THE IMPLEMENTATION OF THE 2019 ACTION PLAN ON FLOOD, FLASH FLOOD, AND MUDSLIDE: A CASE STUDY OF THE PRE-DISASTER STAGE AT MUEANG DISTRICT, UBON RATCHATHANI PROVINCE

CHULIT NAKORNRATTANACHAI

MASTER OF ARTS

IN

INTERNATIONAL DEVELOPMENT

SCHOOL OF SOCIAL INNOVATION

MAE FAH LUANG UNIVERSITY

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Thesis Title	The Implementation of the 2019 Action Plan on Flood, Flash Flood, and Mudslide: A Case Study of the Pre-Disaster Stage at Mueang District, Ubon Ratchathani Province
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ABSTRACT

Thailand is the most vulnerable to a flood. Ubon Ratchathani was the last province that received water from the 2019 Flood before flowing into the Mekong River. The 2019 Flood was announced as a large-scale disaster (the level 3 disaster), and Mueang District was one of the districts that were damaged severely because it was adjacent to the Mun River. This study aims to examine measures, implementation, and obstacles of implementation during the pre-disaster stage of the 2019 Action Plan on Flood, Flash Flood, and Mudslide, Ubon Ratchathani, in the Mueang District, Ubon Ratchathani Province, based on the perspective of the governmental side.

To fulfill the aims of the study, the qualitative method was conducted through document analysis and semi-structured of fifteen key informants, and the data were analyzed through content analysis. The study found that the implementation of the 2019 Action Plan on Flood, Flash Flood, and Mudslide was too emphasized on preparedness measures and lacked of prevention and mitigation measures. Lack of coordination among stakeholders, poor understanding on the natures and roles of each actor in flooding operations, and excessive rules and processes were the main issues that decreased the performance of the implementation.

The results suggest that the Action Plan must include prevention and mitigation measures, and adjust the Action Plan towards active-oriented strategies. Providing more knowledge, training, and exercise on the pre-flooding operation, along with the enhancement of coordinators, can increase the understanding and performance of all stakeholders in the implementation. Further, reducing the decision-making process makes the implementation faster and more effective.

Keywords: Implementation, Flood, Disaster Risk Management, Pre-Disaster

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Dealing with disasters is one of the aspects of international policies. Climate change which is a well-known global concern rises climate-related disasters, such as storms, floods, and droughts (Thomas & López, 2015). Disasters are going to increasingly appear, be more risky, and disrupt the development and wealth of developing countries (Dilley, Chen, Deichmann, Lerner-Lam & Arnold, 2005). Losses and damages from disasters are significantly increased that "*there is variability in annual losses and deaths from disasters, but annual total damage averaged over a 10-year period) has increased tenfold between 1976–1985 and 2005–2014, from US$14 billion to more than US$140 billion*" (Global Facility for Disaster Reduction and Recovery [GFDRR], 2016, p. xiv). In 2017, 335 natural disasters occurred and caused more than 95.6 million affected people, 9,697 deaths, and US$335 billion of economic damages. When comparing the occurred disaster events in 2017 with the period during 2007-2016, the number of disaster-affected people and deaths decreased, but economic losses were greater. Nonetheless, one of the most vulnerable continents to floods and storms was Asia that shared "*44% of all disaster events, 58% of the total deaths, and 70% of the total people affected*" (Below & Wallemacq, 2018).

To cope with disasters, response was the focus during 1970s – 1980s. However, disaster risk reduction (DRR) has become the core after the launch of the United Nations Decade of Natural Disaster Reduction in 1990 (Shaw, Scheyvens, Prabhakar & Endo, 2016). DRR includes mitigation that mitigation aims to reduce a hazard, and its negative consequences; mitigation also covers preparedness and response (Coburn, Spence & Pomonis, 1994; Coppola; 2015; Haque & Burton, 2005). Thus, reducing disaster risk and impacts, and disaster resilience are discussed and concerned by

international community, which resulted into three main documents: (1) the Yokohama Strategy and Plan of Action for a Safer World, (2) the Hyogo Framework for Action 2005–2015, and (3) the Sendai Framework for Disaster Risk Reduction 2015–2030.

The Yokohama Strategy and Plan of Action for a Safer World was adopted in 1994 at the United Nations World Conference on Natural Disaster Reduction, Yokohama, Japan, as the first document at the international level providing guidelines for natural disaster prevention, preparedness and mitigation. The Yokohama Strategy focused on the mechanisms for coping with disaster impacts and community involvement, and laid the foundation for the recent notion of disaster risk reduction (International Decade for Natural Disaster Reduction [IDNDR], 1994; Tozier de la Poterie & Baudoin, 2015). After the 2004 Indian Ocean earthquake and tsunami, people awareness on disaster risks and impacts has gained more attention. In 2005, the World Conference for Disaster Reduction was held in 2005, at Kobe, Hyogo, Japan (Tozier de la Poterie & Baudoin, 2015). As a result, the Hyogo Framework for Action 2005–2015 (HFA) was adopted as the outcome of the conference, and "*described the detailed processes necessary to reduce disaster risks in various sectors and at different scales*" (Tozier de la Poterie & Baudoin, 2015, p. 130). After the end of the commitment of the HFA, lessons learned from the HFA along with the reflection of the current situation resulted into the renewed commitment to disaster reduction as the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR), which was adopted in Sendai, Japan, in 2015. SFDRR is the current document for disaster risk reduction guidelines, which pays more attention to the roles of scientific and technological development to disaster risk reduction (United Nations Office for Disaster Risk Reduction [UNISDR], 2015; Tozier de la Poterie & Baudoin, 2015).

Disaster risk management is widely used in the current era. It applies risk reduction strategies and policies, which consist of measures and activities in the period of before, during, and after disasters with the purpose to avoid disasters and reduce losses. Disaster risk management is divided into three phases as a disaster risk management cycle, which are before disaster, during disaster, and after disaster. Firstly, before disaster phrase, or called risk reduction, refers to mitigation and preparedness, which aims to reduce losses of people and property by hazards. Secondly, during disaster, or called response, refers to response activities that provide needs to disaster-

affected people, and minimize the losses. Lastly, after disaster, or called recovery, refers to activities that recover and rehabilitate disaster-affected people and losses (Khan, Vasilescu & Khan, 2008).

Disaster is not only a part of disaster management, but is also included in international development agenda. The Sustainable Development Goals (SDGs) is a comprehensive framework for a development, which integrates and balances social, economic and environmental dimensions. SDGs comprises of 17 goals, which are integrated and indivisible, and universally applicable to all countries (Osborn, Cutter & Ullah, 2015; UNISDR, 2015). In the target number 11B of the Goal 11, Sustainable Cities and Communities, states to increase the number of cities and human settlements with holistic disaster risk management based on the Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations [UN], 2015). Besides, in the target number 13.1 of the Goal 13, Climate Action, states to develop resilience and adaptive capacity to climate-related hazards and natural disasters (United Nations, 2015).

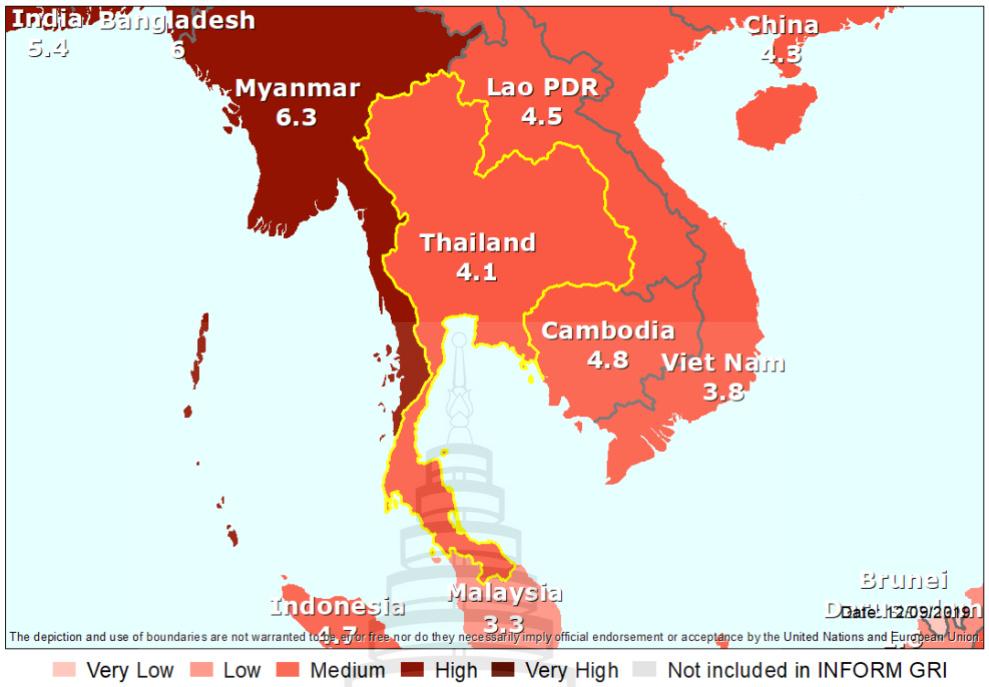
Thailand frequently faces natural disasters because Thailand is located on the tropical belt which usually has storms and monsoons. Consequently, it increases Thailand's vulnerability to natural disaster impacts such as flooding, typhoons, landslides, droughts, and earthquakes. Thailand has faced several major natural disasters; for example, Typhoon Gay in 1989 resulted in 500 casualties, and the 2004 Indian Ocean Tsunami caused more than 8,000 deaths and US$2 billion of economic damages. The 2004 Tsunami stimulated Thailand to pay more attention to disaster preparedness (Center for Excellence in Disaster Management & Humanitarian Assistance [CFE-DMHA], 2018; UN, 2005).

Eventually, a decade after the 2004 Tsunami, natural disasters have become an issue in Thailand's national agenda (Khunwishit, 2014). In 2007 was the cornerstone of the development of Thailand's disaster management. Thailand's Disaster Prevention and Mitigation Act B.E. 2550 (A.D. 2007) was enacted as the main legal instrument that provides a basic framework for disaster management in Thailand. The 2007 Disaster Act established the Department of Disaster Prevention and Mitigation (DDPM) as a central and leading agency in Thailand's disaster management. Currently, the National Disaster Risk Management Plan (2015) is the main guideline for the national disaster plan which adopts the disaster risk reduction concept, as the main

concept of the Sendai Framework. The National Plan also provides a guideline for disaster prevention and mitigation as a part of disaster risk reduction strategies (Disaster Prevention and Mitigation [DDPM], 2015, 2007).

Flooding is the major disaster, and Thailand is the most vulnerable to flood, which impacts various regions of Thailand (CFE-DMHA, 2018). Index for Risk Management (INFORM), an indicator for supporting decision-making about disaster prevention, preparedness, and response, presents that Thailand has a medium risk to disasters, and has the highest physical hazard and exposure to flood (European Commission, 2019). Following the INFORM information, from 2006 – 2015, flood is the most occurred disaster and causes the most severe effects to Thailand (CFE-DMHA, 2018).

In 2019, Thailand faces a large-scale flood. On 29 August 2019, Thailand faced the tropical storms Podul and Kajiki, which affected thirty-three provinces, mainly located in the north and northeast regions. Torrential rain had lashed for two weeks causing flash floods and mudslides (Techakitteranun, 2019). On 21 September 2019, the flood was announced to be the level 3 disaster, that according to the National Disaster Risk Management Plan 2015, the level 3 disaster is a large-scale disaster that the Central Disaster Management Centre is required to take responsibility for coping with disasters and making a decision (National News Bureau of Thailand [NNT], 2019; DDPM, 2015). Overall, the Podul and Kajiki affected 419,988 households, damaged 4943 houses, and caused 35 deaths (Komchadluek, 2019).

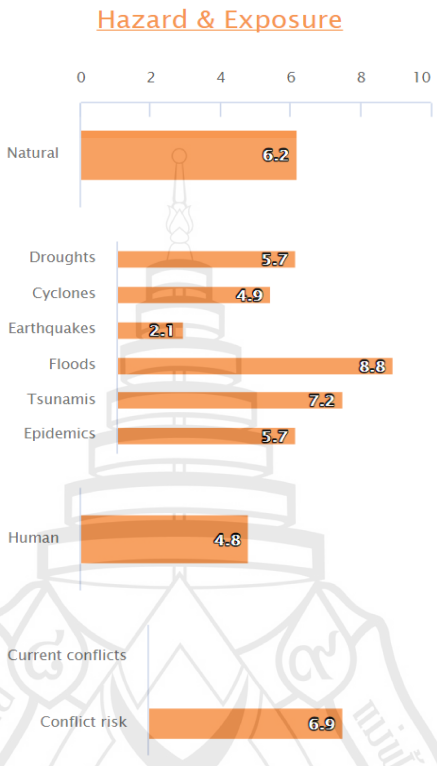


Source European Commission (2019)

Figure 1.1 Level of Thailand Risk in 2020 by INFORM

The most affected provincial groups are located in the northeast region, which are Ubon Ratchathani, Yasothon, Roi Et, and Si Saket. However, the most affected province is Ubon Ratchathani due to its geographical location, where Ubon Ratchathani has low terrain where floodwater from elsewhere gushed in (Techakitteranun, 2019). Accordingly, Podul and Kajiki caused the biggest flood to Ubon Ratchathani in twenty years (Prachachat, 2019). The main policy to deal with the hazard is the Action Plan on Flood, Flash Flood, and Mudslide of Ubon Ratchathani. Nevertheless, the flood affected Ubon Ratchathani more than 42,000 households in 25 districts; damaged 414 houses and partial damage to more than 5,500 houses (Thai PBS World, 2019); caused more than 23,000 people in evacuation (The Straits Times, 2019); and approximately cost economic loss of 1 billion baht (Prachachat, 2019). Mueang district is one of the severely affected districts of Ubon Ratchathani because Mueang District is one of the two Ubon Ratchathani's economic districts, and contains the most population of Ubon

Ratchathani, 222,679 people from 1,869,955 people of the total Ubon Ratchathani population (DDPM, 2019).



Source European Commission (2019)

Figure 1.2 Level of Thailand Hazard and Exposure in 2020 by INFORM

Table 1.1 Disaster in Thailand from 2006 – 2015

Disaster type	Occurrence	Deaths	Total affected	Total damage (USD $ x 1,000)
Drought	4	-	16,482,602	-
Earthquake	2	2	17,539	62,000
Epidemic	2	29	38,608	-
Extreme temperature	1	63	1,000,000	-
Flood	20	1,616	27,523,287	41,292,284
Strom	3	18	1,001,000	-
Total	32	1,740	46,063,036	41,354,284

Source CFE-DMHA (2015, p. 94)

The Thai government has attempted to enhance and develop disaster management in Thailand. Several disaster events lead to an improvement that the Tsunami in 2004 stimulated people and government to aware of risks from a tsunami, and revised laws, policies, and operations to be more coherent. Despite development of disaster management after the Tsunami in 2004 and several-small scale disasters, management of the Flood in 2011 was not much effective (Kamolvej, 2014). The 2011 Flood was a good example for Thailand to further develop disaster management, make a lesson learn, build readiness, and enhance capacity for coping with disasters. Eventually, the consequences of the level 3 disaster of flood in 2019 portray that Thailand still has some fallbacks, and needs to improve implementation of disaster readiness, in accordance with the commitment of the SFDRR. To prevent, mitigate and prepare for disasters are vital that these actions can prevent and lessen disaster's adverse effects that *"…plans to reduce the effects if such disasters strike can be most effective*" (Buchanan, 1981, p. 242). Accordingly, it is significant to emphasize on the pre-disaster period in order to reduce losses and impact of hazards, and the 2019 flood in Ubon Ratchathani is a great opportunity for the development of the implementation of pre-disaster policies implementation, or the implementation of the pre-disaster stage of the

Action Plan on Flood, Flash Flood, and Mudslide of flood-risked sub-districts in Mueang Ubon Ratchathani.

1.2 Research Questions

1.2.1 How does the 2019 Action Plan on Flood, Flash Flood, and Mudslide, Ubon Ratchathani, identify the measures and guidelines to deal with the flood during the pre-disaster stage?

1.2.2 How are the pre-disaster measures of the 2019 Action Plan implemented?

1.2.3 How do the problems during the implementation of the pre-disaster measures of the 2019 Action Plan affect the results of the implementation?

1.3 Research Objectives

1.3.1 To understand the procedures and measures of the 2019 Action Plan on Flood, Flash Flood, and Mudslide, Ubon Ratchathani, that deals with the flood during the pre-disaster stage

1.3.2 To study how the 2019 Action Plan on Flood, Flash Flood, and Mudslide is implemented during the pre-disaster stage

1.3.3 To explore the obstacles and barriers that affect the effectiveness and efficiency of the implementation of the 2019 Action Plan on Flood, Flash Flood, and Mudslide during the pre-disaster stage

1.4 Scope of the Study

This research studied the implementation of the 2019 Action Plan on Flood, Flash Flood, and Mudslide of the Ubon Ratchathani Province, based on the implementation of the government side. The study focused on the event of 2019 Flood of the North East Thailand, in the flood-risked areas of Mueang District, Ubon Ratchathani. The flood-risked areas in this study were (1) Ubon Ratchathani City

Municipality, (2) Chae Ramae Town Municipality, and (3) Kut Lat Sub-District Administrative Organization. Mueang District, Ubon Ratchathani, is the district with the most population in Ubon Ratchathani, approximately 222,679 of 1,869,955 people. Mueang District was also one of the two economic zones of Ubon Ratchathani and was one of the most late-recovery districts that flood resolved, from the 2019 Flood. The three main objectives of the study aimed to understand the protocols and measures of the Action Plan, the implementation of the Action Plan, and the barriers and obstacles of the implementation. This research studied based on concept of disaster risk management, which focused on the pre-disaster stage, and the theory of policy implementation. The study was aimed to be a qualitative research, and used case of the 2019 Flood in Mueang District, Ubon Ratchathani, as a case study. To seek the answer of objectives, this study employed document analysis, and in-depth semi-structure interviews to fifteen key informants who were governmental officials working on disaster risk management in the area of Mueang Ubon Ratchathani.

1.5 Limitation of the Study

This research is designed as qualitative research and collects data through semi-structured interviews. However, due to the outbreak of Covid-19, The Thai government announced a policy to strict traveling across provinces, as well as lockdown policy. Therefore, it is difficult to travel and collect data in the field at Mueang Ubon Ratchathani. Data collection was consequently changed from face-to-face interviews into a phone interview. When changing to the phone interview, another obstacle appeared that it is difficult to appoint the interviewee for an interview. The interviewees usually changed the interviewees' time, and sometimes forgot the appointment. Thus, it needs to appoint the interviewees several times in order to be able to interview. Moreover, some interviewees are not comfortable or willing to give an interview through the phone. Because of using the phone interview to collect the data, it is unable to observe the research site. Thus, some aspects of this research might not be covered. Rather than the data from the conversation, a problem is also found in the document. When requests for documents related to disaster risk management, the interviewees

often forget to send the documents. Besides, if the documents are sent, many files are unable to be read due to a messy layout and arrangement, because almost every significant file created by the governmental organizations are saved and sent in Word Document. Lastly, this research is based on a case study; therefore, it may not directly apply to the other areas.

CHAPTER 2

LITERATURE REVIEW

2.1 Definition of Disaster, Hazard, Vulnerability, and Risk

2.1.1 Disaster

Disaster has been tracked along with, or longer than, human's history (Carter, 2008). However, disaster has no universal definition. Generally, disaster is a rapid and adverse event, which can be either natural or man-made events, which causes immense damages and losses of life, income and property to human beings, as well as animals and plants (Khan, Vasilescu & Khan, 2008). The UNISDR defines a disaster in a different perspectives as "*a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources*" (UNISDR, 2009, p. 9). For The Centre for Research on the Epidemiology of Disasters (CRED), as a criteria for adding disasters into its database, an event would be considered as a disaster if it fulfills at least of the following criteria, which are "*10 or more people reported killed; 100 or more people reported affected; declaration of a state of emergency; call for international assistance*" (Guha-Sapir, Vos, Below & Ponserre, 2011, p. 7).

Disaster is not a mere natural event that disasters are resulted from the interplay of social, political, economic and environmental structures, and the process of these structures influences vulnerability how hazards affect people with different intensities and ways (Mercer, 2010; Wisner, Blaikie, Cannon & Davis, 2003). On the other hand, disaster is linked with development that disaster is a result of human actions and development patterns (Coppola, 2015). Although disasters and their consequences may generate negative effects to the goals and policies of economic and social development,

it provides opportunities to reconsider the priorities and resources of the development and policy (Kapucu & Tom Liou, 2014).

Furthermore, disaster is a result of hazard and vulnerability as defined by the UNISDR that

"*disasters are often described as a result of the combination of: the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation*" (UNISDR, 2009, p. 9).

2.1.2 Hazard

Hazard is indicated as "*a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage*" (UNISDR, 2009, p. 17), which is an external risk factor (Tiwari, 2015). The occurrences of natural phenomenon, which are climatological, hydrological, or geological processes, are not a hazard. If natural phenomenon contacts human being, it is a natural hazard. When affected people contact with natural hazards, and are unable to cope, it is a disaster. Hazards can be single, sequential, or combined in their origin and effects. Each hazard is characterized by its location, intensity and probability (United States Agency for International Development [USAID], 2011).

2.1.3 Vulnerability

Vulnerability is defined as "*a measure of the propensity of an object, area, individual, group, community, country, or other entity to incur the consequences of a hazard. This measurement results from a combination of physical, social, economic, and environmental factors or processes*" (Coppola, 2015, p. 33), which is an internal factor (Tiwari, 2015). Based on sociological perspectives, vulnerability is the root cause of disaster. And the root cause of vulnerability is the societal structure, which creates a higher risk of disasters to underpriviledged and weak groups of people in society

(Tiwari, 2015). It increases marginalization of population due to the rise population, problems of economic opportunities and misallocation of resources, which consequently lead to vulnerable of a community (USAID, 2011).

2.1.4 Risk

Generally, risk refers to "*the combination of the probability of an event and its negative consequences*" (UNISDR, 2009, p. 25). In the realm of disaster, risk defined as "*the potential (not actual and realised) disaster losses, in lives, health status, livelihoods, assets and services, which could occur in a particular community or society over some specified future time period*" (USAID, 2011, p. 9). Since people live in different social context, they also have different risk perception based on their social circumstances. However, poorer communities have more risk (USAID, 2011). In addition, risk can be defined as the likelihood of an event occurring multiplied by the consequence of the event (Ansell & Wharton, 1992, as cited in Coppola, 2015). Likelihood is either a probability or a frequency, consequence is an effect of hazard on people or property (Coppola, 2015).

