening preparedness on disaster risk reduction which include:

#### 1.1 Guidelines for Disaster Prevention and Mitigation

Preventions and mitigations are actions to avoid the disaster impacts through the implementation of structural and non-structural measures. These guidelines consist of infrastructure building, land-use planning, reinforcing laws and regulations, planning the collaboration with stakeholders, training and educating on disaster preventions and mitigations and financial supports.

#### 1.2 Guidelines for Disaster Preparedness

Preparedness actions are measures to reduce the disaster risks prior disaster occurrence through activities in communities. These actions include increasing educations, strengthening the volunteer group and the network, exchanging knowledge, setting warning systems and communication systems, practicing the evacuation plans, raising awareness, and reviewing laws and regulations.

2. Emergency management is action to respond during-disaster occurrence through organizational structure, decision-making processes and command system in order to reduce the impact from the disaster. This phase includes the setting of the incident command center, the emergency operations, the communication systems, the data center and the emergency medical service system. Therefore, the emergency action has provided the response of the incident situation in a rapid, efficient and timely manner.

3. Build back better and safer is the action to respond after disaster occurrences. This step composes the restoration of damaged public utilities and facilities, infrastructures, environmental system and people who are affected to be back to normal situation. Therefore, the rehabilitation and reconstruction has contributed the opportunity for disaster relief, leading normal livelihood.

4. International cooperation on disaster management is action in the post-disaster process. This action provides development and coordination with international agencies in order to request for disaster rehabilitation. Thereby, developing collaboration with national organization will provide the strengthening for addressing disasters.

In this regard, it can be concluded that the strategy of policy guidelines on disaster risk management aims to increase the efficiency of disaster management that includes disaster prevention and mitigation, preparedness, along with emergency management as well as recovery to build back better under international cooperation.



Figure 2. Disaster Risk Management Cycle  
 Source: The National Disaster Risk Management Plan, Department of Disaster Prevention and Mitigation, 2015

According to policy guidelines on disaster risk reduction, the study found that 31.03 % of the respondents knew about the policy guidelines. They explained that the policy guidelines on disaster risk reduction are integrated with the community planning and multiple sectors such as governmental sector, private sector, and the network group through knowledge and training activities. In addition, respondents viewed that policy guidelines are the ways to practice pre-disaster steps, during-disaster steps and post-disaster steps in order to decrease the disaster risks. Moreover, the respondents mentioned that policy guidelines are the access information for planning before, during and after disaster. Finally, respondents noted that policy guidelines on disaster risk reduction are measure to lay down for disaster risk reduction.

Another point of views from the respondents was that policy guidelines on disaster risk reduction are necessary because it would help preventing and coping with the disaster impacts in a long term. They also indicated that the policy's achievements on disaster risk reduction are important due to the reduction of losses and damages from the disasters. The policy guidelines would ensure people in the communities to be ready to cope with the upcoming disasters in a long term. The policy actions can provide communities to response and recover the managing of the remaining disaster risk. The policy actions are also advantaged to provide the communities with well-timed disaster preparedness and capacity building on disaster occurrence.

In terms of disaster prevention and mitigation, this study reviewed that physical structures, namely concrete weirs, small dam, rock embankment were indicated by 77.78% of respondents. Meanwhile, 88.89 % of them indicated that laws and regulations are needed for the construction control in the community. Also, 100 % of the respondents unanimously agreed with stakeholder collaboration through the meeting in the community. For example, the monthly meetings among the network of Klong Yan groups should be conducted. The network of Klong Yan groups consists of the community leader, local wisdom scholars, the network of friend-warning

groups, and the Forest and Sea Foundation members. This activity provides the opportunities for people to exchange knowledge and discuss the existing problems together within the community. Additionally, 77.78 % of the respondent's opinions revealed that the improvement and revision of law on disaster risk management will help reducing risk disaster. In local organization, there was an improvement of the action plan of disaster prevention and mitigation for sub-district administration organization every year. Besides, all respondents (100%) pointed that the educating on disaster prevention and mitigation will help people realize the necessity of the disaster management such as the methods of preparation, and evacuation practices. There was also supportive disaster management with technology of warning system such as emergency communication system, radio system, and emergency alert. There is also a usage of local wisdom in order to monitor the adverse disaster in the communities, namely the changes of the water level, the changes of colors in the river, the frequency of rainfall rates.

For a financial issue, all the respondents (100%) agreed that there should be more organizations to budget them for disaster risk management. At present, such budgets come from sub-district administration organization, Department of Disaster Prevention and Mitigation on the emergency and recovery, the Forest and Sea Foundation on agricultural development, the Coca-Cola Foundation on reforestation and check dam and the Utokapat Foundation on mountain plumbing.

Regarding preparedness measures, all respondents (100%) are well-educated of preparedness before, during and after disaster. Those respondents stated that there is a training by using local knowledge for preparation such as the observation of the nature and surroundings such as monitoring the frequency of the rainfall, the rising level of the river, and the changing color of the river. Furthermore, there is a training on pre-evacuated preparation, for instance, the food, the medicine, the fuel supplies, and the vehicles as well as the primary and secondary routes for the emergency situation. Also, raising awareness of the disaster effects in the community are all agreed by 100 % of the respondents. They noted that holding a meeting on 14<sup>th</sup> day of every month makes them aware of the dangerous effects among members of Klong Yan network groups. They have exchanged information and experiences about the effects of the flood which lead others to conserve the forest in the community. Besides, the respondents also said that they try to encourage others to join the reforestation, building more weirs, and planting perennial trees in order to reduce flash floods and soil erosion as a way of raising awareness among the people.

The study found that there are many groups in the community such as the network of friend-warning groups, the network of Klong Yan groups, Klong Yan Youth Group, the network of warning friends, Mr.warning groups, the member of civil protection volunteers, and the member of health volunteers. Those groups were supported by government sectors and non-profit organizations to participate on disaster risk management in community. All the respondents (100%) also exchanged their knowledge inside and outside their community. For example, the Forest and Sea Foundation has shared their information about the sufficiency economy

philosophy, organic planting, and organic agriculture to the communities, the Utokapat Foundation has shared information about water management by using local wisdom and Department of Disaster Prevention and Mitigation has shared information about disaster management.

The annual evacuation practice, based on emergency situation, was held by all the respondents (100%). This study reviewed that there is an annual evacuation practice with all sectors in the community in order to ensure enhancing capacities of preparedness for disaster risk reduction. There is also a yearly revision of the working plan of disaster prevention and mitigation by sub-district administration organization.

Furthermore, the study found that the implementation on monitoring and early warning systems in the questionnaire was chosen by all the respondents (100%). The method of monitoring would include a following-up the weather situation from television, radio, facsimile, mobile-phone, broadcast tower, broadcast mobile-car and social media as known as Line groups, and Facebook of Thai Meteorological Department. Moreover, there is a real-time monitoring the situation from the network of friend-warning groups at the upstream area by using radio system. Setting the communication system or channel to respond for warning disaster, including backup community system was also chosen by all the respondents (100%). Additionally, the result further found that there are the warning towers to broadcast the situation and activate emergency alert around the community as well as a daily morning radio communication system test by the network of radio communication groups.

On the other hand, the majority of respondents accounted for 68.97% were not familiar with the policy guidelines. They viewed that they relied on their experiences to deal with floods and other related ones such as encouraging knowledge through preparedness training for people in communities, practicing yearly evacuation plan, setting the network group for disaster warning and building check dams at the upstream.

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