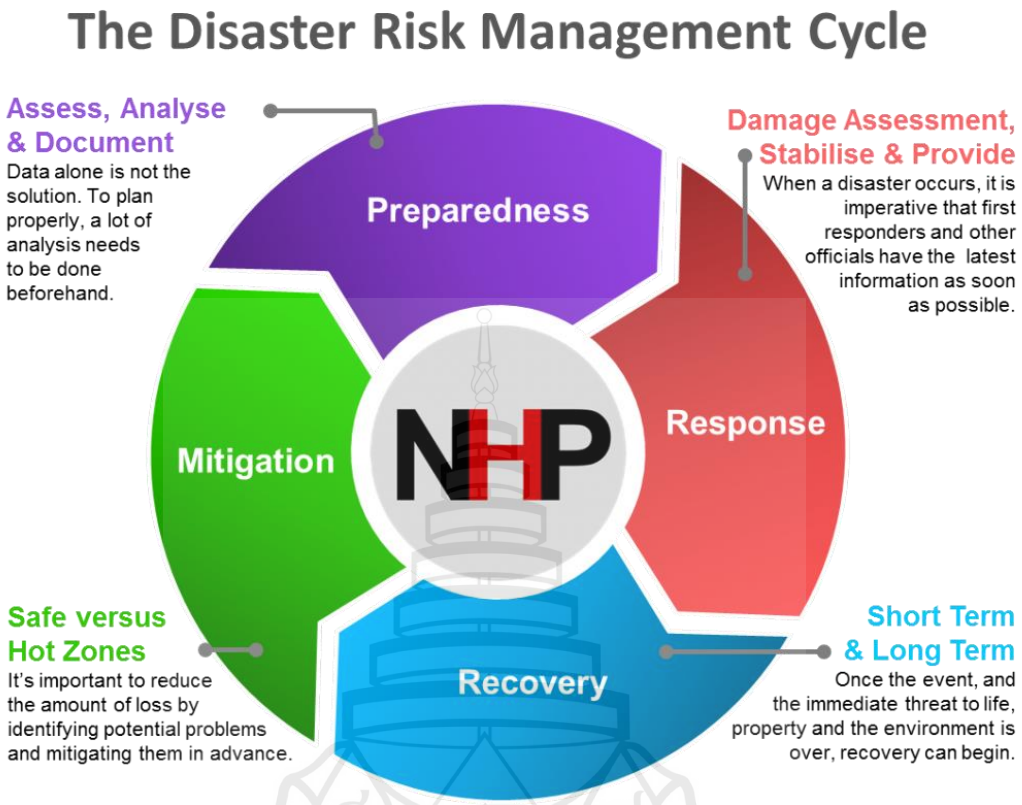
2.2 Disaster Management

Disaster management is defined as "*the body of policy and administrative decisions, the operational activities, the actors and technologies that pertain to the various stages of a disaster at all levels*" (Surianto, Alim, Nindrea & Trisnantoro, 2019, p. 2214). Disaster management applies various sciences in order to systematically observe and analyze disasters and unexpected events (Carter, 2008; Hollnagel, 2015). The process of disaster management is a set of interdependent activities (Parchure & Soman, 2016) which refers to these interlinked activities: prevention, preparedness, response and recovery (Lee, Kim, Sharma & Azam, 2019; Carter, 2008). The objectives of disaster management are to reduce or avoid losses from hazards; assure prompt assistance to disaster affected people; and succeed rapid and effective recovery (Warfield, n.d.).

Disaster management cycle visualizes the ongoing process which aims to achieve the goals of disaster management. The four phrases of disaster management are:

1. Mitigation aims to minimize or eliminate hazard risk;
2. Preparedness aims to increase survival chances and minimize losses of impacted people by tools and knowledge;
3. Response focuses on the action that reduces or eliminates disaster impact, and prevents damage of life and property; and
4. Recovery focuses on the process that returns the situation of disaster-affected people to normal (Warfield, n.d.; Coppola, 2015).

Besides, mitigation and preparedness phrases contribute to sustainable development because they aim to increase dealing capacity to emergency response, reduce hazards, and prevent disasters (Warfield, n.d.). The task in each phrase of disaster management cycle are proceeded by different stakeholders, so collaboration and coordination among different stakeholders and their effort to cope with adverse effects of disaster. However, each phase can proceed simultaneously, and each phrase's length depends on the disaster circumstances (Islam, Tasnuva, Islam & Haque, 2014). These phrases are not generally isolated, and proceed in precise order (Warfield, n.d.).



Source Natural Hazards Partnership (n.d.)

Figure 2.1 Disaster Management Cycle

Nevertheless, there are several criticisms on disaster management. Disaster management cycle is a disaster-oriented focus that all activities and resources are geared towards a disastrous events. Implementation of disaster management cycle as a phrased approach, that activities follow the sequential path, causes a weakness because each phrase can be simultaneous (USAID, 2011). The causes of disasters are not much considered, along with bureaucratic ignorance that "many disaster managers still choose to refer to the 'casual factors of disasters' as espoused by the UNDP Disaster Management Training Programme over two decades ago" (USAID, 2011, p.39). In addition, Surianto, Alim, Nindrea and Trisnantoro (2019) analyze disaster management and find that disaster management is limited to preparedness and response. It does not give adequate attention risk reduction and post-disaster recovery.

2.3 Disaster Risk Reduction

During the 1970s and 1980s, the focus on disaster was emphasized at the response. After 1990, the launch of the United Nations Decade of Natural Disaster Reduction started to recognize the importance of pre-disaster preparedness. The concept of risk reduction was gained a lot of attention in the latter part of the 1990s and the early 2000s, causing a recognition of disaster risk. Risk reduction has concerned on vulnerability reduction and capacity development (Shaw, Scheyvens, Prabhakar & Endo, 2016). Thus, disaster management paradigm has shifted from managing disasters to managing risks (Coppola, 2015).

Disaster risk reduction (DRR) is defined as

"*the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events*" (UNISDR, 2009, pp. 10-11).

DRR is multi-disciplinary in nature that hazards situate in social, economic, and political environments. Thus, DRR policies and strategies view socio-economic and politics as an origin of disaster (Mercer, 2010). DRR has strategies focusing on the function of hazard, vulnerability and capacity (Shaw, Scheyvens, Prabhakar & Endo, 2016; Mercer, 2010), and intends to build resilient livelihoods in order to cope with disaster impacts, hazards and shock before the event occurs (Davies, Guenther, Leavy, Mitchell & Tanner, 2008).

The *Hyogo Framework* for Action 2005-2015 (HFA), the first international policy in DRR (UNISDR, 2015; Banwell, Rutherford, Mackey & Chu, 2018). Disaster management paradigm has shift due to the introduction of the HFA, from the focus on emergency response and preparation into more comprehensive approach Surianto, Alim, Nindrea and Trisnantoro (2019). The Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) is the current global disaster risk reduction policy, which was adopted at the Third United Nations World Conference on Disaster Risk

Reduction, held from 14 to 18 March 2015 in Sendai, Miyagi, Japan (UNISDR, 2015). SFDRR has intention to continue international cooperation, effort, and progress on disaster risk reduction from the previous international disaster management policy, the HFA (UNISDR, 2015; Banwell, Rutherford, Mackey & Chu, 2018). SFDRR aims at

"*the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries… prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience*" (UNSIDR, 2015, p. 12).

In order to pursue the goals and expected outcome, SFDRR set four priorities, which lay on the cooperation and capabilities of all stakeholders from global to local levels (UNISDR, 2015).

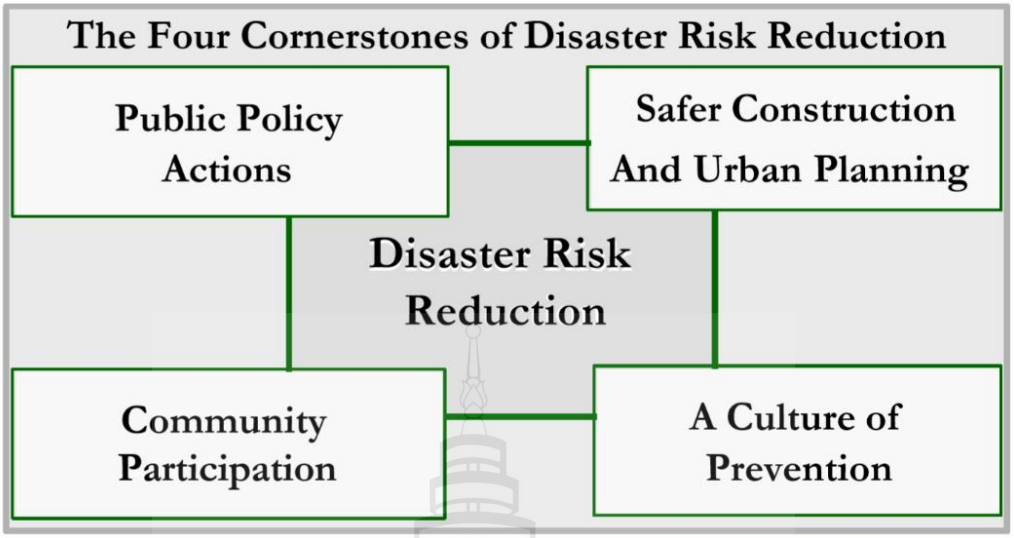
1. Understanding disaster risks in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment

2. Strengthening disaster risk governance to manage disaster risk of all levels and all sectors, along with coherent laws and public policies, and clear roles and responsibilities of stakeholders;

3. Investing in disaster risk reduction for resilience in disaster risk prevention and reduction through structural and non-structural measures; and

4. Enhancing disaster preparedness for effective response, and to 'Build Back Better' in recovery, rehabilitation and reconstruction, with the concerns gender-equitability and universal accessibility

DRR is a parallel and contemporary action and strategy for reducing exposure to disasters, and achieving sustainable development. Bendimerad (2005) presents the four cornerstones of disaster risk reduction, which are (1) community or stakeholder participation, (2) public policy action, (3) safe construction and urban development, (4) a culture of prevention.



Source Sørensen, Vedeld and Marit Haug (2006, p. 29)

Figure 2.2 The Four Cornerstone of Disaster Risk Reduction

Community based disaster risk management (CBDRM) puts community as a center of disaster management, so community participates in all process of disaster management cycle. Disaster risk reduction would be generated by the context of the community which constructs the sense of being a part of the project. Engagement of community leads to consensus, acceptability, transparency, reducing political manipulation. Community engages in vulnerability identification analysis, development planning, monitoring and evaluation. Engagement of community leads to consensus, acceptability, transparency, reducing political manipulation. Based on community's proceeding on disaster risk reduction, experts are needed to catalyze for and provide knowledge to the community. Consequently, participation of community can contribute to community empowerment and sustainability, which would transform vulnerable into resilient communities (Bendimerad, 2003; Boonreang, 2015; Tozier de la Poterie & Baudoin, 2015).

DRR policy handles with the actions which are adopted by the government, in order to understand hazards, assess vulnerability, evaluate risk, and adopt measures for risk reduction. Linking disaster with development and societal needs, and effectiveness

of enforcement power and legal structure are significant to the success of the risk reduction policies. Including all stakeholders' participation in DRR policy is a concern because implementation of mitigation is too complex for government alone. Civil society are active in development, environment, social action and humanitarian work. Scientist community provides scientific knowledge and introduces new technologies (Bendimerad, 2005). However, government's disaster management is ineffective in many places because of the absence of political will and centralization (Tiwari, 2015), and lacks of regulations related with the management of land use, urban planning, construction and building standard, civil protection, and public safety (Bendimerad, 2005).

Unplanned urbanization leads to vulnerability and environmental degradation. Sustainable development and DRR are often in conflict due to the pressure and demand to provide housing, employment, social service and education. These pressures and the growth of urbanization face the challenges of urban planning, land use management and construction supervision. Illegal construction, lacking of compliance and ineffective enforcement to safety standard result to unplanned and unregulated urban. In consequence, large urban areas are vulnerable, and people are at risk (Bendimerad, 2005). Enforcement power, a holistic approach addressing structural and non-structural vulnerabilities for planning development, and information technology and scenario loss analysis for risk communication are key factors to the effectiveness of urban planning and infrastructure mitigation.

A culture of prevention is a fundamental of DRR because it dictates how people perceive risk, motivate resilience, and aggravate vulnerability. It also means to develop skill, knowledge and confidence of human and community to cope with hazards' impacts and reduce negative consequences. Based on socio-environmental constraint, rural community is likely to be more aware and receptive to collectively adopting safeguards against hazards and environmental degradation. In contrast, in urban area, which have higher competition and pressure, can cause people to favor personal risk adversity. Developing a culture of prevention under stress can be more difficult (Bendimerad, 2005). Thus, including stakeholders is the key action for developing a culture of prevention:

1. Awareness raising, a long-term educational process, raises the awareness of vulnerabilities and negative impacts of hazards within their livelihoods. Awareness raising should target at several segment of society. It should be put in the context of the everyday challenges of a community in order to attract attention.

2. Social arrangement is when societies organize themselves to link individual to a community. It leads to the creation of civil society organization where represents stakeholders' interests of community, and has more capacity to mobilize resources, provide capacity development, and implement DRR programs.

3. Forging accountability at institutions and individuals is helpful to build a culture of safety, which enforce good governance which is beneficial to the community's interests over individuals or powerful groups. Lack of accountability is the barrier and obstacle to DRR. However, forging accountability needs a leadership at government and civil society, a vision, and a good policies that provide a space for community to voice in governing.

4. Empowerment of individuals and communities to be active participants can be empowered by good governance. A community which has the knowledge of awareness in its vulnerability is likely to take more actions. Besides, in post-disaster phrase provide opportunities to build a network aiming at local community empowerment in disaster management (Bendimerad, 2005).

Nonetheless, only fear and anxiety cannot develop a culture of prevention, that funding, community training, building network, developing a sense of community ownership, and participation of individuals in developing action plans for disaster mitigation and preparedness are needed (Bendimerad, 2005).

2.4 Disaster Risk Management

SFDRR strengthens and supports disaster risk management (DRM). UNISDR (2009) defines DRM as "*the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster*" (p. 10), and *"... aims to avoid, lessen or transfer the adverse*

effects of hazards through activities and measures for prevention, mitigation and preparedness" (p. 10). DRM includes all measures which reduce disaster-related losses, property, and assets by reducing hazard risks and vulnerability. Accordingly, disaster management is basically disaster risk management (Khan, Vasilescu & Khan, 2008).

Khan, Vasilescu and Khan (2008) presents that disaster management has three key stages: before a disaster (pre-disaster), during a disaster (disaster occurrence), and after a disaster (post-disaster). In 'before a disaster (pre-disaster)', risk reduction activities are taken to minimize and reduce the losses and damage due to a potential hazard. Hence, risk reduction measures in this stage are called as prevention, mitigation, and preparedness activities (Khan, Vasilescu & Khan, 2008; Parchure & Soman, 2016). 'During a disaster (disaster occurrence)' focuses on activities minimizing disaster-affected people's suffering and ensuring the provisions of disaster-affected people's needs. Activities in this stage are called as emergency response activities (Khan, Vasilescu & Khan, 2008; Parchure & Soman, 2016). Lastly, 'after a disaster (post-disaster)' proceeds activities to early recover and rehabilitate affected disaster-affected communities immediately after the disasters. These activities should also eliminate the earlier vulnerable conditions. Activities in this stage are called as response and recovery activities (Khan, Vasilescu & Khan, 2008; Parchure & Soman, 2016).

In conclusion, interrelation and interaction among disaster management, disaster risk reduction and disaster risk management are clear. Disaster management is disaster-oriented focus, emphasizing on preparedness and response. Disaster risk reduction focuses on activities and strategic level of management to reduce risks. Disaster risk management focuses on all activities in both structural and non-structural measures to avoid or limit adverse consequences of hazards, emphasizing on prevention, mitigation and preparedness. Therefore, disaster risk management concerns on operational implementation or application of disaster risk reduction (USAID, 2011).

2.4.1 Disaster Prevention

Disaster prevention aims to avoid the occurrence of disasters (Carter, 2008), or negative impacts from hazards and disasters to communities (UNISDR, 2009). Besides, prevention is the activities resulting a long-term perspective to reduce risks Lee, Kim, Sharma and Azam (2019). Accordingly, prevention can be subdivided into mitigation

and preparedness (Voodg, 2004). Nevertheless, some countries use combined the term prevention and mitigation as a heading for action (Cater, 2008). Disaster prevention should focus on holistic perspective. Because disaster prevention deals with risks, there are three epistemological perspectives to study risks. Firstly, '*engineering perspective*' views that "*risk is seen as the probability of an occurrence of a hazard…*" (Voodg, 2004, p. 5), and can be measured independently from social and cultural processes. Secondly, '*sociological perspective*' views that risks are inseparable from society because risks are the consequences of social and cultural processes. Lastly, '*postmodern perspective*' views that risks are agreed or recognized discourses (Voodg, 2004).

Source Khan, Vasilescu and Khan (2008, p. 47)

Figure 2.3 Disaster Risk Management Cycle

Based on the idea that disaster is the act of society, dysfunction of human and behaviors create disasters, and it is the responsibility of a government to reduce and minimize the occurrences and negative consequences of disasters. Thus, it is disaster prevention (Voodg, 2004). Lee, Kim, Sharma and Azam (2019) proposes the idea of the government towards disaster prevention as Voodg's idea that government plays an important roles in disaster management because protecting people's life and property are the basic functions of the government. Accordingly, disaster avoidance is as important as response. To ensure the effectiveness of disaster management policies, government should initiate measures to prevent disaster before it occurs. However, local governments usually are more practical in disaster management policies and activities because they contact with the disasters, while central government has main roles to support to local governments (Lee, Kim, Sharma & Azam, 2019).

Carter (2008) proposes several problems of disaster prevention. The attention of development policies and programs to disaster prevention at national planning is not sufficient because government usually prioritizes issues related to health care, education and economic development rather disasters. In contrast, some development projects increases disaster risks instead. On political aspect, preventive measures, such as land and property encroachment, may upset to public interests, and cause risk to political parties. Additionally, cost of preventive measures can be expensive, and response and recovery actions are given priority rather than prevention.

2.4.2 Disaster Mitigation

Mitigation aims at reducing a hazard that is possible to occur, or reducing negative effects if it were to occur (Coburn, Spence & Pomonis, 1994; Coppola, 2015). In disaster management, preparedness and response are often considered as mitigation because the actions of preparedness and response set the readiness for dealing and coping with expected and sudden events (Haque & Burton, 2005). However, mitigation is different from preparedness and response. Mitigation focuses on the actions to reduce or eliminate risk to hazard in long term through sustained measures, while preparedness and response focuses on operational preparedness or emergency response (Federal Emergency Management Agency, 2013; Haque & Burton, 2005). Mitigation is complex and interdependent that must be associated with related elements of disaster planning,

such as preparedness and reconstruction; hence, leadership and coordination are essential to mitigation. Active mitigation measures, which rely on incentives, are more effective than passive mitigation measures, which rely on restrictive laws and controls (Carter, 2008).

2.4.2.1 Goals of mitigation

Coppola (2015) indicates several goals of mitigation for treating a hazard risk: risk likelihood; risk consequences; risk acceptance, and risk transfer, sharing, or spreading

1. Risk likelihood reduction is to reduce the risk at the likelihood in order to reduce the chance of hazard to be manifested into a disaster

2. Risk consequences reduction aims to protect population, structure, system and other subject by reducing the impact of hazards on human, structure, economy, environment, or their combination.

3. Risk avoidance refers to reduce the risk to absolute zero, or total risk avoidance. Removing or relocating people and structure in natural hazard-affected area can be the mean of total risk avoidance, and usually needs law enforcement and government authority to implement due to the difficulty from socio-cultural aspect and legal matters

4. Risk acceptance is the risks of certain hazard which are acceptable. Risk acceptance usually occurs when face these barrier: limited funding; undesirable consequences which are discovered after conducting mitigation; and sociocultural patterns that people decide to face a certain risk.

5. Risk transfer, sharing, or spreading commonly refers to disaster insurance that losses are shared across wide population, because financial impacts to disaster are shared. Insurance, a periodic payment for a compensation of specific potential future losses, helps to cope with unexpected losses although it does not reduce physical consequences of disasters

When risk reduction and risk avoidance cannot be achieved, risk acceptance usually occurs. Moreover, risk acceptance is mostly conducted in poor countries due to the lack of funding (Coppola, 2015). Besides, Tiwari (2005) points that disaster insurance create false perception of security. Due to various factors, poor people are put at the center of disaster mitigation because they are more vulnerability. They live

in hazard-prone areas, and their housing is capable of less disaster resistant. If a disaster occurs, poor people have less resources to rebuild and recover their livelihood and housing. Thus, the measure of disaster insurance plays a significant role to increase a risk. Disaster insurance generates false sense of security that create incentives for people to keep living in hazard-prone areas.

2.4.2.2 Types of Mitigation

In order to reduce negative impacts of hazardous events, structural mitigation and non-structural measures are two main types of mitigation. However, several measures can go with either structural or non-structural measure, which is based on the aspect and expected outcome of the measure (Coppola, 2015).

Structural mitigation measure involves with the application of the physical construction and engineering, which aims to improve or change the structure's resistance and resilience towards the hazards (United Nations General Assembly, 2016; Coppola, 2015). Coppola (2015) additionally considers structural mitigation measure as the efforts of man to control nature; however, a mere structural measure is likely to create a false sense of security due to the notion that human can fully control the hazards (Andjelkovic, 2001; Coppola, 2015). Generally, structural mitigation can refer to these actions:

Resistant construction aims at the maximization of a structure's ability to resist hazard's forces. Hazard-resistant design and materials are selected based on the hazard's forces. Because the cost of resistant construction is high, funding is required (Coppola, 2015; Carter 2008; Coburn, Spence & Pomonis, 1994).

Relocation is a measure to protect a structure or people by relocate them away from the hazard. Relocation usually challenges such as unanticipated hazards in the new site, lack of community participation, poor planning impacts to surrounding of the new site, and socio-culturally inappropriate settlements. Relocation should be the last option. Relocation should be voluntary, carry possible cultural properties and artifacts, and the new site should be close to the old site (Coppola, 2015).

Structural modification is to adjust or modify the exposed structures to be more resilient the new risks information and hazard's forces. Generally, it refers to retrofitting. Types of structures and nature of hazard risks are the factors that determine

the options of retrofitting (Coppola, 2015; Carter 2008; Coburn, Spence & Pomonis, 1994).

Construction of community shelters is vital when a majority of community member are unable to protect themselves from the hazards in their residences. Community shelters are consistent with warning systems so that community members would have enough time to travel to the shelters, and public awareness so that they can recognize appropriate reactions during the travel (Coppola, 2015).

Construction of barrier, deflection, and retention systems are engineered structures that attempt to control or exert the hazards. Barriers, such as floodwalls and defensible space, are designed to stop, block or absorb a physical force of the hazard. Deflection, such as spillways and avalanche bridges, are designed to divert the hazard's physical force that change the flowing paths. Lastly, Retention, such as dams and landslide walls, are designed to prevent a force of hazard to be released by a containment (Coppola, 2015).

Detection systems aims *to* recognize a hazard that human may not be able to perceive, in order to warn of hazard consequences or prevent disasters. The examples of detection systems are weather stations, radiological detection and ground movement monitoring system (Coppola, 2015).

Physical modification alters physical landscape in order to reduce the impacts of hazard, such as slope terracing and dredging rivers and channelization (Coppola, 2015).

Non-structural mitigation measure involves with the application of non-physical measures to reduce disaster risks through modify human behavior, raise public awareness, conduct training and education, and exercise laws and policies (UNGA, 2016; Coppola, 2015). These measures consider in the perspective of the adaptation of man to nature (Coppola, 2015). Non-structural mitigation can refer to these actions:

Institution building concerns on the strength of related disaster management institutions and community in disaster mitigation capacity. Besides, strong capabilities of local institutions is one of the requirement of the success of community-based mitigation. Enhancing institutions and community capacity; increasing coping mechanisms for intervention and assistance provisions; and promoting cooperation among stakeholders are vital to development of institutions and community. The strong

institutions can play more roles in disaster mitigation in various aspects (Coppola, 2015; Carter 2008; Coburn, Spence & Pomonis, 1994).

Administration and organization powers, which concern on the planning, procedures and implementation, along with the involvement of community of these actions, are needed for an effective mitigation. In addition, capacity of staff, resources and organizational structures can affect implementation of mitigation. Administration should carry mitigation policy throughout the implementation (Coppola, 2015; Carter 2008; Coburn, Spence & Pomonis, 1994).

Regulatory Measure uses legal framework to limit hazard risk by controlling human actions. The examples of regulatory measure are land use management, density control of population, building codes, and public disclosure to risk when selling the property (Coppola, 2015; Carter 2008; Coburn, Spence & Pomonis, 1994).

Public awareness is fundamental that generally informs the needs and benefits of mitigation programs to public. Public awareness is helpful for public involvement which contributes to the effectiveness of mitigation programs. People should be acknowledge and understand hazards as a fact of life, that hazard safety, people's conscious and automatic precautions, should be aware (Coppola, 2015; Carter 2008; Coburn, Spence & Pomonis, 1994).

Educational program and training are considered as both mitigation and preparedness. The aims are to train, educate and involve all stakeholders to be informed that hazard exists, and what are appropriate measures to limit its risk. Training and education support the implementation of mitigation programs. Four target groups are public officials who play essential roles with disaster management, technical students, small builders and craftsmen, and schoolchildren (Coppola, 2015; Carter 2008; Coburn, Spence & Pomonis, 1994).

Warning systems inform reaching hazard risk and minimum protective actions to public. Effective warning systems need prior knowledge of risks faced by community, a technical monitoring, dissemination and understanding warnings to those risks, and people's knowledge and capacity to react. Under the mitigation, warning systems emphasize on issues of warning and authority action, evacuation, and

dissemination of warning (Coppola, 2015; Carter 2008; Coburn, Spence & Pomonis, 1994).

2.4.3 Disaster Preparedness

Disaster Preparedness refers to a state of readiness indicating planning, measures and decisions in advance for handling with the disaster in a particular locality (Sena & Woldemichael, 2006; Voogd, 2004; Buchanan, 1981), which aims to minimize negative consequences of hazards (Coppola, 2015). UNISDR defines preparedness as "*the knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions*" (UNISDR, 2009, p. 21). Hence, preparedness is interrelated and can affect almost every aspect of disaster management. However, compared preparedness to prevention and mitigation has some differences. Preparedness is more action-oriented and needs strong coordination among organizations. On the contrary, prevention and mitigation tend to be driven by decisions or directions at governmental level or senior management level (Carter, 2008).

Some disaster management cycles divide preparedness into three sub-segment. Firstly, 'warning' is the period when a hazard has been identified, but is not yet a threat to a particular area. Secondly, 'threat' is the period that a hazard has been become a threat to a particular area after a hazard assessment. Lastly, 'precaution' refers to the action taken after the warning disseminated in order to prepare and handle with the hazard's adverse effects (Carter, 2008). On the other hand, Sena and Woldemichael (2006) proposes that preparedness consists of three basic steps: 1) preparing a plan, 2) training to the plan, and 3) exercising the plan.

Coppola (2015) presents that disaster preparedness of government has estimated five key actions: planning, exercise, training, equipment, and statutory authority. The first action is planning. Government must know in advance what to do, how to do, what to use, how can assist, and the emergency operation plan (EOP) is the most comprehensive plan for dealing with disasters. EOPs define the responsibilities and action of each organizational level, and describe what circumstances each organization will interact, as defined that

"*An EOP is a document that describes in intricate detail the people and agencies who will be involved in the response to hazard events (including disasters), the responsibilities and actions of these individuals and agencies, and when those responsibilities and actions will be called upon. It may also describes how citizens and structures will be protected in the event of a disaster. It may catalog the equipment, facilities, and resources available within and outside the jurisdiction*" (Coppola, 2015, pp. 276-277).

Plans linking jurisdiction's commitment to emergency management is an essential element of preparedness (Federal Emergency Management Agency, 1996). It is necessary to have EOPs at all level of governments. An effective emergency response plan is composed of four elements: hazard risk analysis, the basic plan, functional annexes, and hazard-specific annexes (Coppola, 2015). Firstly, hazard risk analysis identifies existing hazards and their effects to a community, and prioritizes them for a treatment (Coppola, 2015; FEMA, 1996). Secondly, the basic plan, or base plan, is a main body of emergency operations in the community or country. The basic plan carries out the purposes, emergency response policies, concepts of operations, scopes of the plan, lists of related organizations and their responsibilities, and delineate authority. Basic plan guides the development of functional annexes (Coppola, 2015; FEMA, 1996). Thirdly, Functional annexes identify policies, processes, role, and responsibilities before, during, and after emergency period. Functional annexes cover on the functions, activities, and organizations which responds for those activities. The organization of the annexes expands and develops further details based on the basic plan (FEMA, 1996). Lastly, hazard-specific annexes describe further operational information based on the basic plan. Hazard-specific annexes focus on special planning from provide a hazard-specific information in order to deal with specific response, action, warning system, needed information, and other required action for a particular hazard. It should be created for any hazard in a particular community (FEMA, 1996; Coppola, 2015).

The second government's preparedness actions is exercise. Exercise is to practice and validate roles and responsibilities before the events occur. Exercise prepares individuals to fulfill and carry their duties out, and helps to discover

unforeseen problems based on the EOPs. There are four main components of comprehensive exercise programs: drill, tabletop exercise, functional exercise, and full-scale exercise (Coppola, 2015). Firstly, drill practices or tests one function, operation, or activities. Secondly, tabletop exercise practices full emergency response plan in a predesign, controlled and low-stress scenario of hypothetical events. Thirdly, functional exercise practices all associated activities, but does not require a full action of emergency response plan. Functional exercise includes participants' acts, time limitation, and stress scenario. Lastly, full-scale exercise creates scenario and atmosphere closely to the actual disasters. Players are necessary to act as full-scale exercise stated in the EOPs as in the real events. It can test functional capacity and response mechanism (Coppola, 2015).

Training is the third government's preparedness actions. Disaster response can be more effective if involved players in the EOPs are trained (Coppola, 2015). Improper training causes failure as well as lack of support and trainee' attitudes. Training needs analysis (TNA), which is the systematic process designing what kind of program is needed organizational, operational or individual levels, and who are needed to be trained, is vital to the training accomplishment (Nik Nazli, Sipon & Razdi, 2014). The fourth government's preparedness actions is equipment. Equipment increases the effectiveness of response and recovery operations, and reduces number of losses and damages. Several equipment is needed. Specific-hazard equipment is designed to suppress or limit a hazard's effect such as fire suppression. Personal protective equipment (PPE) uses to protect responders from harm during the operations. Rescue equipment uses to save the living from any dangerous situation. Disaster medical care assists injured to pass disaster scenario. Warning and alert system warn people to prepare themselves or avoid a hazard. Communication equipment allows responders to receive and transmit information in order to assess to the needs. Lastly, other emergency and disaster response equipment contributes to facilitate the response operation such as shelters, transportation and needs assessment (Coppola, 2015).

Statutory authority is the last government's preparedness actions. Coppola (2015) points that "*statutory authorities ensure that emergency and disaster response agencies and functions are established, staffed, and receive regular funding*" (p. 293). Accordingly, absence of established laws defining source of money and responsible

agencies can lead to confusion and increasing of cost and supplies. Because EOPs describe the action of particular authorities, statutory authorities grant them a power to take actions, ensure involvement of organizations and individuals in disaster management, and providing legal framework for the action between different jurisdictions (Coppola, 2015).

Besides the preparedness from the government, preparedness is vital to be provided to public so that they can respond for their own needs and support the response of officials. Public preparedness is the actions empowering citizens to help themselves, has awareness of a hazard, and educate public to properly perform during disaster. Public education is the core of public preparedness because it informs needed information, and aims to raise awareness of the hazard risk, change people behavior, and warn risk-related information of a hazard. Educating public about hazards and risks corrects feeling of preparedness, which raise awareness of hazards and risks (Coppola, 2015).

There are three categories to convey public education. Firstly, 'advice and answers' instructs, summarizes and concludes what is needed to do. Secondly, 'numbers' is a quantitative summaries of knowledge. Citizen received knowledge would have own decision-making and make choices in accordance with their situation. Thirdly, 'process and framing' provides more details on the creation of risks and how to control them. It allows people to debate, identify risks, decide appropriate response, and monitor the situation (Morgan et al., 2002, as cited in Coppola, 2015). Consequently, public education would change behavior during pre-disaster phrase, which develops awareness of risk existence and preparation for dealing with a hazard (Coppola, 2015).

Warning is also a public education. Warning provides risk situation as well as its change, informs authoritative instruction for recipients' immediate actions (Coppola, 2015). Warning system is beyond only technology that Collins and Kapucu (2008) states that "*early warning systems protect the public by combining scientific monitoring and detection systems with social design factors and components to notify the at risk public*" (p. 588). Warning system and its message are required and designed to reach all recipients of their communities regardless of their places and time. Words and language conveying message are needed to be proper, understandable, clear and

consistent, and concern the target population. Comprehensive warning systems should conduct these seven actions in order

"*1. Detect the presence of a hazard… 2. Assess the threat posed by that hazard… 3. Determine the population facing risk… 4. Inform the population… 5. Determine appropriate protective actions that may be taken… 6. Direct the public to take those actions… 7. Support the actions taken by the public*" (Coppola, 2015, p. 306).

2.5 National Disaster Risk Management Plan (2015)

Thailand faces various disasters in various scales. The 2004 Tsunami caused immense deaths and losses, and reflected that Thailand lacked of preparation and knowledge towards disaster. Thus, a lot of efforts was taken to deal with disasters and develop disaster preparation (Kamolvej, 2014). Thailand's Disaster Prevention and Mitigation Act B.E. 2550 (A.D. 2007) is the main legal instrument that provides a basic framework for disaster management in Thailand. The Act established the Department of Disaster Prevention and Mitigation (DDPM) as a leading agency at the central level to deal with disasters, as well as developing national disaster plan. The current plan was enforced in 2015, called the National Disaster Risk Management Plan (2015) (Srikwan, 2017; CFE-DMHA, 2015). National Disaster Risk Management Plan (2015) aims to provide concept, which is consistent and compile with international guidelines, and direction to all stakeholders for collectively implementation of disaster management activities, and develop disaster risk management capacity. Based on the Disaster Prevention and Mitigation Act B.E. 2550 (A.D. 2007), the National Plan must include a guideline, a measure and procedure for budgeting disaster prevention and mitigation operations; providing disaster prevention and mitigation assistances; assisting relief to affected people; preparing for disasters; and repairing, recovery and rehabilitating (DDPM, 2015).

For disaster risk management mechanism, it is divided into two levels: policy level and operational level (DDPM, 2015). At the policy level, the National Disaster Prevention and Mitigation Committee formulates national disaster management plan, provides consultation and performance support, and stipulates expense and

compensation (DDPM, 2015, 2007). At the operational level, the National Disaster Command Headquarters, which has the Minister of Interior as a commander, responds for overseeing, management and coordination of all lower disaster management center. DDPM is required to set the Central Disaster Management Centre, which has Director-General of DDPM as a director, which performs coordination and integrates information, resources and plans of all governmental-related agencies for ensuring state's readiness; preparation of response operation in disaster likelihood; directing and coordinating small-scale and medium scale disasters; taking responsibility to direct and monitor large-scale disaster; and providing information and recommendations to the National Incident Commander in case of large-catastrophic disaster.

At provincial level, the Provincial Disaster Management Centre, having provincial governor as a director performing within each provinces, formulates the Provincial Disaster Prevention and Mitigation Plan which must be compatible with the National Disaster Risk Management Plan (2015); oversees and supports disaster mitigation and operation of local administration organization. At district level, the District Disaster Management Centre, having district chief as District Director, has function to develop the District Disaster Risk Management Plan and other related plans; monitor and conduct disaster situation analysis and assessment; provide support and coordination of local administration organizations within jurisdiction (DDPM, 2007, 2015). Besides, local organization is the first organization that face disasters (Boonreang, 2015).

Thailand's disaster management focuses on disaster management principle, disaster countermeasure procedure, and security threats and countermeasure (Boonreang, 2015). Disaster Prevention and Mitigation Act B.E. 2550 (A.D. 2007) defines that

"*'Disaster' means fire, storm, flood, drought, human epidemic, animal epidemic, aquatic animal epidemic, and plant epidemic; including other hazards which affect the public, be it, induced by nature or human, accidents or any other event which is harmful to a life, a body of the people or inflicts the damage on a property of a people or of a State, and shall as well as mean air threat and sabotage*" (DDPM, 2007, p. 2).

Disaster declaration has four levels, based on disaster severity, that each level gives authority to different commanders. Firstly, small-scale disaster (level 1) is a disaster occurred at local or district level which has enough capacities to control, so the commanders are local or district directors. Secondly, medium-scale disaster (level 2) is the disasters which are beyond the capacities of local or district directors, so the commanders are provincial directors. Thirdly, large-scale disaster (level 3) is when the severity of disaster is widespread and further than the second level, and requires some specialist and special equipment. The commanders are held the central level who are central director or national commanders. Lastly, large-catastrophic disaster (level 4) requires national leadership to monitor the disaster, so the commanders are the Prime Minister or Deputy Prime Minister (DDPM, 2015; CFE-DMHA, 2015).

The strategies in National Disaster Risk Management Plan (2015) adopts the concept of disaster risk reduction based on the Sendai Framework for Disaster Risk Reduction 2015 – 2030 (DDPM, 2015). National Disaster Risk Management Plan (2015) defines disaster risk reduction as

"*Disaster risk reduction is a concept and practice of reducing the potential negative consequences of disaster through analysis and management of the casual factors and the impacts of disasters to set forth the policy, measures or initiate the activities for reducing exposure to hazards, lessening and tackling the root causes of vulnerability as well as enhancing the capacities in disaster risk management and is meant to reduce the existing disaster risk inherent in the communities and society and prevent new and emerging risks*" (DDPM, 2015, p. 61)

The National Plan's disaster risk reduction has three strategies. Firstly, *creating standardized system for disaster risk assessment* aims to assess and identify disaster risk inherent in community or society in order to develop strategic instrument of disaster risk management. Secondly, *developing disaster risk reduction measures* are composed of guidelines of disaster prevention and mitigation, guidelines for disaster preparedness, and guidelines for effective early warning systems. Thirdly, *promoting a multi-sectoral and multi-level approach in setting up guidelines for disaster risk reduction* aims to create enabling environment and encourage multi-stakeholder cooperation for effective disaster risk reduction actions (DDPM, 2015).

Under the second strategy, developing disaster risk reduction measures, it contains three guidelines: guidelines for disaster prevention and mitigation, guidelines for preparedness, and guideline of effective early warning systems. The guidelines for disaster prevention and mitigation identifies measures to reduce or avoid adverse impacts from hazards or related impacts in both structural and non-structural measures during pre-disaster stage (DDPM, 2015). Disaster prevention and mitigation measures identified in the National Plan are

1. Conducting land demarcation and using planning, hazard and risk mapping for creating safety standards
2. Ensuring safety standards for design and construction of buildings and structures
3. Reinforcing river banks; planting vegetation, shrubbery, vetiver grass, and mangroves; constructing seashore embankment to protect riverside and seashore communities
4. Dredging and rehabilitating the canals, public sewers, and maintaining drainage capacity on a regular and immediate basis
5. Adjusting agricultural plan for the purpose of risk
6. Development of deep and shallow wells
7. Creating awareness in communicable disease prevention and other aspects
8. Promulgation of laws and regulations needed to support disaster risk reduction efforts (DDPM, 2015).

Under prevention and mitigation phrase, DDPM as a leading agency has responsibilities to relay information from Department of Meteorological and Department of Mineral Resources to risk province as an early warning action; coordinate stakeholders in large-scale disasters; manage disasters at the Operation Center set by the National Committee; proceed relief operation; coordinate telecommunication concerned agencies to utilize telecommunication facilities; and disseminate disaster related information as a warning to public (Srikwan, 2017).

Guidelines for preparedness defines preparedness action as the actions in pre-disaster stage, that increase knowledge related to disaster risk management to public and relevant organizations, and develop skills and capacities to anticipate, respond to

and recover from hazards and hazards' impact effectively. Preparedness actions are composed of eight activities.

1. Community – Based Disaster Risk Management emphasizes the roles of community in all phases of disaster management that provides opportunities for community to participate, process, take decision, and develop knowledge, capacities and partnerships.

2. Emergency management exercise refers to mechanism ensuring preparedness of disaster risk management agencies and personnel; finding a shortfall and capacity gap; and improving disaster risk management plan and response. Emergency management exercise can be divided into two categories: firstly, discussion-based exercise, referring to a workshop and tabletop; secondly, operational-based exercise, referring to a drill, functional exercise and full-scale exercise.

3. Pre-evacuation preparation states that Disaster Management Centre at each level of government is responsible for developing comprehensive evacuation plan, emergency plan to relocate government services or to set evacuation measures.

4. Temporary shelter management aims to address housing issue in the post – disaster setting. Government is responsible to prepare strategic action plan for the set – up of temporary shelters to accommodate the evacuees. The Disaster Management Centre at each level is in charge of selecting shelter sites, and the temporary shelter must meet the minimum standards of the SPHERE.

5. To Build a Body of Knowledge Related to Four Phases of Disaster Risk Management aims to provide four phases disaster management knowledge to public and community, and support human resource development. The National Disaster Command Headquarters and the Disaster Management Centres at all levels to consider setting up a natural disaster learning centre at each level. DDPM and the Central Centre should cooperate and coordinate with relevant agencies and higher education to arrange education and training programs.

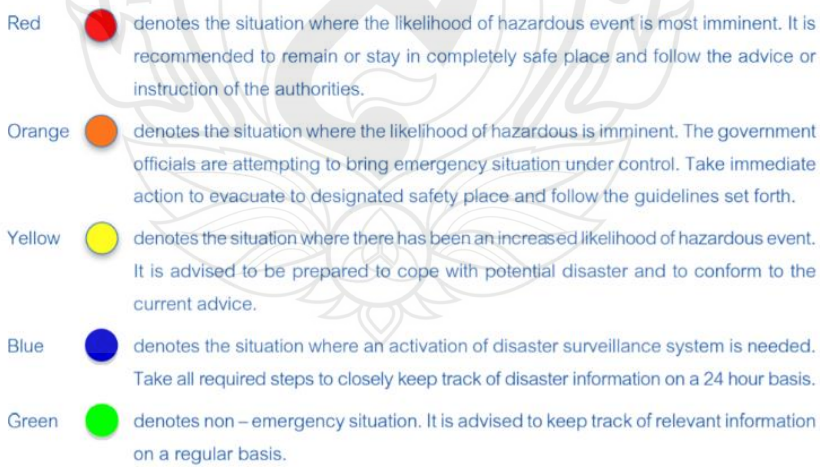
6. Development of national data bank aims to develop common standard database for all relevant stakeholders at all levels to use as the basis for developing and improving their databases. It would create network connection, and information sharing and exchange.

7. Warehousing establishment and stockpiling management aims to accumulate and maintain resources to ensure availability and mobilization to emergency support in disaster affected areas. The agencies involved in disaster risk management are allowed to utilize these resources to fulfill their disaster risk management roles and responsibilities.

8. Business continuity plan is a document containing information of public and private sector businesses which needs to run despite of adverse events. Relevant government agencies have duties to undertake intervene actions for ensuing the resilience of business function (DDPM, 2015).

The third guideline in the second strategy is the guideline of effective early warning systems. DDPM (2015) states that "*early warning system is a structure of disaster management system and a communication system for timely dissemination of warning information to the authorities and general public*" (p. 68). The guideline contains three guiding principles for effective early warning systems:

1. Level of alerts and early warnings helps identify the severity of the situation by using the colors: red, orange, yellow, blue, and green. Each color refers to different level of severity that red is the most severity, while green is the least severity, as presented in the figure below.



Source Department of Disaster Prevention and Mitigation (2015, p. 68)

Figure 2.4 Level of Alerts and Early Warnings by Colors

2. *Notification and warning dissemination process* consists of these actions: (1) monitoring and conducting surveillance towards the evolving situation, (2) notifying and alerting relevant government agencies at all levels and general public regarding the significant likelihood of hazardous event, (3) validating data and confirming information that probability of disaster occurrence has increased more than sixty percent, and notifying relevant government agencies at all levels and general public to ensure readiness; emergency warnings and timely notification should be made not less than 72 hours in advance of actual event, and (4) identifying and putting guidelines and procedures for all stakeholders to follow in emergency situation.

3. Developing early warning systems enhances efficiency and effectiveness, accuracy and reliability of the systems, through the development of forecasting and dissemination capacity, building up early warning processes, and extending early warning ranges and activities (DDPM, 2015).

2.6 Pre-Disaster Measures of the Disaster Prevention and Mitigation Plan of Ubon Ratchathani

Pre-Disaster Measures of Disaster Prevention and Mitigation Plan of Ubon Ratchathani focuses on reducing disaster risks. It is divided into three sections, which are (1) prevention and mitigation, (2) preparedness, and (3) warning system. For prevention and mitigation, it is divided into structural and non-structural measures. For non-structural measures, the plan lists eight measures: (1) categorizing land-use management, (2) strengthen river banks, (3) dredging canals and streams, (4) adjusting agricultural plans regarding the climate conditions, (5) pond development, (6) raising awareness on communicable diseases, (7) enacting disaster risk regulations, and (8) establishing networks of disaster management and disaster warning (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019).

The second section of the pre-disaster measures of the plan focuses on the preparedness. The first measures is the implementation of community disaster risked management (CBDRM). It aims to reduce the communities' risks and vulnerabilities, and enhance capacity for the basic ability to deal with disasters. Disaster prevention and

mitigation exercise is the measures that aims to mutually enhance coordination, cooperation, and capacity to deal with disasters among stakeholders. The plan states that disaster prevention and mitigation organizations at every level must hold a disaster prevention and mitigation exercise at least once a year. The next measure details about evacuation that disaster prevention and mitigation organizations at every level must have own evacuation plan. In consequence, temporary shelter must be issued. Disaster prevention and mitigation administrative body must select the location of temporary shelters; assign staff and responsibilities for a management in the temporary shelters; provides basic needs; and collect disaster-affected people's information at the shelters. The other measures in the second section are establishing disaster lesson learnt at the local level, Ubon Ratchathani's disaster data bank, business continuity plan, and disaster prevention and mitigation plan at district and sub-district levels (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019).

The third section shows details about warning system. Disaster prevention and mitigation office, Ubon Ratchathani, has responsibility to disseminate warning to all relevant organizations. The two warning methods are direct warning through such as television, radio, siren, and audio transmission, and warning thorough local governmental organizations or relevant organizations. Warning is divided into three types. Firstly, surveillance follows the situations and conditions that have probability to become a hazard. Secondly, early warning is to disseminate warning when there is a possibility of a hazard so that people can follow and update the situation. Generally, warning should disseminate at least 120 hour before a disaster. Lastly, disaster warning is implemented when a possibility to have a disaster is at least 60 percent. The warning must be disseminated at least 72 hour before the hazard attacks. Disaster warning must disseminate the information about expected times and areas of disasters; the period of disasters and expected consequences; procedures and protocols for relevant organizations and people in disaster-risked areas to follow; and preparative measures to the disasters (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019).

2.7 Disaster Management in Thailand

Within 10 years after the 2004 Tsunami, policy makers emphasize more attention to natural disasters, and has become the issue in national agenda (Khunwishit, 2014). However, the result of the 2011 Flood indicated that Thailand readiness to deal with disaster is insufficient (Kamolvej, 2014). Overall, Thailand disaster management lacks of operational guidelines, capacity, budgets and resources, support on research and development, integrated cooperation among related agencies, and focus on disaster prevention and preparedness (Boonreang, 2015). In case of the 2011 Flood, Kamolvej (2014) points that "political conflict, poor risk assessment and analysis, and less awareness of familiar risk are the reasons the management of flood response operation fails" (p. 117). Thailand's disaster management needs less decision making process, improvement of disaster-related database and information system, development of local response plan and operation standard procedures, and capacity building for all levels (Kamolvej, 2014).

Promsri (2017) proposes four factors to reduce loss and damage from flood. Firstly, Thai citizens need flood disaster preparedness awareness because "*past studies showed no evidence of the set of relevant factors that help enhance individual flood disaster preparedness awareness*" (Promsri, 2017, p. 6). Secondly, training programs are needed to be developed in order to increase the effectiveness of disaster coping. Thirdly, sharing flood experience and knowledge to family and community is necessary because it would enhance preparedness awareness. Lastly, developing flood preparedness at household level can elevate readiness and preparation for flood disaster (Promsri, 2017).

Later, the study of local administrative organizations performance in disaster prevention and mitigation was conducted. Putta and Poboon (2018) results that Thailand's local administrative organizations have moderate performance in disaster prevention and mitigation. People can receive assistance and information from officials and media, and have opportunity to commend and express their needs to the officials. Insufficient budget cause prioritization of problems in the area. Since disaster issue is usually ignored, it causes the lacks of some equipment, human resources, and

emergency response exercise. Local administrative organizations' managers and staff has inadequate competency to convey public disaster education effectively (Putta & Poboon, 2018). Additionally, majority of people still believe that it is the responsibility of the officials to response and management if disaster occurs (Kampongdang & Montri, 2010, as cited in Putta & Poboon, 2018).

Putta and Poboon (2018) further give suggestions for general policy that legal frameworks and laws about budgeting and compensation of governmental organization should be revised to be clearer and practical. It should be more coordination and cooperation between organizations related to disaster-training providers in order to enhance the performance in disaster training and research. Sectors in local administrative organizations should have more autonomy, and reduce structures and steps in order to make the process faster. For suggestions to disaster-related local administrative organizations, local administrative organizations should review and consider to recruit more staff, increase disaster-related training and exercise, reorganize budget to be more sufficient, and change managers' vision towards the important of disaster risks. In addition, activities with and to people should be more comprehensive in term of area with people participation, as well as adding channels to interact and communicate with people (Putta & Poboon, 2018).

Boonreang and Harasarn (2021) analyze several elements for developing local administrative organizations' natural disaster development capacity in Thailand. They divides capacity development into three levels. At the personal level, the number of the disaster-prevention and mitigation staff is inadequate. Consequently, the staff who assists and works in the front line does not have sufficient disaster management skills and knowledge. At the organizational level, local administrative organizations focus on passive-oriented disaster management and do not have enough necessary resources. For these reasons, their capacity to respond with disasters was insufficient. Lastly, at the institutional level, disaster-related policies and laws are not prioritized compared to economics and social well-being. Disaster-related laws and policies also do not support local participation. In addition, the Disaster Prevention and Mitigation Act, B.E. 2550 (2007) has never been revised since its enactment. In order to address these problems, Boonreang and Harasarn (2021) suggest to recruit more staff who has skills and knowledge on disaster management; organize and practice local disaster prevention and

mitigation plans every year; create disaster prevention and mitigation networks among local administrative organizations and communities where face similar disasters in nearby areas; and bring people and communities to participate in the disaster management.

2.8 Policy Implementation

Defining policy is subjective (Hogwood & Gunn, 1984, as cited in Hill & Hupe, 2002). Public policy is a law or rule which is enforced by any level of government (Shah, 2011); accordingly, "*public policies may regulate behavior, organize bureaucracies, distribute benefits, or extract taxes--or all of these things at once*" (Dye, 2013, p. 3). Public policy relates to broad framework that contains problems, objectives, actors, decision network, and actions to achieve the goals (Khan & Khandaker, 2016; Hill, 2005). Besides, policy involves with the intentions and behavior, and policy outcome may not result as expected (Hill & Hupe, 2002). Public policy can be seen as a problem-based, which needs multidisciplinary methods and considers based on the context of problems (Dewey, 1927; Laswell, 1951; Laswell, 1970, as cited in Hill & Hupe, 2002), and concerns on the relationship of governmental units to its environment (Eysestone, 1971, as cited in Smith & Larimer, 2009). Due to the absence of universal definition of public policy, Birkland (2016) presents the key attributes of public policy: made to response to problems that needs attention; made for the sake of public; oriented towards a goal; made by governments; interpreted and implemented by public and private actors, who have different interpretations of problems, solutions and motivations; and what the government chooses to do or not to do.

Anderson (2003) identifies that policy process has five stages: agenda setting, policy formulation, policy adoption, policy implementation, and policy evaluation. First, agenda setting is about problem identification and specification that government examines that causes, conditions and significances of the problem. Second, policy formulation aims to set the goals, methods, and actors for dealing with the problems. Third, policy adoption involves with the decisions toward the proposed policies, including taking no action, Forth, policy implementation carries or enforces the policies

into effects. Lastly, policy evaluation assesses the outcomes based on the goals of policy (Anderson, 2003).

Mthethwa (2012) defines that "*policy implementation refers to the mechanisms, resources, and relationships that link policies to programme action*" (p. 37), in order to apply the policy to the target, and accomplish the goals (Anderson, 2003). Policy implementation is about the function of implementation program, so studying implementation process relates with the investigation and analysis of action programs (Grindle, 2017). In order to implement the policy in accordance with the policy intentions, to figure out the policy intentions and the way to proceed it are the key challenges (Smith & Larimar, 2009). Policy implementation is the most difficult stage of policy process; moreover, policy implementation can influence the policy design that "*design and implementation are very closely related because the choices made in the design of a policy will profoundly influence the way a policy is implemented, which then influences the outcomes of these policies*" (Birkland, 2016, p. 332).

Establishing new organizations, or assigning responsibilities to the existing organizations can be one of activities for implementing policy (Dye, 2013). Consequently, policy implementation involves with stakeholders, balance of power, flowing of information, mechanisms, resources, and relationships, which contribute the policy into action, from executive to administrative levels (Mthethwa, 2012). Ongoing decision-making process and pressures from opposing parties always attach within policy implementation. Thus, policy implementation is complex and interaction, and needs consensus-building that stakeholders are convinced (Mthethwa, 2012). Additionally, politics always links with policy that "*implementation is the continuation of politics by other means*" (Van Meter & Van Horn, 1975, as cited in Dye, 2013, p. 55). Also, Winter (2012) argues that in order to make implementation's outputs or outcomes match with policy goals, it is a genuine political process.

2.8.1 Top-Down Approach

Top-down approach looks at the formal implementation structure of the policy (Winter, 2006). Policy makers who are central actors take policy as property, and gives advice for an effective implementation, as well as manipulate factors and environment the central level (Matland, 1995; Elmore, 1979, as cited in Signé, 2017; Hill, 2005). In

top-down approach, policy makers assume that any suggested problems can be overcome, so the focuses are held at the structures and controls for an effective compliance in order to achieve the policy goals (Birkland, 2016). By this approach, it can reduce the number of negations or rejections of the decisions (Winter, 2012). Birkland (2016) sets that basic assumption for top-down approach: policy must clearly defines goals and tools; policy is characterized by a single statute; as an implementation chain, the top starts policy message; lastly, policy designers have good knowledge of implementers' capacity and commitment. In consistent with Birkland's idea, Signé (2017) proposed that "*most top-down models advise governments to have clear and consistent goals, to limit the extent of change necessary, and to place the responsibility for implementation with an agency sympathetic with the policy's goals*" (p. 13). Accordingly, top-down approach is suitable for studying implementation when the situation is well-structured and dominated by one specific legislation (Sabatier, 1986, as cited in Winter, 2006).

Pressman and Wildavsky, the founding father of policy sciences states, argue that

"*A policy, naturally. There must be something out there prior to implementation; otherwise there would be nothing to move forward in the process of implementation. A verb like 'implement' must have an object like 'policy'. But policies normally contain both goals and the means for achieving them. How, then, do we distinguish between a policy and its implementation?*" (Pressman & Wildavsky, 1973; 1984 edition: xxi, as cited in Hill, 2005).

In consistent with Pressman and Wildavsky's statement, implementation process is "*those actions by public or private individuals (or groups) that are directed at the achievement of objects set forth in prior policy decisions*" (Van Meter and Van Horn, 1975, p. 445, as cited in Hill, 2005). Van Meter and Van Horn concerns on dealing with difficulties in implementation, so they presents six-linked variables, which impact on the performance of implementation: (1) policy standards and objectives; (2) resources and incentives made available; (3) quality of inter-organizational relationship; (4) characteristics of the implementation agencies, (5) economic, social, and political environment; and (6) understanding, response, and intensity of response

of implementers towards the policy (Van Meter and Van Horn, 1975, as cited in Hill & Hupe, 2002).

Mazmanien and Sabatier also recommend some points of implementation close to those scholars mentioned above. Mamanien and Sabatier propose that policy should have clear and consistent goals; minimize involving actors; limit the change necessary; and place responsibility to the agency sympathetic with the policy's objectives (Mazmanien & Sabatier, 1983; Sabatier, 1986, as cited in Mugambwa, Nabeta, Ngoma, Rudaheranwa, Kaberuka & Munene, 2018). Furthermore, Bardach proposes another implementation perspective under top-down approach. Bardachh perceives implementation process as a game that concerns on 'scenario writing', the structure to achieve the outcome, and 'fixing the game', involving with mending and something close to cheating (Bardach, 1977, as cited in Hill & Hupe, 2002).

Hogwood and Gunn also propose recommendations for policy makers that they should ensure absence of external crippling constraints; adequate time and resources; combination of resources; implementation based on cause and effect; minimize agencies involved in implementation; understanding and agreement upon the objectives; implementing towards the objectives; perfect communication and co-ordination of various elements; and perfect obedience that authority can demand (Hogwood & Gunn, 1984, pp. 199-206, as cited in Hill & Hupe, 2002, p. 51). Hogwood and Gunn points that recommendations mentioned above are necessary to realize, but it is unattainable to perfect combination because they are hard to control. (Hill & Hupe, 2002).

2.8.2 Bottom-up Approach

Bottom-up approach views that top-down approach is ineffective because of a little concern on local conditions and flexibility, and flexibility is vital to achieve the goals (Signé, 2017). Bottom-up approach focuses on the abilities and motivations of the lowest-level implementers, service deliverers, and target groups because policy is made at the local level (Hill, 2005; Matland, 1995). Bottom-up approach considers that goals are ambiguous and may conflict with other goals and norms of local implementers (Birkland, 2016), and acknowledge that implementation is complex and involve with discretion of actors within the chain of process (Najam, 1995, as cited in Mugambwa,

Nabeta, Ngoma, Rudaheranwa, Kaberuka & Munene, 2018). In addition, policy does not limit to a single policy that "*policy can thought of as a set of laws, rules, practices, and norms, such as 'energy policy' or 'criminal procedure,' that shape the ways in which government and interest group address these problem*" (Birkland, 2016, p. 338). Accordingly, bottom-up approach is suitable for studying implementation when several different policies are directed, and a person is interested in studying dynamics of different local situations (Sabatier, 1986, as cited in Winter, 2006)

Lipsky is the founding father of the bottom-up approach that studies on the analysis of street-level bureaucrats' behaviors (Hill & Hupe, 2002), that their discretions are vital in policy implementation (Winter, 2006). Lipsky (2010) states that street-level bureaucrats have to cope with workload, adverse circumstances, and pressures in order to fulfill their job expectation as much as possible. In consequence, their coping mechanism can lead to the distortion of their implementation from the policy intentions, that

"*Further, the jobs typically could not be performed according to the highest standards of decision making in the various fields because street-level workers lacked the time, information, or other resources necessary to respond properly to the individual case. Instead, street-level bureaucrats manage their difficult jobs by developing routines of practice and psychologically simplifying their clientele and environment in ways that strongly influence the outcomes of their efforts*" (Lipsky, 2010, pp. xi-xii).

"*They believe themselves to be doing the best they can under adverse circumstances, and they develop techniques to salvage service and decision-making values within the limits imposed on them by the structure of the work. They develop conceptions of their work and of their clients that narrow the gap between their personal and work limitations and the service ideal. These work practices and orientations are maintained even as they contribute to the distortion of the service ideal or put the worker in the position of manipulating citizens on behalf of the agencies from which citizens seek help or expect fair treatment.*" (Lipsky, 2010, p. xv).

Besides, Lipsky also argue that organizational differences and attitudes of individual bureaucrats do not have important implication to their behaviors. Street-level bureaucrats apply similar behavior if they have similar working conditions (Lipsky, 2010).

Hjern contributes to the bottom-up approach through the collaboration with his colleagues, studying interactions between numerous organizations, and importance of networks which are influence by Scharpf (Hill & Hupe, 2002). Hjern and his colleagues points that "*…activities as within 'implementation structures' formed from within 'pools of organizations' and 'formed through processes of consensual self-selection"*" (Hjern & Porter, 1981, p. 220, as cited in Hill & Hupe, 2002, p. 54). Hjern and Porter construct the empirical networks related to the field-level decision making actors, through the identification of pools of relevant organizations by conducting snowball method (Hill & Hupe, 2002). Studying empirical structures consider more on networks formed by cross organization interaction, and emphasize more on implementation and structures at the operational level (Winter, 2006). Besides, Barrett and Fudge see hierarchical challenges in top-up approach as Hjern and his colleagues (Hill & Hupe, 2002). Barrett and Fudge points that top-down approach tends to depoliticize the policy-action relationship, and it is difficult to separate policy formulation from policy implementation because "*it is mediated by actors who may be operating with different assumptive worlds from those formulating the policy, and, inevitably, it undergoes interpretation and modification and, in some cases, subversion*" (Barrett & Fudge, 1981b, p. 251, as cited in Hill & Hupe, 2002).

Policy implementation occurs at two levels which are macro implementation and micro implementation. Actors at macro implementation creates governmental plans. Local organizations in micro implementation respond the macro level's plans through the establishment of their own programs for the implementation (Berman, 1978). Berman points that problems of implementation usually occur at the micro level from the reaction to the policy based on their institutional setting. Central planners can indirectly influence micro level factors, so the macro level's plans are implemented differently at the local (Berman, 1978). Thus, implementation is likely to be more effective if local implementers have freedom to adapt the plans to the local conditions

and circumstances (Palumbo, Maynard-Moody & Wright, 1984, as cited in Matland, 1995).

2.8.3 Synthesis Approach

Synthesis approach attempts to combine the beneficial value of top-down and bottom-up approaches into a comprehensive explanatory (Signé, 2017). However, Matland (1995) points that one group of researchers combine top-down and bottom-up approaches into a model, while another group attempts to find the condition to see which approach is more appropriate. Synthesis approach adopts greater scientific way that

"*key variables must be clearly defined; hypotheses derived from theoretical constructs should guide empirical analysis; more use of statistical analysis using quantitative data to supplement qualitative analysis. It endorses the use of multiple measures and methods; more comparison across different units of analysis within and across policy sectors; and more longitudinal research design (research timeframe of at least 5 to 10 years)*" (Goggin et al., 1990; Goggin, 1986; Lester et al., 1987, as cited in Mugambwa, Nabeta, Ngoma, Rudaheranwa, Kaberuka & Munene, 2018, p. 217).

Elmore attempts to combine forward and backward mapping, as top-down and bottom-up approaches (Matland, 1995). Forward mapping is the strategy which begin at the top, and try to influence implementation process, containing policy objectives, policy intentions, procedures and outcome (Elmore, 1985; Matland, 1985). In contrast, backward mapping starts from the behavior of the lowest level of implementation process, questioning "*What is the ability of this unit to affect the behavior that is the target of the policy? And what resources does this unit require in order to have that effect*" (Elmore, 1985, p. 604). He emphasizes on the way to study rather than to control and rule the implementation (Hill & Hupe, 2002). Looking at policy implementation through the combination of forward and backward mapping, policy makers can choose the instruments and structures for implementation, and still recognizes the motivations and needs of lowest level implementers (Birkland, 2016).

Sabatier proposes his synthesis framework called “Advocacy Coalition Framework (ACF)” (Sabatier, 1986, as cited in Winter, 2006). He argues that his proposal on top-down perspectives, associated with Mazmanian, overemphasizes on policy proponents, and neglects other actors and strategies (Sabatier, 1986, p. 30, as cited in Hill & Hupe, 2002). In ACF, top-down approach provides structural features and simplified complex system, while bottom-up approach focuses on the understanding, perspectives, and strategies of public and private actors involved with the problems (Birkland, 2016). Within the structures, such as socioeconomic economic conditions and government structure, contain several actions; thus, “*Sabatier argues that advocacy coalitions should be the main unit of analysis in the study of these actions. Advocacy coalitions are groups of policy advocates from differing organizations, both public and private, who share the same set of beliefs and goals. These groups attempt to have their views of policy problems, solutions, and legitimate actors accepted*” (Sabatier, 1986; 1988; 1991; Sabatier and Pelkey, 1987, as cited in Matland, 1995).

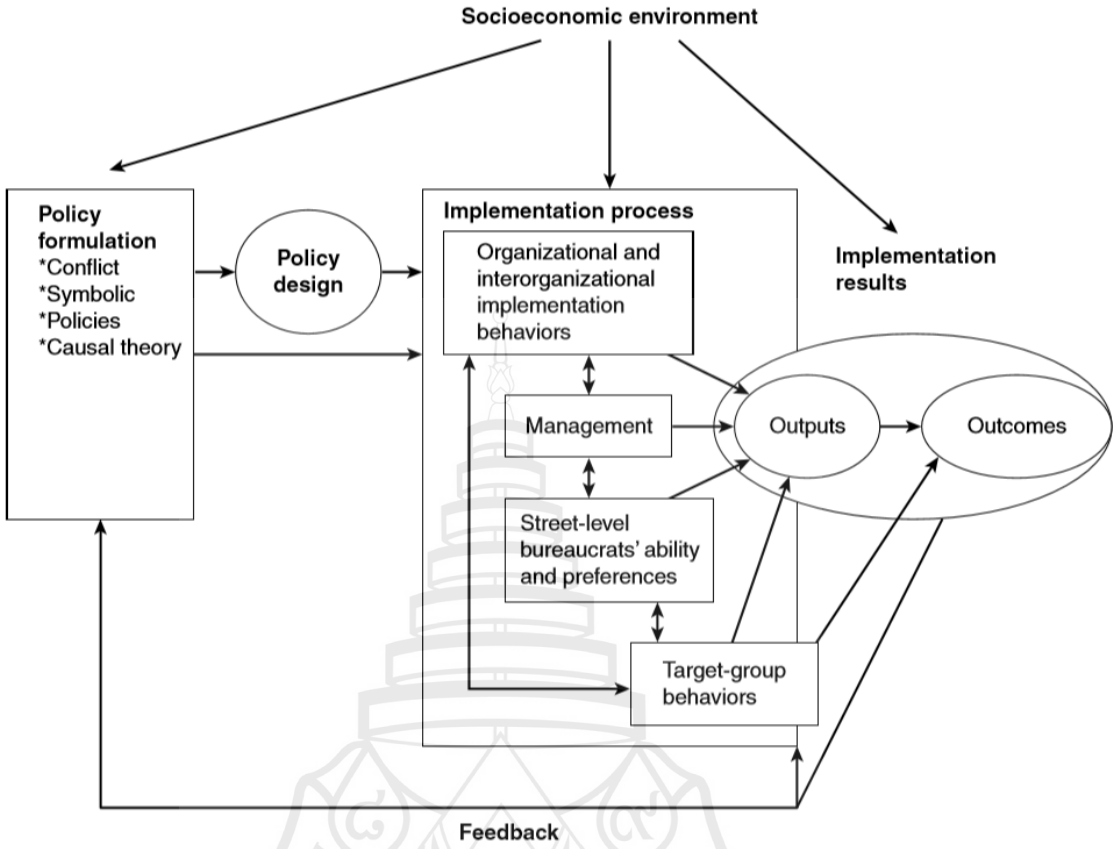
Matland synthesizes top-down and bottom-up approaches into ambiguity-conflict model. He considers two factors: ambiguity and conflict, on how these factors affect implementation (Matland, 1995). Conflict is often based on incompatibility of values and objectives. When an organization sees policy relevant with its interests with incongruous view, policy conflict exists. On the other hand, ambiguous can be at both goals and means. Ambiguous goals is unclear goals that cause misunderstanding and uncertainty. Ambiguous means refer to complex environment where is hard to select and use the tools, as well as to know its effects (Matland, 1995). The ambiguity-conflict model has four perspectives that

“*When the levels of both conflict and ambiguity are low, the implementation is administrative and will be successful if resources are available. When the levels of both conflict and ambiguity are high, the implementation is symbolic, and its success will depend on the strength of the coalition. When the conflict is high and the ambiguity low, the implementation is political, and power is the prime determinant of a successful implementation. Finally, when conflict is low and the ambiguity high, the implementation is experimental and will depend on contextual conditions*” (Matland, 1995, as cited in Signé, 2017, pp. 14-15).

2.8.4 Søren Winter's Integrated Implementation Model

Implementation research mainly focuses on the obstacles and barriers of successful implementation. Søren Winter develop a model that integrates fruitful elements of top-down and bottom-up approaches into a common framework, called "Integrated Implementation Model". The model indicates the factors and mechanisms that affects outputs and outcomes of implementation (Winter, 2012, 2006). However, he imposes that the model is an integration rather synthesis of two implementation approaches. The model sets implementers' actions delivering policies and societal outcomes relating policy objectives as dependent variables. Winter proposes the five factors that affect the results of implementation: policy design, organizational and interorganizational behaviors, street-level bureaucracy, management, and target groups (Winter, 2012).

The first factor is policy design. Policy design contains objectives, instruments, identification of responsibilities, and resource allocation, which all aims to achieve policy objectives. Nonetheless, implementation is the continuation of formulation, and problems in implementation are usually found in formulation stage due to conflicts that can lead to ambiguous goals and conceptualization, inappropriate instruments, invalid theory, and symbolic policy. Thus, conflict in policy formulation usually lead to poor implementation process (Winter, 2012, 2006).



Source Winter (2011, p. 1159)

Figure 2.5 Integrated Implementation Model

The second factor is organizational and interorganizational behaviors. Winter (2012) states that "*implementation processes are characterized by organizational and interorganizational behaviors that represent different degrees of commitment and coordination*" (p. 1161). Joint action among interorganizations will not be occurred if there disagreement in policy objectives, and Lack of coalition partners, conflicts of interest, bureaucratic politics, and disagreement in policy objectives make implementation more difficult. Decision points are not independent (Winter, 2012, 2006). Creating common interests, cooperation facilitation, and increasing commitment in policy design helps reducing interorganizational coordination problems (O'Toole, 2004; May, 2003, as cited in Winter, 2006). Besides, implementation prospect also depends on resources among

participating organizations that reciprocal relations, that two or more organizations depends on each other, can create greater cooperative intentions and decrease veto (Winter, 2012).

The third factor is street-level bureaucracy, which is grounded from Lipsky (2010). Discretion of street-level bureaucrats, who work to fulfill legislative mandates, managers and citizen, while have to cope with pressures and adverse conditions, is vital to policy implementation. Coping strategies of implementation resulted implementation conditions is distort from legislative mandates. Nevertheless, increasing resources does not solve the problems because it may lead to greater demand. Hence, street-level bureaucrats are more crucial than policy makers because they have authority to make decisions (Lipsky, 1980, as cited in Winter, 2012; Winter, 2006). The next factor is the management that managerial control influences street-level bureaucrat practices. Only effective manager is not adequate to achieve policy objectives, and all street-bureaucrats may not share all preferences with managers. The relationship between them is characterized by information asymmetry that systematically disadvantage principals. Winter argues that "*when applied to the management of street-level bureaucrats, managers' influence seems to vary with the visibility of street-level bureaucratic practices…Managerial objectives are likely to be better reflected in frontline practices when these are relatively visible*" (Winter, 2012, p. 1164). Capacity building and goal-directed management are famous tools for managers, but applying goal-directed management must rely on the support from local policies. Sometimes, their local managers may not be loyal to the policy and law (Winter, 2012).

Lastly, target groups also have roles contributing outputs and outcomes. Target groups affect implementation behaviors of street-level bureaucrats and success of policy objectives. Achieving policy objectives usually requires the change in target groups' behaviors. Accordingly, Public policy often aims at changing or developing target groups' behaviors by regulating their behaviors or providing services (Winter, 2012). Winter argues that *"…the role of target populations in policy implementation depends on their action model in terms of their preferences and abilities. Relevant resources are cognitive skills, expertise, wealth, affiliation with actors with resources including powerful interest groups (whether the group has a positive or negative social construction), and institutional arrangements and norms*" (Winter, 2012, p. 1165). In addition to the five factors mentioned above, socio-economic environment create conditions for the implementation (Winter, 2006).

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Design

This research studied the implementation of the 2019 Action Plan on Flood, Flash Flood, and Mudslide, in the event of the 2019 Flood in flood-risked sub-districts of Mueang District, Ubon Ratchathani. The research was aimed to understand the protocols and measures of the Action Plan, the implementation of the Action Plan, and the barriers and obstacles of the implementation. To fulfill the research questions and research objectives, this study applied qualitative methodology, which provided insight and descriptive data for analyzing and answering research questions and research objectives. The study employed a case study design, using the case of the 2019 Flood in Ubon Ratchathani Province. The frameworks which were used in this study were mainly on disaster risk management, focusing on the pre-disaster stage, and policy implementation, focusing on the implementation of the action plan.

Methodology to obtain the data was a semi-structured interview and document analysis. Applying semi-structured interview, which set open-ended questions for interviewees, allowed interviewees to answer and express that might be unexpected beneficial data. It was used to collect data from key informants. Document analysis was used to collect documents related to the study which emphasized on the disaster-related policies. The documents could be accessed from both online and offline sources. Then, the data were analyzed through content analysis, which interpreted the data in a form of text, audio, and pictures.

3.2 Research Site

Ubon Ratchathani was the province located in the northeast region of Thailand, which had a GDP per capita of 70,556 baht per year, which was the 66th rank of Thailand's highest gross provincial product (GPP) (Office of the National Economic and Social Development Council, 2019). Ubon Ratchathani composed of 25 districts, 216 sub-districts, 2,704 villages, 576,969 households, and population of 1,869,955 people. Mueang Ubon Ratchathani District had 11 sub-districts, 87,212 households, and a population of 222,679 people (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019). Ubon Ratchathani was located on Khorat Basin, where geographically sloped to the east, Mekong River. Mun River and Chi River were two main rivers in the northeast of Thailand, where Chi River joined Mun River at Mueang District, Ubon Ratchathani, before joining Mekong River at Khong Chiam District, Ubon Ratchathani (Water Resources Regional Office 11, n.d.). Accordingly, if there was a heavy rain, residents along rivers were risk to flood. Special flooded-monitoring zones were located in Mueang District and Warin Chamrap District, where were economic zones of the Province. This study focused on the local flood-risked areas of Mueang Ubon Ratchathani, located along with Mun River. These areas were under the administration of (1) Ubon Ratchathani City Municipality, (2) Chae Ramae Town Municipality, and (3) Kut Lat Sub-District Administrative Organization.

3.3 Data Collection

This study employed mainly two data collection methods: document analysis and semi-structured interview. Document analysis was used for gathering related documents which were policies and reports related to the case study. Because the documents were used both offline and online forms, it must be accessed from reliable sources and publications. The semi-structured interview was used when the interviewer has some questions in mind, but it does not need to follow the questions by order. The semi-structured interview had some degree of flexibility. It was an informal interview

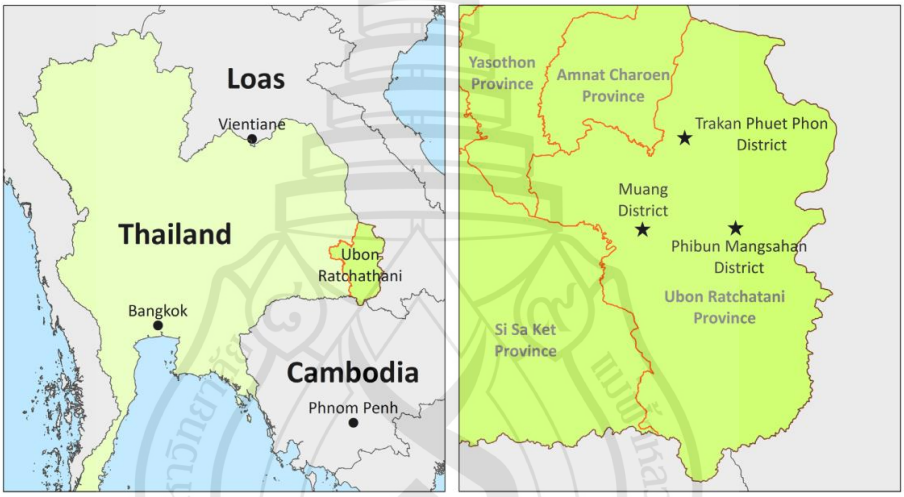
that allows more responsiveness between interviewers and interviewees, and provided opportunities to get participants' insights.

Following the research objectives, non-probability sampling is used to select the key informants because this study did not intend to be statistically representative, but sought to conduct in-depth studies. This research applied a purposive sampling, which was aimed to use to select government officials who were eligible and able to provide significant data, which contribute to the research questions and objectives. However, the sampling size of qualitative research was different from quantitative research that "as a very general rule of thumb, qualitative samples for a single study involving individual interviews only often lie under 50" (Ritchie, Lewis & Elam, 2003, p. 84).

The interview was conducted with 15 people. The interviewees, who were key informants, were approached through contacting with the Head of the Strategy and Management Division, Disaster Prevention and Mitigation Office, Ubon Ratchathani. To approach the key informants, he was the key person, as well as the key informants, who could suggest and help to contact other people who are eligible and suitable for being key informants. Then, these key informants were able to help snowball to find other eligible key informants. A person who was considered to be a key informant must mainly work on flood-related operations, especially in the pre-flooding stage, in the 2019 Flood, and understand the protocols, policies, and measures related to pre-flooding operations. The lists of the key informants are

1. The staff of the Disaster Prevention and Mitigation Office, Ubon Ratchathani – 3 people
2. The staff of the Disaster Prevention and Mitigation Centre 13 – 2 people
3. Civil defense volunteers – 4 people
4. The staff of the Ubon Ratchathani City Municipality – 2 people
5. The staff of the Chae Ramae Town Municipality – 1 person
6. The staff of the Kut Lat Sub-district Administrative Organization – 1 person
7. Academics who work on flooding issues – 2 people

While document analysis was used to get the relevant policies, plans, and action plans to disaster prevention and mitigation, and disaster management, a semi-structured interview was used to get insight data and perspective for the interviewees, who were related to pre-disaster action plan implementation for a flood at both policy level and operational level. The interview aimed to conduct to these government officers from a relevant organization as key informants, and academics who have experience in conducting research and finding critical issues related to the implementation of disaster risk management in Ubon Ratchathani.



Source Prapharsavat et al. (2021, p. 7)

Figure 3.1 Location of Ubon Ratchathani Province, and Mueang Ubon Ratchathani District

3.4 Data Analysis

The data were analyzed through content analysis. As a level of analysis, this research analyzes the data of the implementation of the policy of the 2019 Action Plan on Flood, Flash Flood, and Mudslide during the pre-disaster stage, responding to the event of the 2019 Flood in the three flood-risked areas of Mueang District, Ubon

Ratchathani, namely the flood-risked areas of (1) Ubon Ratchathani City Municipality, (2) Chae Ramae Town Municipality, and (3) Kut Lat Sub-District Administrative Organization. As a unit of analysis, this study analyzed an individual who implements the Action Plan. The individual was also a person who faces several and different experiences, obstacles, and understanding of the Action Plan's implementation.

The analysis analyzed the data gathering from key informants that provided data of the Action Plan details, the implementation of the Action Plan in the pre-flooding stage in the real field, and the problems and obstacles found in the implementation. The data were framed and analyzed under the framework of flooding, pre-disaster stage of disaster risk management, policy implementation. The analyzed data was in the scope, which was identified in the Action Plan. The data must be in the context of the 2019 Flood, and the flood-risked areas of the flood-risked sub-districts of Mueang Ubon Ratchathani.

3.5 Conceptual Framework

The National Disaster Risk Management Plan in A.D. 2015 is the key and the main instrument and policy for the management of disasters in Thailand. The National Plan requires every province to have its Disaster Prevention and Mitigation Plan, as the foundation for managing disasters in each province. Then, the Provincial Disaster Prevention and Mitigation Plan also requires each sub-districts to have its Disaster Prevention and Mitigation Plan. While it requires the plan for sub-district level, the Provincial and the National Plans only suggest district level to have its Disaster Prevention and Mitigation Plan. The National Plan also requires local level, meaning sub-district/municipalities to have its action plan for dealing with any types of hazards. Dealing with flooding is also included, and in Ubon Ratchathani Province, the action plan that deals with flood is named the Action Plan on Flood, Flash Flood, and Mudslide.

The Action Plan on Flood, Flash Flood, and Mudslide in A.D. 2019 provides the protocols of management and measures to handle floods before, during, and after

periods. Nevertheless, this study focuses on only the pre-disaster period. The Action Plan identifies five measures to operate during the pre-flood stage which are:

1. Collecting data and establishing a data bank of flood-risked areas
2. Examining resources relating to pre-flooding operations
3. Flood warning dissemination
4. Pre-evacuation
5. Establishment and management of temporary shelters

These measures are implemented through the actors mainly are disaster prevention and mitigation staff at various levels, local administrative organizations' staff, civil defense volunteers, staff, or officials from other relevant organizations. Thus, interviewing these key informants provides significant data that are analyzed under the concept of flooding, pre-disaster stage of disaster risk management, and policy implementation to answer the research questions and research objectives.

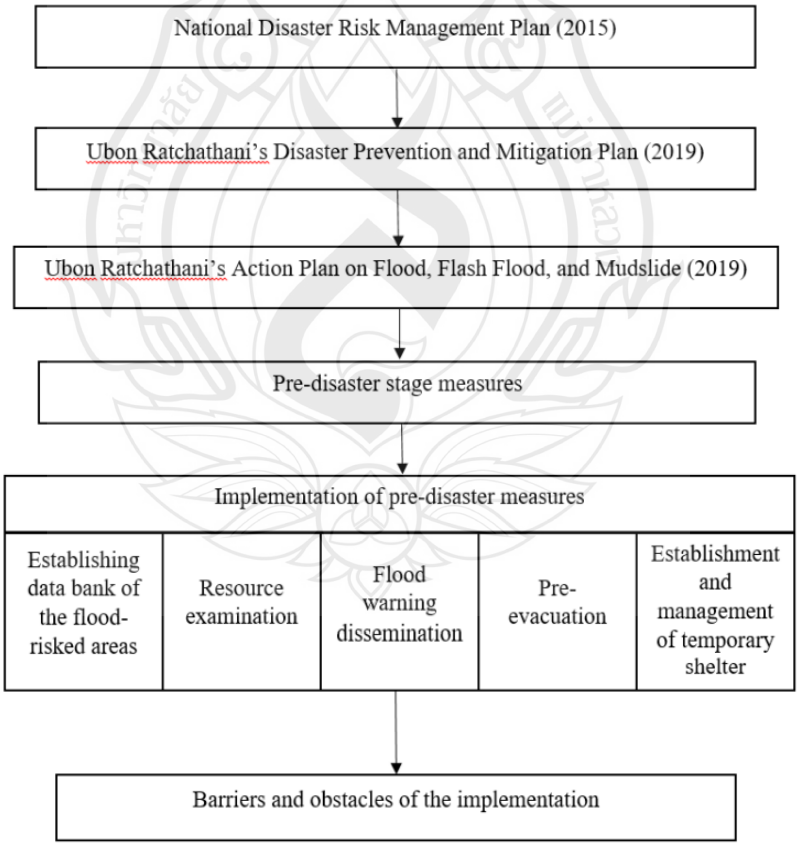


Figure 3.2 Conceptual Framework

CHAPTER 4

FINDINGS

4.1 The 2019 Action Plan on Flood, Flash Flood, and Mudslide of Ubon Ratchathani

The action plan which was used during the event of flooding in 2019 was the 2019 Action Plan on Flood, Flash Flood, and Mudslide. Based on the guidelines and legal instruments on disaster management, the Action Plan related to the Disaster Prevention and Mitigation Act, B.E. 2550 (A.D. 2007), the 2015 National Disaster Risk Management Plan, and the 2019 Ubon Ratchathani's Disaster Prevention and Mitigation Plan. Disaster Prevention and Mitigation Act, B.E. 2550 (A.D. 2007) is the principal legal mechanism for disaster risk management practices in Thailand. The Act bound the Department of Disaster Prevention and Mitigation to establish the National Disaster to draft and set the National Disaster Prevention and Mitigation Plan. The current National Plan is named the 2015 National Disaster Risk Management Plan. The National Plan laid the guidelines and ideas for disaster governing in nationwide. Additionally, the National Plan determined that each province must have its disaster prevention and mitigation plan as a principle for managing disasters in each province. Likewise, the provincial plan also obligated municipality and sub-district administrative organizations to have their own disaster prevention and mitigation plan, as well as action plans for each disaster founded in their jurisdiction (Department of Disaster Prevention and Mitigation, 2015). Accordingly, the 2019 Action Plan on Flood and Mudslide must be consistent with the 2019 Disaster Prevention and Mitigation Plan, Ubon Ratchathani, and the Provincial Plan must be in accordance with the 2015 National Disaster Risk Management Plan.

The 2019 Action Plan on Flood and Mudslide was a guideline for dealing with both flood and mudslide. While it was the plan at the provincial level, the interviewee (2020), who is the head of the policy and planning department of Ubon Ratchathani's Disaster Prevention and Mitigation Office, confirmed that this action plan was also used as a guideline at the district level or Mueang District. The interviewee further clarified that the Action Plan was used to serve as a guideline of flood countermeasures. Thus, the period of the action plan's implementation was limited. For the pre-disaster stage, the plan was used mainly after the confirmation, or more than 60 percent of probability, of the hazards. In the Action Plan, the measures and actions during the pre-disaster stages are identified to operation in a period of 72 hours before the hazards attack. The plan was divided into eight sections (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019).

The first section detailed the general information of Ubon Ratchathani Province. Ubon Ratchathani is located on Khorat Basin where is higher than the sea level for 100 to 760 metres. The geography is a plateau with a slope to the east, to the Mekong River. Chi River meets Mun River at Ubon Ratchathani and flows to the east down to Melong River. In 2019, the population of Ubon Ratchathani was 1,869,955 people. Mueang District consisted of 11 sub-districts; 8 sub-district administrative organizations; 155 villages; 1 city municipality; 1 town municipality; 3 sub-district municipality; 87,212 residences; and 222,679 people. The three main water sources that affected the water level in Mueang District are the Chi River, Mun River, and Se Bai Stream (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019).

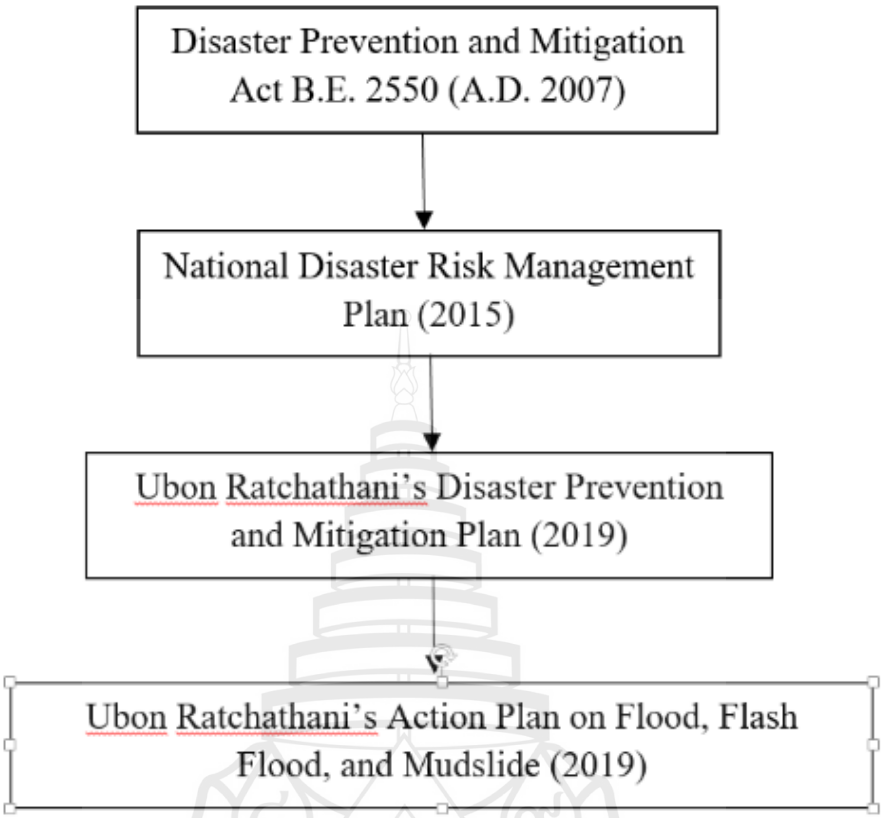


Figure 4.1 Related Policies to the 2019 Action Plan on Flood, Flash Flood, and Mudslide

The second part showed the situation of flooding in Ubon Ratchathani. The Ubon Ratchathani has a higher amount of rainfall compared to other provinces in the region. Rain usually falls from May to October and often faces depression that causes floods. Ubon Ratchathani is a downstream province of the main rivers in the northeast region. When rain falls simultaneously in the region, residences located on the river banks usually face flooding due to the overflow. The action plan divided affected areas into two categories. Firstly, economic areas are Mueang District and Warin Chamrap District. Secondly, regular-flooded areas are the general districts flooded due to over-rainy. For flood-surveillance areas, the action plan is divided into three categories. Firstly, a special flood-surveillance area means the economic area governed by Ubon Ratchathani City Municipality, and Warin Chamrap Town Municipality. The main cause of the flood is the overflow of water in the Mun River. Secondly, a regular flood-surveillance area means areas where are flooded due to rainfall more than 50

millimeters for more than an hour, including obstruction of water flow. Thirdly, a regular surveillance area means the districts where the main water sources flow by. The third section identifies the mission of the disaster prevention and mitigation administrative body of Ubon Ratchathani. The body has duties to command, manage, and coordinate the operations of the districts' disaster prevention and mitigation administrative body, local government organizations, and relevant actors. The body also needs to provide assistance to disaster-affected people and nearby provinces, when receiving a request (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019).

The section four is the operation to deal with the flood, flash flood, and mudslide in the stage of pre, during, and after disasters. This section is divided into three sub-section, which are (1) operational ideas on dealing with flood, flash flood, and mudslide, (2) preparedness procedures, and (3) emergency management during disasters. The Action Plan identifies six measures for operational ideas on dealing with flood, flash flood, and mudslide

1. To establish the disaster prevention and mitigation administrative body at the provincial: Ubon Ratchathani Governor is the head of the body. The governor assigns staff to monitor the body, and assign relevant actors.

2. To establish the disaster prevention and mitigation administrative body at the district level: The prefects are the head of the district level bodies, and assign assistances who are district officers or reliable people to monitor the bodies.

3. To establish the disaster prevention and mitigation administrative body at the local level, which is either municipalities or sub-district administrative organizations: The mayors or the head of sub-district administrative organizations are the head of the bodies and assign the head of local governing staff or local developer to monitor the bodies.

4. To establish the action plan on flood and mudslide in order to be a guideline for flood preparation, assign tasks, coordination between, and support operations.

5. The fifth step of the guidelines to dealing with flood and mudslide is to initiate a guideline for assisting disaster-affected people through preparedness measures, such as warning system, managing system, and task separation.

6. To determine procedures to prevent and mitigate the flood of governmental organizations, privates, and local people: To determine flood prevention and mitigation procedures, it is divided into three phases. Firstly, during 24 hours before flooding, the main purposes of operations are to evacuate people in flood-risked areas and provide life support. Secondly, the period of 48 hours before flooding aims to provide livelihood assistance such as food, drinks, medicines, and subsistence supplies. Thirdly, 72 hours before flooding aims to provide safe and temporary residences, and subsistence supplies (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019).

The second sub-section in the operational ideas identifies six procedures of the preparedness procedures

1. Establishment of the action plan on flood, flash flood, and mudslide at the provincial, district, municipality, and sub-district administrative organization levels by each governmental administrative organization.

2. To establish the provincial disaster prevention and mitigation administrative body, and to assign missions and responsibilities.

3. Assigning staff to surveillance and monitor the flood situation closely twenty-four-seven as the third procedure.

4. To establish flood-risk maps, and to collect the information of safe areas, and flood-risked population and residences.

5. To examine and test the readiness of equipment.

6. To focus on the warning system. The warning consists of the news of the situation, climate forecast, and climate warning, which are the information for flood-dealing decisions and operations (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019).

The section five of the action plan contents about relief and recovery. For relief, the operation focuses on the distribution of survival bags. For recovery, it contains three main operations, which are cooperation among government sectors, private, and civil society for rebuilding flood-affected residences; rebuilding flood-affected infrastructure in order to prevent harm to people; and medical assistance for injured.

The section six states about financial support which consists of two main budgets. Firstly, a normal budget is used for the pre-disaster phase, which is a budget

granted from the central government to each organization, and a budget that sub-district administrative organization earned by their operations. Secondly, the emergency budget is divided into two main categories. A budget for supporting emergency disasters is the budget spent during-disaster that the budget is set by the central government in order to use in an emergency situation by the governor's discretion. Another budget is the central budget for rebuilding and recovery after the disaster. Local governmental organizations can apply to get this budget in a form of recovery projects. The project must be sent through the disaster committee at the district and provincial levels in order to get an approval of the projects. Then, the last two sections of the action plan is communication and appendix (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019).

While the Action Plan is the plan used for dealing with flood in Ubon Ratchathani, it must be consistent with the Ubon Ratchathani's Disaster Prevention and Mitigation Plan. Also, the Provincial Plan must be based on the 2015 National Disaster Risk Management Plan. Thus, the procedures and measures to deal with floods of the Action Plan must be in accordance with the Provincial Plan and the National Plan (DDPM, 2015). During the pre-disaster stage, the measures are divided into mainly two categories which are the prevention and mitigation, and preparedness.

To examine the measures for dealing with a flood during the pre-disaster of the Action Plan, it is essential to explore its consistency to the Provincial Plan, and the National Plan. Nevertheless, the Action Plan scoped the period of the pre-disaster implementation to 72 hours before contact to the hazards, or the point in which the hazards were confirmed to contact risked-areas. Hence, the examination of the measures was based on the measures which were able or must be implemented during the pre-disaster stage. In the 2015 National Disaster Risk Management Plan, the measures which could be relevant to the period of the Action Plan's implementation were

Prevention and Mitigation

1. Reinforcing river banks
2. Dredging and rehabilitating the water sources
3. Creating awareness

Preparedness

1. Emergency management exercise
2. Pre-evacuation preparation
3. Temporary shelter management
4. Development of data bank
5. Warehouse establishment and stockpiling management
6. Early warning systems

In the Provincial Plan, the 2019 Disaster Prevention and Mitigation Office, Ubon Ratchathani. identified pre-disaster stage measures in accordance with the National Plan that it had all aforementioned nine measures.

In the case of the 2019 Action Plan on Flood and Mudslide, which must be consistent with the Provincial Plan mainly, it had only five out of nine measures in the Provincial Plan. Besides, all five measures were only preparedness measures with the absence of prevention and mitigation measures. The five measures in the pre-disaster stage of the Action Plan are

1. Pre-evacuation preparation
2. Temporary shelter management
3. Development of data bank
4. Warehouse establishment and stockpiling management
5. Early warning systems.

Pre-disaster measures presented in the Action Plan highly emphasized on preparedness. However, emergency management exercise was not founded in the Action Plan. For prevention and mitigation measures, they were completely ignored in the Action Plan that it did not have a section or activities of pre-disaster prevention and mitigation measures. The prevention and mitigation measures that were disappeared from the Action Plan were

1. Reinforcing river banks
2. Dredging and rehabilitating the water sources
3. Creating awareness.

In the Action Plan, some measures were added more than the measures identified in the National Plan and Provincial Plan. They were

1. Establishment of the Action Plan on Flood, Flash Flood, and Mudslide at provincial, district, municipality, and sub-district levels.

2. Preparation for the establishment of Flood, Flash Flood, and Mudslide Command Center

3. Assign staff for close flood surveillance at provincial, district, municipality, and sub-district levels.

Table 4.1 Comparison of the Pre-Disaster Stage Measures in the 2015 National Disaster Risk Management Plan, the Ubon Ratchathani's Disaster Prevention and Mitigation Plan

Measures	**National Disaster Risk Management Plan (2015)**	**Disaster Prevention and Mitigation Plan of Ubon Ratchathani (2019)**	**Action Plan on Flood, Flash Flood, and Mudslide of Ubon Ratchathani (2019)**
Prevention and Mitigation			
1. Reinforcing river banks	x	x	
2. Dredging and rehabilitating the water sources	x	x	
3. Creating awareness	x	x	
4. Emergency management exercise	x	x	
5. Pre-evacuation preparation	x	x	x
6. Temporary shelter management	x	x	x
7. Development of data bank	x	x	x
8. Warehouse establishment and stockpiling management	x	x	x
9. Early warning systems	x	x	x

However, the measure of the establishment of the Action Plan at every level of administration could be questioned. The National Plan stated that every level of administration must have an action plan for each type of disaster that occurred in its jurisdiction. Hence, generally, the Action Plan must always be available to be a guideline for dealing with the flood since it happened regularly in Ubon Ratchathani, and the year 2019 was not the first year of flooding. Therefore, the Action Plan was always ready to be used, and the contradiction arose that the 2019 Action Plan stated to establish the plan a couple of days before the hazards attack. Besides, the head of the policy and planning department of Ubon Ratchathani's Disaster Prevention and Mitigation Office confirmed that in case of the 2019 flooding, it had the presence of the Action Plan, and it was reviewed and revised annually.

4.2 Implementation of the 2019 Action Plan on Flood, Flash Flood, and Mudslide, Ubon Ratchathani, in the Pre-Disaster Stage

The Action for Flood, Flash Flood, and Mudslide, Ubon Ratchathani is implemented in the flood-risked sub-districts on Mueang District. The implementation of the action plan must be consistent with the district and provincial disaster prevention and mitigation plan of Ubon Ratchathani. However, in the case of Ubon Ratchathani Province, the implementation of the action plan is based on provincial disaster prevention and mitigation because the district level also uses the provincial plan. Thus, there is no disaster prevention and mitigation plan at the district level (Head of Policy and Planning Division of Ubon Ratchathani's Disaster Prevention and Mitigation Office, personal communication, April 2, 2020)

In the case of the 2019 Flood in Ubon Ratchathani, the storm named Podul and Kajiki were detected in Laos before the storms moved to Thailand. Based on the protocols and procedures in the Action Plan, provincial disaster prevention and mitigation administrative body was established estimated a week before the storms attacked Ubon Ratchathani, which had Ubon Ratchathani governor as the head of the body. The provincial body was established early because it was confirmed by Meteorological Department that the storms definitely hit Thailand, and caused flooding.

Then, Mueang District also established a disaster prevention and mitigation administrative body that operated and facilitated activities related to handling the consequences of the Podul and Kajiki, namely the flood. In consequence, disaster-administrative bodies were established at the sub-districts and municipalities level of Mueang District, which was sub-district/municipality emergency operation center. The district disaster prevention and mitigation administrative body, and sub-district/municipality emergency operation center had responsibilities to facilitate, conduct, and support any flood-prevention, flood-mitigation, and flood-preparedness operations, as well as support assistance requests from nearby districts or sub-districts (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019; Head of Disaster Prevention and Mitigation Division of Ubon Ratchathani's Disaster Prevention and Mitigation Office, personal communication, May 19, 2020).

The next step was to establish an action plan on flood, flash flood, and mudslide, at provincial, district, and sub-district/municipality levels. Normally, the action plan on flood, flash flood, and mudslide was revised every year, so the action plan was always ready to serve. Nevertheless, in the case of the 2019 Flooding as well, the action plan would be revised and updated before being used as a guideline to deal with the flood. The action plan guided protocols and procedures for flood prevention, mitigation, and preparedness; contact and coordination among relevant actors; positions and responsibilities of each organization. The disaster administrative bodies in each level determined measures to assist and facilitate flood-affected people when hazards came. The last step of the basic idea to dealing with the flood was to determine procedures and practices for preventing and preparedness for dealing with the flood, which was divided into three phases: (1) 24 hours before the flood; (2) 48 hours before the flood; and (3) 72 hours before the flood (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019; Head of Disaster Prevention and Mitigation Division of Ubon Ratchathani's Disaster Prevention and Mitigation Office, personal communication, May 19, 2020).

Based on the Action for Flood, Flash Flood, and Mudslide, Ubon Ratchathani, 2019, the measures to dealing with flood in the stage of pre-disaster were consist of mainly five activities: (Disaster Prevention and Mitigation Office, Ubon Ratchathani, 2019).

1. collecting data and establishing a data bank of flood-risked areas
2. examining the resources
3. disseminating flood warning
4. pre-evacuation of people in flood-risked areas
5. establishing and organizing temporary shelters

4.2.1 Collecting Data and Establishing a Data Bank of Flood-Risked Areas

For the first activities, collecting data and establishing a data bank of flood-risked areas, the data that were collected were the data of the numbers of population and residences in flood-risked areas, and the safe places for evacuation and temporary shelters. To implement this measure, generally, the data of people and residences were already saved in the government's population database, which could identify the location of people and residences. For the safe places for evacuation and temporary shelters, they were already identified in the community's disaster prevention and mitigation plan, which was formed through the conduct of community-based disaster risk management (CBDRM). Disaster prevention and mitigation staff of sub-district administrative organizations or municipalities were a part of the implementation of CBDRM, and they had copies of the community's disaster plan. In addition, because Ubon Ratchathani usually had floods every year, both people and staff knew the safe place. Thus, collecting data related to flood-affected people and areas was not difficult; besides, community leaders usually contacted local government organizations' staff, so they transmitted the data easily. However, the data would be collected again at the temporary shelters when people evacuated. The data needed to identify the name, family, location of residences, in order to manage further activities, such as compensation and other supports (Head of Disaster Prevention and Mitigation Division of Ubon Ratchathani's Disaster Prevention and Mitigation Office, personal communication, May 19, 2020)

4.2.2 Examining Resources

The second activity was to examine the resources. The resources used in the pre-flood stage could be divided into three main categories which were human resources, financial resources, and equipment. Firstly, human resources, the main actors in pre-disaster stages were (1) Disaster Prevention and Mitigation Office, Ubon Ratchathani;

(2) Disaster Prevention and Mitigation Centre 13; (3) Local (sub-district) disaster prevention and mitigation staff; and (4) civil defense volunteer. Disaster Prevention and Mitigation Office had responsibilities to overall manage, coordinate, and cooperate disaster-related activities. Disaster Prevention and Mitigation Centre 13 had the responsibilities to provide staff support and equipment when was requested. Local disaster prevention and mitigation staff had responsibilities to deal with the front-line situation related to disasters. Civil defense volunteers had duties to assist the operation of disaster prevention and mitigation at all levels, but emphasized on the local level based on the civil defense volunteer's affiliation. All relevant staff was ordered, prepared, and acted on disaster-related operations in short since the first flood warning arrived; however, the operations were especially intensive during the 24 hours warning. Their operation would be step by step following the guidelines based on the Disaster Prevention and Mitigation Plan, Ubon Ratchathani, and the Action Plan on Flood, Flash Flood, and Mudslide. These two documents already identified and divided the responsibilities of each relevant organization, and the action was based on the annual disaster prevention and mitigation exercise. Other than the governmental staff, NGOs, civil society, and military also assisted in pre-flooding operations although they were not involved in the operations as much as in the during-flooding and after-flooding periods.

For financial resources, finance for dealing with disasters was granted from two channels, which were a regular budget and emergency budget. For the period of pre-disaster, the financial resource was granted based on a regular budget. A regular budget meant a budget that each governmental organization received annually from the country's budget and a budget that local governmental administrations earned by the organizations themselves. It meant that governmental organizations used a regular budget for prevention, mitigation, and preparedness operations. To prepare and manage the pre-flooding operations, Disaster Prevention and Mitigation Office, Ubon Ratchathani, Disaster Prevention and Mitigation Centre 13, and sub-district/municipality administrative organizations must follow the regular process based on the bureaucratic system. A budget for proceeding with pre-flooding operations must be planned ahead in the organizations' annual budget. Otherwise, the organizations were allowed to propose separate pre-flooding projects in order to receive a separate budget. Thus, the implementation of pre-flooding measures was needed to be planned ahead because it

spent a lot of time to get approval and receive a budget (Head of Disaster Prevention and Mitigation Division of Ubon Ratchathani's Disaster Prevention and Mitigation Office, personal communication, May 19, 2020; Disaster Prevention and Mitigation Centre 13's Engineering Staff, personal communication, May 19, 2020; Disaster Prevention and Mitigation Centre 13's Staff, personal communication, June 3, 2020).

Interviewees from the two disaster-specialized organizations mutually told that the budget was insufficient for the operation. For Disaster Prevention and Mitigation Office, Ubon Ratchathani, the Head of Disaster Prevention and Mitigation Office Ubon Ratchathani stated that "The Office received a budget annually no more than 500,000 baht for each year, and the amount of budget was gradually decreasing every year. It was in contrast to the scope and mission of the Office that had to manage and oversaw disaster-related issues for the whole Ubon Ratchathani province" (personal communication, May 19, 2020). For the Disaster Prevention and Mitigation Centre 13, the budget was also insufficient that it needed to be spent for technical assistance and humanitarian assistance not only flooding, but also for every disaster-related operation in four provinces of northeastern Thailand, namely Ubon Ratchathani, Sri Sa ket, Amnat Charoen, and Yasothon. While two disaster-specialized organizations received a budget solely on disaster-centric purposes, a budget for pre-flooding activities, as well as other disasters, of local administrative organizations must rely on the leaders of the organizations. In the case of flood-risked sub-districts in Mueang District, the flood happened regularly every year as a seasonal disaster, so a budget for pre-flooding was always secured (Disaster Prevention and Mitigation Centre 13's Engineering Staff, personal communication, May 19, 2020; Disaster Prevention and Mitigation Centre 13's Staff, personal communication, June 3, 2020).

In terms of equipment, as a consequence of financing, flood-risked local administrative organizations had a reserve of pumps, prams, and life jackets. Based on the National Disaster Prevention and Mitigation Plan, local administrative organizations must manage and take care of disaster issues in their own jurisdiction. During a rush-evacuation period, estimated 24 hours flood warning, this equipment was shortage due to high demand. Therefore, local administrative organizations could request equipment assistance from the Disaster Prevention and Mitigation Centre 13, which had the mission to provide technical and equipment assistance. Due to the limited

budget, equipment under the Centre 13 was also inadequate because it was utilized to operate not only in Ubon Ratchathani, but also in Sri Sa ket, Amnat Charoen, and Yasothon, where were flooded by the 2019 Flood as well. Generally, equipment would be examine since the first flood warning was announced. For the Disaster Prevention and Mitigation Centre 13, equipment was regularly examined and maintained during the year; however, it was also examined again after the flood warning announced as well (Disaster Prevention and Mitigation Centre 13's Engineering Staff, personal communication, May 19, 2020; Disaster Prevention and Mitigation Centre 13's Staff, personal communication, June 3, 2020).

4.2.3 Flood Warning Dissemination

The third activity was flood warning dissemination. A Flood warning was initiated from the central organization and transmitted to the local areas. The process started at the Department of Meteorology, which was the organization that oversaw the climate conditions and forecast the climate pattern. After the Department of Meteorology could detect the climate pattern which had probability to cause a flood, the data would be analyzed and sent to the National Disaster Warning Center. The National Disaster Warning Center analyzed the data based on the provinces or areas where got affected by the flood, including the estimated date and time of the effects of the flood. Then, the National Disaster Warning Center sent flood warnings to provincial government organizations, meaning Ubon Ratchathani's Provincial Administrative Organization, and the Disaster Prevention and Mitigation Office, Ubon Ratchathani. Later, the provincial government and the Disaster Prevention and Mitigation Office sent the flood warning to district governments, and sub-district governments step by step. From the first point of the process, from the Department of Meteorology to local governments, the flood warning was issued officially through the government's official documents. The document must consist of expected period of time and date of flood-affected areas; expected consequences and a period of time a flood occurred; guidelines for governmental organizations, private, and people to act towards a flood; and a guideline for preparedness such as foods, drinks, and medicines. The flood warning at the provincial and district levels was disseminated through mainly official documents, radio, and social media (Head of Disaster Prevention and Mitigation Division of Ubon

Ratchathani's Disaster Prevention and Mitigation Office, personal communication, May 19, 2020).

A Flood warning was disseminated at least 72 hours before being contacted with the flood. At the sub-district levels, the flood warning would be sent to people in flood-affected areas more directly. At the local level, the staff from Ubon Ratchathani's Disaster Prevention and Mitigation Office conducted a significant action towards flood warning. The staff who was assigned closely followed the rise and fall of the water level at the Gauging Station M7, located at the foot of the Seri Prachathipatai Bride, Mueang City Municipality. The Gauging Station M7 was used to determine the level of water in the Mun River. It could determine and be used as information for managing the flood situation of the flood-risked areas along Mun River. Thus, the water level at the M7 Station could project the coming flood, and determine the flood warning situation (Disaster Prevention and Mitigation Staff of Mueang City Municipality, personal communication, June 3, 2020). However, the interviewee who was the Head of Disaster Prevention and Mitigation Division of Ubon Ratchathani's Disaster Prevention and Mitigation Office, and also the head of the staff assigned to measure the water level at the M7 Station pointed that lack of staff and technology were the obstacles to measure the water level. A human was the person that measure and fill the data of water level; thus, staff must stand by closely to follow the water level. The staff must stay at the M7 Station twenty-four seven. Currently, there was no technology to help or assist in determining and measuring water levels (personal communication, May 19, 2020).

The three main disseminators were disaster prevention and mitigation officers, civil defense volunteers, and community leaders/committee, through three methods. Firstly, audio transmission announced flood warnings through audio broadcasting in the community. The audio transmission was usually done by community leaders or a person who was appointed based on the community's disaster prevention and mitigation plan. Secondly, using announcement vehicles to disseminate flood warnings in flood-risked areas was usually done by civil defense volunteers and local disaster prevention and mitigation officers. Nevertheless, using audio transmission and announcement vehicles was limited. It often accessed to only main and local routes with a decent infrastructure, and where people were crowded. In contrast, it poorly to

access to remote areas, and areas where did not have many people and had poor infrastructure. The third method was using social media to disseminate flood warnings through relevant organizations' social media. It reached a flood-risked population more than the two previous methods since, overall, people could access to the internet. In contrast, the official documents did not attract people to read due to a lot of words and had more difficult and confusing language. Although, using social media could reach more people than audio transmission, which reach people only in the community areas, and people could not hear all messages from announcement vehicles (Head of Disaster Prevention and Mitigation Division of Ubon Ratchathani's Disaster Prevention and Mitigation Office, personal communication, May 19, 2020; Civil Defense Volunteer, personal communication, May 30, 2020).

In the event of the 2019 Flood, the implementation of flood warnings found various flaws and problems. Based on Coppola (2015), the guidelines on comprehensive warning consisted of seven actions which were

1. Detect the presence of a hazard
2. Assess the threat posed by that hazard
3. Determine the population facing risk
4. Inform the population
5. Determine appropriate protective actions that may be taken
6. Direct the public to take those actions
7. Support the actions taken by the public

The implementation of flood warning based on the Action Plan towards the 2019 Flood could achieve five out of seven actions that were

1. Detect the presence of a hazard
2. Assess the threat posed by that hazard
3. Determine the population facing risk
4. Determine appropriate protective actions that may be taken
5. Direct the public to take those actions

In the warning process, hazard detection and assessment of the threats from hazards were conducted by the Department of Meteorology before being sent to provincial and local government. Determining risked population was conducted by the National Disaster Warning Center, which analyzed the area of effects, risked

population, estimated time and date to contact flooding, a period of flood occurrence, and a basic guideline of flood preparedness. This information done by the National Disaster Warning Center would be sent to provincial and local government and the public through an official document. The official document would serve as a general warning from the government. In the front line, local disaster prevention and mitigation staff, civil defense volunteers, and other relevant staff were the government staff who disseminated flood warnings at the field of risked areas in order to warn and guide protective actions.

However, the two actions guideline on comprehensive warning that could not be achieved were

1. Inform the population
2. Support the actions taken by the public

Many flood-risked populations were not informed of the flood warning which was confirmed and admitted by all interviewees who implemented flood warning. While social media could disseminate flood warning infinitely, it did not guarantee that all warning in social media was reliable and up to date. For the support on the actions taken by the public, local government and relevant staff could not fully implement because of inadequate staff, financial resources, and equipment.

4.2.4 Pre-Evacuation Preparation

The fourth activity was pre-evacuation preparation. Although pre-evacuation measures started 72 hours before the disaster based on the Action Plan, in practice, pre-evacuation was started at least 72 hours before disasters. For the governmental preparation, the local governments designed and reviewed evacuation plans and evacuation measures in order to conduct an evacuation as smoothly as possible. During pre-evacuation preparation, they established data containing the list of evacuees, evacuation areas, evacuation routes, communicable channels, communicable devices, vehicle preparation, fuel supply preparation, assigning staff, and assigning responsibilities of each relevant actor. At the field, local governments would work altogether with the community's leader and the community's disaster committee, in order to prepare for evacuation based on the community's disaster prevention and mitigation plan. Community leaders and community disaster prevention and mitigation

committee were the main actors to manage pre-evacuation actions, with close contact with local government. If the community had civil defense volunteers, they would be the main power to facilitate pre-evacuation operations. Since flood-risked areas of Mueang District faced flooding regularly, pre-evacuation was not a struggle because evacuation places and evacuation routes were already designed and determined from previous years.

For the measures assisting flood-risked population, assisting property packing was one of the main actions during pre-evacuation. Local disaster prevention and mitigation staff, civil defense volunteers, and other main stakeholders such as the military mainly facilitated property packing. Generally, property packing was firstly done by sub-district administrative organizations, and municipalities, which sent local disaster prevention and mitigation staff, and civil defense volunteers to assist and facilitate packing. Property packing was done in order to be ready for evacuation. When the water attacked, or will surely attack, it would be faster for evacuation. People who lived in flood-risked areas would pack their property on their own, but if they required assistance they could contact local staff. By the process, the first organization to facilitate this activity was the sub-district administrative organizations or the municipality. The flood-risked population could call or contact this local government for requesting assistance. Then, the local government would send their staff, along with civil defense volunteers, to help packing. However, the main problem was the lack of staff. When flood-risked population contacted their local government for help, they often faced either no response or no staff available. More than property packing, governmental staff had responsibilities to assist consumer good provision, security provision, suggestion on proper actions towards the flood, and informing an update situation.

4.2.5 Establishing Temporary Shelters

The last activity in the Action Plan on Flood, Flash Flood, and Mudslide during the pre-flooding period was establishing temporary shelters. The temporary shelters were the safe places from flood, where flood could not reach. Commonly, people in the community knew the places used as temporary shelters since people in flood-risked areas of Mueang District faced flooding every year. For a community that already

conducted community-based disaster risk management, the community's disaster prevention and mitigation plan identified the safe places and the routes to travel to the safe places. Nevertheless, in the case that selected safe places based on the community's disaster prevention and mitigation plan were not available, the local disaster prevention administration body was in charge of selecting safe places for establishing shelters. Safe places usually referred to communal areas such as governmental offices, schools, temples, or sport stadiums.

The temporary shelters of safe places were managed mainly by local social development and human security staff. Police in local areas took care of the security and peace in the shelters, and local public health staff oversaw the sanitation, people's health, and the shelters' hygiene. In some rare cases, flood-affected people who were vulnerable, such as the elderly, disabled, and children evacuated to the shelters before the evacuation announcement because the conditions or situation at their houses or families were not safe enough. When the affected people arrived at the shelters, they had to register with the local government administrative officials in order to collect and establish data of evacuees, and local social development and human security staff would be the main staff to take care of vulnerable groups.

Generally, temporary shelters during the pre-flooding period were the stage of preparation before the flood attack. When the flood attacked, and evacuation was announced, the shelters must be ready to assist evacuees and manage the situation within the shelters effectively. Thus, shelters in the pre-disaster stage did not have a lot of problems because the activities during this period were mainly about the preparation of the shelters. The problems and issues to be concerned in the shelters usually occurred during the flooding period. In the pre-flooding period, the appeared issues were generally around the readiness of the site and infrastructures in the shelters, and coordination among the stakeholders (Head of Disaster Prevention and Mitigation Division of Ubon Ratchathani's Disaster Prevention and Mitigation Office, personal communication, May 19, 2020; Disaster Prevention and Mitigation Staff of Mueang City Municipality, personal communication, June 3, 2020).

4.3 Problems and Barriers of the Implementation of the 2019 Action Plan on Flood, Flash Flood, and Mudslide in the Pre-Disaster Stage

Implementation of the Action Plan on Flood, Flash Flood, and Mudslide found several problems and obstacles. Ubon Ratchathani's provincial government had a policy for Ubon Ratchathani's local governments to work based on an integrated approach. Under the integration approach, it highly needed cooperation and coordination both within and outside the organizations. Nevertheless, the implementation of the integration approach in the pre-disaster stage of the Action Plan was not smooth and resulted as the expected outcome of the approach, to increase the performance of the operation. Integration approach was commanded to be applied in disaster-related operations in order to increase the effectiveness, efficiency, and speed of the operations. In practices, coordination and coordination were seriously concerned on the application of the integration approach; in addition, some sub-district administrative organizations neither applied nor knew this approach (Head of Disaster Prevention and Mitigation Division of Ubon Ratchathani's Disaster Prevention and Mitigation Office, personal communication, May 19, 2020; Civil Defense Volunteer, personal communication, May 30, 2020; Disaster Prevention and Mitigation Centre 13's Engineering Staff, personal communication, May 19, 2020).

The case was found that, in Ubon Ratchathani City Municipality, the municipality government had the policy to work based on an integration approach. After snnouncing Ubon Ratchathani City Municipality to be a flood-risked area, disaster prevention and mitigation officials set a venue for people in flood-risked areas in the Municipality's jurisdiction to apply for support. Under the integration approach, each division in the Municipality government is required to work together cooperatively. Each division would separate their responsibilities based on their duties in the formal Municipalities and their specialists. One of the actions responding to the flood warning announcement was to set a venue for risk people to register for assistance, which was mainly on property packing and pram lending. To set the venue facilities such as tents and audio equipment, it was under the responsibility of the division of engineer; administrative division assisted on document proceedings; pram

provision and other flood-related support were under the responsibilities of disaster prevention and mitigation division. However, in practice, disaster prevention and mitigation officials conducted all parts. Generally, the number of disaster prevention and mitigation officials at each sub-district or municipality were only a few approximately two to three people. Thus, it caused a workload that held the performance and speed of the operations back (Disaster Prevention and Mitigation Staff of Mueang City Municipality, personal communication, June 3, 2020).

The other flood-risked administrative organizations that applied the integration approach also faced similar problems with the Ubon Ratchathani City Municipality. Disaster Prevention and Mitigation Staff at Ubon Ratchathani City Municipality gave an explanation that the main problems that caused ineffective integration approach came from the Municipality staff's poor understanding in the integration approach, which happened in many local governments. Without understanding in concepts and practices of integration approach, the officials did not know or had an idea how to and what to implement. In addition, a nature or a culture of bureaucracy that dominated the current working culture encouraged people to work separately based on their specialties. Hence, under the bureaucratic system, the officials did not want to interfere with other divisions' responsibilities (personal communication, June 3, 2020). Accordingly, the disaster prevention and mitigation officials had to prepare for flood-related operations since the dissemination of flood warnings by themselves, along with some civil defense volunteers, who acted as disaster prevention and mitigation's assistance.

Likewise, under the bureaucracy, excessive rules and processes, or called red tape, was another obstacle in pre-flood operations. When a local government or local disaster prevention and mitigation staff needed to request equipment or other supports from other organizations, red tape caused a delay in the assistance. The proposal document for requesting was very problematic. Requested organizations usually asked for official documents for issuing a request. In order to complete the documents, it must be completely filled with the signatures of several high-level officials of the organizations. To complete the process, the assistance must be waited. Even in the situation in which flood nearly came, or estimated during the 24 hours warning, the structure and policy were not flexible enough to work more effectively and efficiently.

Thus, red tape was highly concerned and affected additional equipment provided in the frontline. Besides, it was also one of the negative factors to the presence of civil defense volunteers (Disaster Prevention and Mitigation Staff of Mueang City Municipality, personal communication, June 3, 2020).

The excessive bureaucratic process was a barrier during an emergency situation when equipment is urgently used. The interviewee who is a civil defense volunteer emphasizes the problem of red tape in requesting equipment support from Centre 13. The interviewee provided an assistance in Mueang Ubon Ratchathani Municipality. The situation demanded a lot of prams. Pram support was available at Centre 13. However, due to the process, He must contact to the Office, and the Office will contact the Centre 13 for issuing pram support. He pointed that it was redundant and the regulation was not flexible. Even the Office and the Centre 13 both were located in Mueang Ubon Ratchathani Municipality, and also on the same road. Accordingly, it was a waste of time to complete the process in an emergency situation (Disaster Prevention and Mitigation Centre 13's Engineering Staff, personal communication, May 19, 2020; Civil Defense Volunteer, personal communication, May 29, 2020; Civil Defense Volunteer, personal communication, May 30, 2020; Disaster Prevention and Mitigation Staff of Mueang City Municipality, personal communication, June 3, 2020).

Sub-district governments had their action plan on flood, and command centers, but they still lacked effective operational guidelines and coordination with external organizations. Generally, disaster prevention and mitigation operation was usually proceeded by a certain organization, which lacked integration, coordination, and data sharing. Consequently, they worked overlapping that each organization worked by their own separately, and had their own set of information and structures. For instance, after the flood announcement, a residence called disaster prevention and mitigation division, or a given contact, rescue organization, or other volunteers for asset relocation. Lack of coordination and mutual operational guidelines was a serious problem for an effective operation (Disaster Prevention and Mitigation Staff of Mueang City Municipality, personal communication, June 3, 2020; Disaster Prevention and Mitigation Staff of Chae Ramae Town Municipality, personal communication, August 13, 2020; Disaster Prevention and Mitigation Staff of Kut Lat Sub-District Administrative Organization, personal communication, August 11, 2020). One of the civil defense volunteers told

that Prime Minister Prayuth Chan-Ocha reprimanded Ubon Ratchathani Governor during the visit due to the lack of operational guidelines and maps (Civil Defense Volunteer, personal communication, June 3, 2020)

In practice, organizations worked quite separately with different operational guidelines. Stakeholders did not have a map and coordination that stakeholders divided their responsibilities by areas to assist risked areas' flood preparation. Without the main organization to utilize and coordinate stakeholders for relocation requests, it caused overlapping works. To call for relocation requests and other helps in preparation stages, a person could contact mainly to the sub-district administration office, local disaster prevention and mitigation division, Ubon Ratchathani Disaster Prevention and Mitigation Office, and Ubon Ratchathani Disaster Prevention and Mitigation Centre 13. Each organization had its association to support the operation. However, when these organizations did not have decent coordination and cooperation, they worked separately. It led them to operate overlapping in the same areas. Furthermore, some of these organizations preferred working separately in order to make an achievement as much as possible. The achievement was expected to enhance the performance and image of the organization (Civil Defense Volunteer, personal communication, May 29, 2020; Civil Defense Volunteer, personal communication, May 30, 2020).

Civil defense volunteer was one of the mechanisms that helped cope with floods at the community level. Civil defense volunteers worked as assistance of disaster prevention and mitigation staff in the field. They are vital to coping with flooding because they are disaster prevention officials' assistance. Ministry of Interior announced local governmental organizations to have local civil defense volunteers equal to at least two percent of the population in their jurisdiction. However, some areas such as Ubon Ratchathani City Municipality have not had local civil defense volunteers for several years because people are not interested, and other types of volunteers, such as Village Health Volunteers, and Community Development Volunteers, have lighter duties. Besides, the payment did not suit with the duties, and usually get late paid due to a long process and strict regulation. Thus, people did not want to be civil defense volunteers. In the other flood-risked sub-districts along the Mun River, they had civil defense volunteers working in their areas. Nevertheless, the number of them did not meet the two percent baseline posed by the Ministry of Interior, and the reasons behind

this were similar to the Ubon Ratchathani Municipality (Civil Defense Volunteer, personal communication, May 30, 2020).

A warning system was a vital mechanism to prepare for floods. For the process, after the possibility of flooding was detected by the Department of Meteorology, the information was sent to the National Disaster Warning Center. National Disaster Warning Center sent a warning to Ubon Ratchathani's Provincial Administrative Organization, and the Disaster Prevention and Mitigation Office Ubon Ratchathani, and further sent to risked-local administrative organizations to announce flood warning. At this level, the flood warning document had brief details about the estimated time of rain, and measures to cope and prepare to flood. However, receiving the warning document spent time to complete the process under the bureaucratic system. In practice, staff who worked on flood warnings contacted each other through social media in order to disseminate the warning faster.

At the sub-district administration organizations, mainly disaster prevention and mitigation officials, civil defense volunteers, thecommunity helped disseminated by flood warning. There were three general methods to disseminate the flood warning in risked community. Firstly, audio transmission announced flood warnings through audio broadcasting in the community. The audio transmission was usually done by community leaders or a person who was appointed to warn based on the community's disaster prevention and mitigation plan. The second method was to use announcement cars. The actor who implemented this method was usually civil defense volunteers. However, these two methods had a flaw that some people or residences could not listen or access to the flood warning. Lastly, using social media to warn a flood could reach several audiences; nevertheless, accuracy and reliability of information were a problem. Many governmental and non-governmental organizations helped share the flood warning, but the warning from various organizations caused people confused due to the contradiction of information. In the case that announced flood warning by posting or sharing an official warning document from specialized governmental organizations such as the Department of Meteorology caused confusion to people because some words were jargon, and some words convey unclear meaning for people such as "possible to have flood". Besides, some people especially the elderly believed in news or posts without sources or from unreliable sources. However, the interviewees

admitted that, currently, the flood warnings were not covered yet that the staff could not access all remote areas. Thus, people could not access to warning and did not believe in the government warning. Meanwhile, various news and unreliable sources were not only confused people in risked areas, but also made staff work harder (Civil Defense Volunteer, personal communication, May 29, 2020; Civil Defense Volunteer, personal communication, May 30, 2020 Civil Defense Volunteer, personal communication, June 3, 2020).

Flood warnings could not be effective if people in flood-risked areas did not have sufficient knowledge and awareness of flood preparation and mitigation. People in flood-risked areas were familiar with flooding because it occurred every year. Since it happened regularly, people used habitude to deal with the flood. The interviewee pointed that when people received a flood warning, many people did not start packing or get ready at the moment, but waited until the water came. Without preparation, specifically on packing stuff for relocation and evacuation, of affected people, it caused the staff to work slower and harder. They started preparing when they could notice the water level that the flood will certainly happen. In addition, when the situation forced flood-affected people to evacuate, they did not willingly evacuate because they were worried about their houses and property. Likewise, many people in flood-risked areas did not believe in flood warnings, but believed in actual the water level that they saw (Civil Defense Volunteer, personal communication, May 29, 2020; Civil Defense Volunteer, personal communication, June 3, 2020). For these reasons, the interviewees pointed that lack of flood preparation knowledge, awareness, and training caused the staff to work harder. Moreover, the interviewees also emphasized that many people still could not access information and knowledge, while people who had knowledge lack reviewing, training, and awareness. It was necessary to provide knowledge through CBDRM and other channels (Disaster Prevention and Mitigation Staff of Ubon Ratchathani City Municipality, personal communication, June 3, 2020; Disaster Prevention and Mitigation Staff of Chae Ramae Town Municipality, personal communication, August 13, 2020; Disaster Prevention and Mitigation Staff of Kut Lat Sub-District Administrative Organization, personal communication, August 11, 2020).

The leadership of the local government's leaders highly affected the implementation of the flood action plan especially on resources and sustainability. The

leadership of local government could procure equipment and propose projects to increase readiness and performance of disaster risk reduction in their jurisdiction. Because the local government had responsibilities to manage the disaster in a given area, they had full authority to procure equipment and risk reduction projects. However, the equipment and the project were not guaranteed in their plan and implementation. It depended on the leadership. In the case of risked areas of sub-districts along Mun River, they faced floods every year, so equipment such as prams was always few stocked and procured for use in an urgent situations. Besides, flood preparing knowledge was trained and disseminated to risked community through a community-based disaster risk management (CBDRM), or cooperation with community leaders for other disaster risk reduction projects (Head of Disaster Prevention and Mitigation Division of Ubon Ratchathani's Disaster Prevention and Mitigation Office, personal communication, May 19, 2020; Disaster Prevention and Mitigation Staff of Ubon Ratchathani City Municipality, personal communication, June 3, 2020; Disaster Prevention and Mitigation Staff of Chae Ramae Town Municipality, personal communication, August 13, 2020; Disaster Prevention and Mitigation Staff of Kut Lat Sub-District Administrative Organization, personal communication, August 11, 2020).

CHAPTER 5

DISCUSSION, CONCLUSION, AND RECOMMENDATION

5.1 Discussion

The 2019 Action Plan on Flood, Flash Flood, and Mud Landslide of Ubon Ratchathani is the main policy or guideline that provides measures to cope during the period of pre-flooding, in the incident of the flooding in 2019. The action plan identifies five measures for coping with a flood during the pre-flooding stage: (1) collecting data and establishing a data bank of flood-risked areas; (2) examining resources relating to pre-flooding operations; (3) flood warning dissemination; (4) pre-evacuation preparation; and (5) establishing of temporary shelters. In addition to the five measures in the action plan.

The integration approach is the approach that increases performance and effectiveness of disaster risk reduction. Mueang Ubon Ratchathani has the policy to implement an integration approach in disaster management. However, practicing in the real situation, stakeholders altogether assist and support pre-flooding operations. The result shows that the integration approach is not implemented effectively because stakeholders lack management in cooperation, collaboration, and communication. It causes overlapping actions and loses opportunities to help people who do not have the capacity to manage to cope with the flood by themselves. In the pre-disaster stage, this situation occurs during evacuation and property relocation. When flood-risked people need service or help from governmental organizations to help move their property as well as evacuation to a safe place, they call for help from several organizations. Due to the absence of the understanding of each stakeholder in the implementation of their operational guidelines, and the absence

of a coordinator, who needs to facilitate operations, communicate and organize stakeholders, and operational guidelines. Hence, all stakeholders go to the field and provide support overlapping each other. This situation shows that joint action does not occur.

On the other hand, an ineffective integration approach does not happen only in the operation among various sectors but also occurs within a certain organization. It happened in the case of Mueang Ubon Ratchathani Municipality that each division does not follow the integration approach guideline. The disaster prevention and mitigation division needs to bear all duties and works with a few staff; consequently, it reduces the performance and effectiveness of the operation. Thus, the problems of effective implementation of integration approach comply with the studies that Thailand's disaster management is needed to be improved in terms of operational guidelines (Boonreang, 2015); and lacks integration between governmental organizations working on disaster management, and other organizations vertically and horizontally (Boonreang & Harasarn, 2021). The 2019 Action Plan is needed to have clearer operational guidelines, identify roles and responsibilities of all stakeholders distinctively, and make sure that all stakeholders understand their roles and responsibilities.

The complexity of bureaucratic processes and regulation is one of the serious problems in coping with the flood. It requires to decentralize the power and decision making process to the local governments. As Lee, Kim, Sharma and Azam (2019) mentioned that local governments contact disasters directly, so they implement disaster management policies and activities practically. They need an autonomy to handling the situation effectively. To wait for the approval and direction from higher level of governments delay the flood responding. Thailand disaster management attempts to apply decentralization of power and authority to the sub-district level to decide, plan, and implement disaster operations within the capacity of sub-district administrative organizations (SAO). In flood-risked sub-districts, SAOs have their disaster prevention and mitigation plan, and a particular action plan for coping with the flood. Nevertheless, Thailand's bureaucratic process is innate with excessive which needs a lot of approvals and signatures causes more time to complete the process. When it needs to lend equipment from other organizations, it is difficult due to inflexible regulation. As happened that the floods attack many sub-districts simultaneously, pumps are not

sufficient. When SAO calls for assistance on pumps to the Disaster Prevention and Mitigation Centre 13, the Centre 13 also faces a shortage of pumps because of pump demands from many sub-districts. Thus, requesting equipment assistance during a pre-disaster stage is problematic because the regulation still requires documents and signatures to complete the process. To finish the lend equipment steps, it is too slow to prepare for the flood.

The excessive process does not only slow down the assistance, but also one of the causes of the factor that reduces the number of civil defense volunteers, who are a front line staff and assistance of governmental staff. The law on civil defense volunteers does not encourage and motivate people to join civil defense volunteers. The law poses that civil defense volunteers can get remuneration for one hundred twenty baht for five to twelve hours work per day, and two hundred fifty baht per day for more than twelve hours work per day. Aside from low payment rates, financial regulation strict the payment. Sometimes, civil defense volunteers do not receive payment at all because it does not have any budget for the wage, and their work cannot receive a payment because it does not comply with the financial regulation. Hence, the problem of inflexible regulation and excessive process in preparing to cope with the flood, in this case, complies with the previous study that it needs to reduce the decision-making process in order to improve pre-disaster operation performance (Kamolvej, 2014), and makes legal frameworks and laws on budgeting and compensation clearer (Putta & Poboon, 2018).

About the warning system, the data is sent from the central agencies which are the Department of Meteorology, and the National Disaster Warning Center to provincial agencies, which mainly are provincial administrative organizations, and the Disaster Prevention and Mitigation Office, Ubon Ratchathani. Then, the data is further sent to the sub-district administration level. Although the official process needs to pass several steps, in practice, the relevant staff communicates flood warning issues through social application to proceed with warning earlier. Mainly, flood warning is disseminated through three channels which are audio transmission, announcement cars, and social media. The problem occurs that using audio transmission and announcement cars cannot access people in remote areas; thus, the warning does not reach all flood-risked people. On the other hand, using social media to announce flood warnings can

reach flood-risked people directly, but in social media has several announcements and information providers. An official flood announcement document from governmental organizations does not effectively reach the target groups due to the use of formal language and jargon, while some other organizations' warnings may not have enough details in the information. In addition, when everybody can post and share flood warnings, it does not refer that all information in social media is reliable, as well as the sources of information. If the information does not come from reliable sources, and receivers do not considerate enough, thus, it may mislead the action to cope with flooding.

People who already received flood warnings still faced severe effects from floods due to the lack of awareness. Coppola (2015), Carter (2008), and Coburn, Spence and Pomonis (1994) pointed that warning systems need prior knowledge of risks faced by community, a technical monitoring, dissemination and understanding warnings to those risks, and people's knowledge and capacity to react. Nevertheless, people awareness plays as an important factor as significant as aforementioned factors in the effectiveness of warning system. In many flood-risked areas, CBDRM is already conducted in the flood-risked communities which provides a foundational knowledge for people to handle with floods. As Promsri (2017) presents in his that Thai people need more flood preparedness awareness. Boonreang and Harasarn (2021) also point that in order to build people awareness of flooding, it is necessary to organize and practice local disaster prevention and mitigation plan annually and continuously. People in Mueang Ubon Ratchathani's flood-risked areas have basic knowledge and basic guidelines to act properly when the flood is coming. However, their insufficient awareness consequently leads to ineffective warnings as well. For the incident of the 2019 flooding in Ubon Ratchathani, aside from people living in remote areas who cannot receive flood warning, flood-risked people who live in urban and downtown areas can receive flood warnings. Practically, they still act based on their experiences rather than the warning's instruction to evacuation preparedness and property moving. They start moving and evacuate when they see the water coming. Thus, applying familiarity, that deal with floods regularly, to cope with the 2019 flood leads to damages and losses. The water attacks flood-risked areas where people do not have time to move or evacuate because the water comes faster than normal flooding. Thus, the previous

studies indicated by Promsri (2017), and Boonreang and Harasarn (2021) are complement with this study, and also projects that it is inevitable to improve local flood awareness practically and continuously.

The 2015 current Thailand's National Disaster Risk Management Plan is based on the frameworks from the Sendai Framework for Disaster Risk Reduction 2015-2030. The Sendai Framework provides a guidelines for countries to handle and counter disasters based on the concept of disaster risk reduction. In the case of the 2019 Flooding in Mueang District, Ubon Ratchathani, pre-disaster measures of the 2019 Action Plan on Flood, Flash Flood, and Mudslide highly emphasize on the preparedness, and do not give much attention to prevention and mitigation measures. However, either prevention and mitigation or preparedness, they are in accordance with the disaster risk reduction. To effectively implement pre-flooding measures of the Action Plan must follow the guidelines of disaster risk reduction. Importantly, only the policy and implementation during the 72 hours or a week before disasters is not sufficient to enhance governmental capacity and public capacity to understand and conduct disaster risk reduction. To prevent, mitigate, and prepare for handling with flood needed prior knowledge to understand in disaster risk reduction and flood comprehensively, and see a big picture of disaster risk management. Thus, to effectively accomplish the Action Plan, it is necessary to go beyond the Action Plan in order to lay the foundation and background for the implementation of the pre-flooding measures of the Action Plan.

Bendimerad (2003) presented the four cornerstone of the disaster risk reduction, which was the four main elements of the disaster risk reduction: public policy action, safe construction and urban planning, community participation, and culture of prevention. These element could be considered as the way to strengthen and enhance the capacity of the Action Plan implementation. The first cornerstone is public policy action. The implementation of the action plan could not fully achieve public policy action. Based on the risk reduction measures, the Action Plan did not include prevention and mitigation measures in the Action Plan. Basically, based on the 2015 National Disaster Risk Management Plan, the Action Plan needs to add prevention and mitigation measures on reinforcing river banks, dredging water channels, and creating awareness on cultural flood-prevention. In term of implementation, while the Action

Plan identified relevant stakeholders in the Action Plan, the implementation faced problems of coordination and cooperation. Absence of the coordinator among stakeholders, it meant that it lacked of a middle who can facilitate, communicate, and organize the operation among stakeholders. Their absence resulted in a messy operations especially on the overlapping works and assistance to help flood-risked population for property packing and operations during pre-evacuation. Even though the Action Plan identified the roles of stakeholders, without a unit to coordinate stakeholders operations during pre-flooding stage, the implementation would not be able to succeed.

To implement the policy action, Winter (2012) and Winter (2006) pointed the five factors that can result the policy implementation in his Integrated Implementation Model, which consists of policy design, organizational and interorganizational behaviors, street-level bureaucracy, management, and target groups. The first factor is policy design. The Action Plan is needed to be more comprehensive that covers flood prevention and mitigation, as the foundation that can affect the result of flood preparedness. It also needs to state the roles and responsibilities of the stakeholders clearly. As Birkland (2016) pointed that policy design and policy implementation were interrelated because choices made in the policy would influence the policy implementation's outcomes. Thus, either the revision of the 2019 Action Plan or the development of the new Action Plan, policy design should require engagement and participation of all stakeholders in order to strengthen mutually understanding and commitment on the pre-flooding policy.

The second factor is organizational and interorganizational behaviors. This factor is one of the significant issues that drags the implementation performance. The data complies with the Winter's (2012) argument that lack of coalition partners, lack of cooperation facilitation, low degree of commitment, and conflict of interests cause ineffective implementation of the Action Plan. These Winter's mentioned problems are also appears to be the consequences from the 2019 Action Plan's design due to the unclear roles and responsibilities of stakeholders, and the absence of prevention and mitigation measures which were linkage with the preparedness. Therefore, it requires to reevaluate and revise the Action Plan from all parties so that the new or improved Action Plan reach the stakeholders' consensus, as the argument of Mthethwa (2012).

The third factor is the street-bureaucrats, a lowest level implementer, that their discretions are vital in policy implementation (Winter, 2006). Libsky (2010) stated that street-bureaucrats made decision and implemented the policy based on certain circumstances, resources, and information, and to implement the policy under the certain conditions might distort the policy. In the study, the main conditions that affect the implementers can be insufficient resources, low degree of autonomy, insufficient of stakeholders' roles and responsibilities in the implementation process, and inadequate number of street bureaucrats. Thus, these factors are needed to be addresses since they affect the outcome of implementation (Lipsky, 2010). Inevitably, amendment of the Action Plan can be beneficial to the street-bureaucrats as well. Based on policy-action relationship, policy formulation and policy implementation because "*it is mediated by actors who may be operating with different assumptive worlds from those formulating the policy, and, inevitably, it undergoes interpretation and modification and, in some cases, subversion*" (Barrett and Fudge, 1981b, p. 251, as cited in Hill & Hupe, 2002).

The fourth factor is the management that managerial control influences street-level bureaucrat practices. Winter (2012) pointed that only effective manager is not adequate to achieve policy objectives, and all street-bureaucrats may not share all preferences with managers. However, based on the obtained data, it is not a major issue in the implementation for the same sectors, but for cross-sector implementation, it is a major obstacles. As the case of Mueang Ubon Ratchathani Municipality which cross-sector operation under the Municipality Office is reluctant, street-level bureaucrats from another divisions do not follow and comply with the manager who affiliates with the Disaster Prevention and Mitigation Division.

The last factor is the target group. The change in target groups' behaviors influences implementation behaviors of street-level bureaucrats and success of policy objectives (Winter, 2012). Therefore, it is about development flooded-risked population knowledge, awareness, and coping capacity. Street-bureaucrats can implement the policy easier and more effective with the risked population readiness and facilitation. Winter (2012) also indicated that public policy targets the development of target groups' behaviors by regulating their behaviors or providing services. Likewise, street-bureaucrats need an improvement for providing services. In this case, basically, the

warning system, knowledge providing, and awareness raising are needed to be improved strategically and practically.

The second cornerstone of the four cornerstone of the disaster risk reduction is safe construction and urban planning. This cornerstone is a part of the prevention and mitigation measures (Bendimerad, 2003), that were absent from the Action Plan. Although safe construction and urban planning were beyond the scope in implementation of the Action Plan, but its implementation related to the Action Plan's implementation. The safe construction helped strengthen building capacity to resist the water, and reduce vulnerabilities, while urban planning helped reduce risks from the flood. When the urban was planning well, the areas of agriculture, residences, and business areas were separately organized. Thus, it meant that water flow and channels were planned. It could reduce the adverse effects of flood, and could reduce losses and deaths. Mueang Ubon Ratchathani needed to enforce safe construction and urban planning in order to well prepare to face the flood. However, it inevitably related to public policy action. It needed to have a policy on safe construction and urban planning, and enforce the policy into action. While

The third cornerstone is community participation. One of the most important actions of community participation is community-based disaster risk management (CBDRM) that the community had a space to fully engage in the process of disaster prevention, mitigation, and preparedness. It contributed to empowering community capacity and transforming the community resiliently. Even CBDRM was beyond the scope of the period of the implementation of the Action Plan. It was undeniable that community participation in disaster risk reduction helped strengthen community capacity and knowledge to handle the flood. In addition, when people had the knowledge to cope with flood, and were aware of the adverse consequences of floods, it facilitated the implementation of the Action Plan as well. Because one of the barriers and obstacles of governmental staff's implementation of the Action Plan was insufficient awareness on the flood of the people in flood-risked areas. Participation of community can contribute to community empowerment and sustainability, which would transform vulnerable into resilient communities (Bendimerad, 2003; Boonreang, 2015; Tozier de la Poterie & Baudoin, 2015). Significantly, disaster risk reduction

cannot be separated from community participation because it is too complex to only governmental sector (Bendimerad, 2003).

The last cornerstone is the culture of prevention. It is one of the fundamentals of disaster risk reduction because when people have a culture of prevention, it means that people have knowledge, skills, and awareness. Bendimerad (2003) indicated that the keys of the culture of prevention are awareness-raising, social arrangement, forging accountability for good governance, and empowerment of community participation for a good governance. People would know what to do and what to be concerned about coping with floods. It can reduce the negative impact of the flood. Also, as Winter (2012) mentioned about the target group, if people are embedded with the culture of prevention, it is beneficial to positive outcomes of the implementation of pre-flooding measures. In order to improve the implementation, local government as well as Ubon Ratchathani's Disaster Prevention and Mitigation Office need to further emphasize and conduct more activities that can enhance people's culture of flood prevention. It is crucial to tackle the problems accurately. Activities to enhance the culture of flood prevention were already suggested from various scholars that communities and government agencies can cooperatively conducts; for example, flood experience sharing (Promsri, 2017), creating disaster-related comprehensive database and information (Kamolvej, 2014). Significantly, it needs to ensure community ownership which community members of flood-risked areas lead the activities. Moreover, Achieving culture of prevention contributes to the avoidance of disaster occurrence in long term perspectives. Culture of prevention can be a part of the social perspective of disaster prevention based on the Voodg's (2004) argument that risks are the consequences of social and cultural processes.

Due to the Action Plan, flood warning dissemination is implemented at least 72 hours before the disasters, or after the hazards are confirmed to affect. Thus, it implies that the Action Plan highly focuses on preparedness measures. Coppola (2015) presented the five key actions of the government's preparedness actions: planning, exercising, training, equipment, and statutory authority. Planning is already implemented as the Action Plan. However, the pre-disaster stage is not covered yet that the Action Plan highly emphasizes on preparedness measures without any prevention and mitigation measures. A major exercise is held at least once a year among all

stakeholders. For local exercise both at the government sectors and community depends on the management of local administrative organizations. Thus, it is suggested to standardize or regulate exercise to be held at least one time during the early or a short period before the rainy season at the local level. This action can improve the performance in pre-disaster operations which has poor coordination and cooperation among stakeholders.

For a training, disaster prevention and mitigation staff and civil defense volunteers are familiar with flood-related operations. To enhance the capacity, it needed to hold training for both relevant governmental staff who are not disaster prevention and mitigation staff in order to better understand the idea, as well as their affiliate roles idea of disaster prevention and mitigation operations and community before the rainy season. For an equipment, the government needs to provide more related equipment such as prams, pumps, life jackets, and vehicles in order to be able to respond to assistance requests from flood-risked people during the implementation of the action plan. Lastly, statutory authority is provided by the Disaster Prevention and Mitigation Act, B.E. 2550 (A.D. 2007), and the 2015 National Disaster Risk Management Plan. They are a legal instrument that provides power and authority to all relevant stakeholders to establish and implement the Action Plan. However, the problems are found that the power and authority are needed to be utilized and organized systematically, as the finding found that stakeholders are failing to work cooperatively due to the lack of effective coordination. Thus, an organization that performs the roles of coordination is needed to be strengthened. Besides, each stakeholder needs to further develop its operational guidelines to make the roles and mission in the pre-flooding operation clearer.

Accordingly, the data indicated that the 2019 Action Plan on Flood, Flash Flood, and Mudslide of Ubon Ratchathani highly emphasizes on preparedness measures, and ignores prevention and mitigation measures. To revise and redesign the Action Plan, reinforcing river banks, dredging water channels, and creating awareness on cultural flood-prevention are necessary to add in the Action Plan. For the implementation, in order to improve the performance and effectiveness of the implementation of the 2019 Action Plan on Flood, Flash Flood, and Mudslide of Ubon Ratchathani during the pre-flooding stage, it must not only improve only the measures during at least 72 hours

implementation of the Action Plan, but it needs to go beyond in order to lay the foundation of the pre-disaster stage of disaster risk reduction. The actions and measures that is needed to be implemented further as the

1. Establishing and strengthening a middle unit served as a coordinator among all relevant stakeholders

2. Conducting more precise and specific operational guidelines of relevant stakeholders in the implementation of pre-flooding measures

3. Providing more space for the public and community to participate in pre-flooding operations

4. Providing more pre-flooding training and exercise to the community in order to enhance coping capacity, knowledge, and awareness towards the flood, which contributes to the creation of a culture of flood-prevention

5. Providing further pre-flooding training and exercise for especially to relevant actors who are not disaster prevention and mitigation staff due to the lack of familiarity and expertise related to pre-flooding operations; it will also enhance understanding and performance in the implementation under the integration approach

6. Reducing decision-making process and rules, that the implementation process needs to be more fast and concise

7. Rearranging the remuneration of civil defense volunteers in order to attract and increase the number of them, as the assistance of the disaster prevention and mitigation staff

8. Providing more support equipment, financial resource, and human resource

9. Redesigning or reframing laws and regulations related to budget provision

10. Adding and improving channels of warning dissemination in order to reach more flood-risked people in flood-risked areas

11. Simplifying and using clear words and easy language in the warning in order to prevent confusion

5.2 Conclusion

This research studied the implementation of the 2019 Action Plan on Flood, Flash Flood, and Mudslide of Ubon Ratchathani, during the pre-disaster stage, in the event of the 2019 Flood in flood-risked sub-districts of Mueang District, Ubon Ratchathani. The research was aimed to understand the procedures and measures of the Action Plan, study the implementation of the Action Plan during the pre-disaster stage, and explore the barriers and obstacles of the implementation. The results indicated that since the probability to cause a hazard result at 60% or more at least 72 hours before the floods attack, the sub-district/municipality disaster prevention and mitigation administrative body was established in the areas of its jurisdiction in order to manage and deal with the upcoming hazard. The center and relevant organizations must follow the protocols and measures in the Action Plan, which consisted of five measures: (1) collecting data and establishing a data bank of flood-risked areas; (2) examining resources relating to pre-flooding operations; (3) flood warning dissemination; (4) pre-evacuation preparation; and (5) establishing temporary shelters.

The implementation of the action found some barriers and obstacles. The Action Plan was designed based on passive-oriented strategies. The Action Plan was also too emphasized on preparedness measures and did not identify any prevention and mitigation measures. While the Action Plan needed to rely on effective coordination and cooperation, the implementation could not reach the expected performance because stakeholders still vaguely understand the integration approach. When the equipment was needed to be lent, the process itself was also a barrier that excessive rules and steps of bureaucratic system delayed the implementation. Limitation of resources was vital barrier that implementers lacked of budget, human resources, and equipment to operate pre-flooding missions. Flood warning as a very crucial strategy to keep people safe or reduce losses from the flood could not reach remote areas and stimulate flood-risked people awareness as expected. Additionally, the lack of civil defense volunteers seriously affected the performance of the Action Plan because they were a part of the implementers to all five measures of the Action Plan, as the assistance of the local disaster prevention and mitigation staff.

Accordingly, it is important to strengthen and improve both the policy and the implementation aspects. On the policy, The Action Plan is needed to cover prevention and mitigation measures, and reach all parties' consensus and commitment. On the implementation, it is necessary to reduce the decision making process and rules in order to make the implementation fast and concise; set and strengthen a unit as coordination of all stakeholders; conduct more details on operational guidelines of stakeholders; provide training, exercise, and knowledge to stakeholders and community for better understanding and capacity on the implementation; support more for sustain resources; using easy to understand words for flood warning; and improving warning channels to reach people in remote areas.

5.3 Recommendation for Further Study

This research focuses on the implementation of the 2019 Action Plan on Flood, Flash Flood, and Mud Landslide in flood-risked areas of flood-risked sub-districts of Mueang District, Ubon Ratchathani. Nevertheless, the scope of this study focuses only on the pre-disaster stage of disaster risk management, namely prevention, mitigation, and preparedness. The data were collected and analyzed based on the scope of the pre-disaster stage of the Action Plan. In order to reach further knowledge and understanding, the researcher suggests research and study on the other stage of disaster risk management, which are during-disaster and post-disaster stages. It would project more details and complexity in flood risk management, as well as the clear implementation of the 2019 Action Plan on Flood, Flash Flood, and Mud Landslide towards the flooding for the whole process of disaster risk management cycle.

REFERENCES

REFERENCES

Anderson, A. E. (2003). *Public policy making: An introduction* (5th ed.). Boston: Houghton Mifflin Company.

Andjelkovic, I. (2001). *Guidelines on non-structural measures in urban flood management*. Retrieved March 8, 2020, from, https://unesdoc.unesco.org/ark:/48223/pf0000124004

Banwell, N., Rutherford, S., Mackey, B., & Chu, C. (2018). Towards improved linkage of disaster risk reduction and climate change adaptation to health: A review. *International Journal of Environmental Research and Public Health, 15*(793), 1-18.

Below, R., & Wallemacq, P. (2018). *Annual disaster statistical review 2017*. Retrieved December 15, 2019, from https://cred.be/sites/default/files/adsr_2017.pdf

Bendimerad, F. (2003). *Disaster risk reduction and sustainable development*. Retrieved October, 12, 2019, from https://www.semanticscholar.org/paper/Disaster-Risk-Reduction-and-Sustainable-DevelopmentBendimerad/721929932392f6b5d9bd4861f615d8554dade5e1

Berman, P. (1984). *The study of macro and micro implementation of social policy*. Retrieved December 20, 2019, from, https://www.rand.org/content/dam/rand/pubs/papers/2008/P6071.pdf

Birkland, T. A. (2016). *An introduction to public policy: Theories, concepts, and models of public policy making* (4th ed.). New York: Routledge.

Boonreang, E. (2015). The capacity building in the natural disaster management of Thailand. *International Journal of Economics and Management Engineering*, *9*(5), 1576-1581. Retrieved October 1, 2019, from https://publications.waset.org/10001369/the-capacity-building-in-the-natural-disaster-management-of-thailand

Boonreang, E., & Harasarn, A. (2021). The capacity development for natural disaster management of local administrative organizations. *Journal of Politics and Governance, 11*(1), 236-253. Retrieved May 5, 2021, from https://so03.tci-thaijo.org/index.php/jopag/article/view/251711/168685

Buchanan. S. (1981). Disaster: Prevention, preparedness and action. *Library Trends*, *30*(2), 241-252. Retrieved November 19, 2019, from https://core.ac.uk/download/pdf/4816532.pdf

Carter, W. N. (2008). *Disaster management a disaster manager's handbook*. Philippines: Asian Development Bank. Retrieved September 5, 2019, from https://www.think-asia.org/bitstream/handle/11540/5035/disaster-management-handbook.pdf?sequence=1

Center for Excellence in Disaster Management & Humanitarian Assistance. (2015). *Thailand disaster management reference handbook 2015*. Retrieved September 30, 2019, from https://www.rcrc-resilience-southeastasia.org/wp-content/uploads/2018/01/2015-CFE-Disaster-Management-Reference-Handbook-Thailand.pdf

Center for Excellence in Disaster Management & Humanitarian Assistance. (2018). *Thailand disaster management reference handbook 2018*. Retrieved September 30, 2019, from https://reliefweb.int/sites/reliefweb.int/files/resources/disaster-mgmt-ref-hdbkthailand.pdf

Coburn, A. W., Pomonis, A., & Spence, R.J.S. (1994). *Disaster mitigation* (2nd Ed.). Cambridge. Retrieved November 30, 2019, from https://www.researchgate.net/publication/292655874_Disaster_Mitigation/link/56b0983308ae9f0ff7b5bce2/download

Collins, M. L., & Kapucu, N. (2008). Early warning systems and disaster preparedness and 91 responses in local government. *Disaster Prevention and Management, 17*(5), 587-600.

Coppola, D. P. (2015*). Introduction to international disaster management* (3rd ed.). Oxford: Butterworth-Heinemann.

Davies, M., Guenther, B., Leavy, J., Mitchell, T., & Tanner, T. (2008). *Climate change adaptation, disaster risk reduction and social protection: Complementary roles in agriculture and rural growth?*. Chichester, United Kingdom: RPM Print & Design. Retrieved January 9, 2020, from https://www.researchgate.net/publication/227600468_Climate_Change_Adaptation_Disaster_Risk_Reduction_and_Social_Protection_Complementary_Roles_in_Agriculture_and_Rural_Growth/link/d318bf1a6fdcc2462ebf9a5/download

Dilley, M., Chen. R. S., Deichmann, U., Lerner-Lam, A. L., & Arnold, M. (2005). *Natural disaster hotspots: A global risk analysis*. Washington, DC: World Bank. Retrieved from November 17, 2019, from https://openknowledge.worldbank.org/handle/10986/7376

Department of Disaster Prevention and Mitigation. (2007). *Disaster prevention and mitigation act B. E. 2550 [2007]*. Retrieved September 1, 2019, from http://project- wre.eng.chula.ac.th/watercu_eng/sites/default/files/lecture%20intro%202112681%20materials/9%20Disaster%20Prevention%20and%20Mitigation%20Act%202550.pdf

Department of Disaster Prevention and Mitigation. (2015). *The national disaster risk management plan (2015)*. Retrieved September 1, 2019, from https://www.disaster.go.th/upload/download/file_attach/584115d64fcee.pdf

Disaster Prevention and Mitigation Office, Ubon Ratchathani. (2019). *แผนเผชิญเหตุอุทกภัย น้ำป่าไหลหลาก และดินโคลนถล่ม จังหวัดอุบลราชธานี พ.ศ.2562*.

Dye, T. R. (2013). *Understanding public policy* (14th ed.). Wilmington, DE: Quebecor World Book Services.

Elmore, R. F. (1985). Forward and backward mapping: Reversible logic in the analysis of public policy. In K. Hanf & T. A. J. Toonen (Eds.), *Policy implementation in federal and unitary systems* (pp. 33–70). Dordrecht: Springer.

European Commission. (2019). *Country profile*. Retrieved October 3, 2019, from https://drmkc.jrc.ec.europa.eu/inform-index/Countries/Country-Profile-Map

Federal Emergency Management Agency. (2013). *Mitigation ideas a resource for reducing risk to natural hazards*. Retrieved February 5, 2020, from https://www.fema.gov/media-librarydata/20130726-1904-25045-2423/fema_mitigation_ideas_final_01252013.pdf

Global Facility for Disaster Reduction and Recovery. (2016). Executive summary. In *The making of a risker future: How our decisions are shaping future disaster risk*. Washington, DC: Global Facility for Disaster Reduction and Recovery. Retrieved November 11, 2019, from https://reliefweb.int/sites/reliefweb.int/files/resources/Riskier%20Future.pdf

Grindle, M. S. (2017). *Politics and policy implementation the third world*. New Jersey: Princeton University Press.

Guha-Sapir, D., Vos, F., Below, R., & Ponserre, S. (2011). *Annual disaster statistical review 2010 the numbers and trend*. Belgium: Ciaco Imprimerie, Louvain-la-Neuve. Retrieved October 1, 2019, from, http://www.cred.be/sites/default/files/ADSR_2010.pdf

Haque, C. E., & Burton, I. (2005). Adaptation options strategies for hazards and vulnerability mitigation: An international perspective. In C. E., Haque (Ed.), *Mitigation of natural hazards and disasters: International perspectives* (pp. 3-24). Netherlands: Springer.

Hill, M. (2005). *The public policy process* (4th ed.). Glasglow: Bell & Bain Limited.

Hill, M., & Hupe. P. (2002). *Implementing public policy: Governance in theory and practice*. Great Britain: Athenaeum Press.

Hollnagel, E. (2015). Disaster management, control, and resilience. In A. Masys (Ed.), Disaster management: Enabling Resilience (pp. 21-36). Cham: Springer.

International Decade for Natural Disaster Reduction. (1994). *Yokohama strategy and plan of action for a safer world*. Retrieved November 5, 2019, from https://www.unisdr.org/files/8241_doc6841contenido1.pdf

Islam, A. R. M. T., Tasnuva, A., Islam, M. T., & Haque, M. R. (2014). Management approach to disaster scenario in Bangladesh: An overview. *International Journal of Scientific and Research Publications, 4*(3), 1-7.

Kamolvej, T. (2014). Has Thailand disaster management, from tsunami to flood, been better?. *Journal of Politics and Governance, 4*(2), 103-119. Retrieved October 1, 2019, from http://www.copag.msu.ac.th/journal/filesjournal/4-2/180120171057216.pdf

Kapucu, N., & Tom Liou, K. (2014). Disaster and development: Investigating an intergrated Framework. In K. T., Liou & Kapucu, N. (Eds.), *Disaster and development examining global issues and cases* (pp. 1-18). Cham: Springer.

Khan, A. R., & Khandaker, S. (2016). A critical insight into policy implementation and implementation performance. *Public Policy and Administration, 15*(4), 538-548. Retrieved October 2, from https://ojs.mruni.eu/ojs/public-policy-and-administration/article/view/4439

Khan, H., Vasilescu, L. G., & Khan, A. (2008). Disaster management cycle – a theoretical approach. *Management and Marketing Journal*, *6*(1), 43-50.

Kamolvej, T. (2014). Has Thailand disaster management, from tsunami to flood, been better?. *Journal of Politics and Governance, 4*(2), 103-119. Retrieved September 12, 2019, from https://econpapers.repec.org/article/aiomanmar/v_3a6_3ay_3a2008_3ai_3a1_3ap_3a43-50.htm

Khunwishit, S. (2014). 10 years of disaster management in Thailand: An examination of policy, organization and performance after the Indian Ocean Tsunami in 2004. *Journal of Politics and Governance, 4*(2), 80-102.

Komchadluek. (2019, September 29). *โพดุล-คาซิกิจากไปเหลือไว้แต่ความทุกข์ระทม*. Retrieved October 6, 2019, from https://www.komchadluek.net/news/regional/390890

Lee, J. E., Kim, S., Sharma, G., & Azam, M. (2019). Effective disaster prevention and mitigation by examining the significance of disaster resilience. *Crisisonomy, 15*(3), 119-139. Retrieved January 2, 2020, from https://www.kci.go.kr/kciportal/ci/sereArticleSearch/ciSereArtiView.kci?sereArticleSearchBean.artiId=ART002457274

Lipsky, M. (2010). *Street-level bureaucracy, 30th anniversary edition: Dilemmas of the individual in public services*. New York: Russell Sage Foundation.

Matland, R. E. (1995). Synthesizing the implementation literature: The ambiguity-conflict model of policy implementation. *Journal of Public Administration Research and Theory, 5*(2), 145-174. Retrieved February 20, 2020, from https://www.researchgate.net/publication/235752963_Richard_E_Matland_1995_Synthesizing_the_Implementation_Literature_The_Ambiguity-Conflict_Model_of_Policy_Implementation_Journal_of_Public_Administration_Research_and_Theory_52_145-174

Mercer, J. (2010). Disaster risk reduction or climate change adaptation: Are we reinventing the wheel?. *Journal of International Development, 22*(2), 247-264.

Mthethwa, R. M. (2012). Critical dimensions for policy implementation. *African Journal of Public Affair, 5*(2), 36-47.

Mugambwa, J., Nabeta, N., Ngoma, M., Rudaheranwa, N., . . . Munene, J. C. (2018). Policy implementation: Conceptual foundations, accumulated wisdom and new directions. *Journal of Public Administration and Governance, 8*(3), 211-232.

National News Bureau of Thailand. (2019, September 21). *Disaster management raised to level 3*. Retrieved October 9, 2019, from http://thainews.prd.go.th/en/news/detail/TCATG190921195814163

Natural Hazards Partnership. (n.d.). *About us*. Retrieved March 20, 2020, from http://www.naturalhazardspartnership.org.uk/about-us/

Nik Nazli, N. N. N., Sipon, S., & Radzi, H. M. (2014). Analysis of training needs in disaster preparedness. *Procedia – Social and Behavioral Sciences, 140*, 576-580.

O'Toole, L. J. (2004). The theory-practice issue in policy implementation research. *Journal of Public Administration, 82*(2), 309-329. Retrieved November 5, 2019, from https://onlinelibrary.wiley.com/doi/10.1111/j.0033-3298.2004.00396.x

Office of National Economic and Social Development Council. (2019). *Gross regional and provincial product chain volume measures 2017 edition*. Bangkok: Office of National Economic and Social Development Council. Retrieved February 21, 2020, from https://www.nesdb.go.th/ewt_dl_link.php?nid=5628&filename=gross_regional

Osborn, D., Cutter, A., & Ullah, F. (2015). *Universal sustainable development goals understanding the transformational challenge for developed countries*. Retrieved September 22, 2019, from https://sustainabledevelopment.un.org/content/documents/ 1684SF__SDG_Universality_Report_-_May_2015.pdf

Parchure, N. P., & Soman, P. Y. (2016). Disaster following natural events-prevention and management of disaster. *International Journal of Management, 7*(1), 1-14. Retrieved October 22, 2019, from https://silo.tips/download/disaster-following-natural-events-prevention-and-management-of-disaster

Prachachat. (2019, September 16). *วิกฤตน้ำท่วมอีสานเสียหาย8พันล้าน กระทบพื้นที่ศก.-เกษตร2ล้านไร่-4 จังหวัดยังอ่วม*. Retrieved October 5, 2019, from https://www.prachachat.net/local-economy/news-371872

Prapharsavat, R., Lim, C., Sunthornsut, P., Wuthiekanun, V., . . . Limmathurotsakul, D. (2021). The utility of an AMR dictionary as an educational tool to improve public understanding of antimicrobial resistance. *Wellcome Open Research, 6*(113), 1-11. Retrieved November 3, 2021, from https://www.researchgate.net/publication/351594740_The_utility_of_an_AMR_dictionary_as_an_educational_tool_to_imp_public_understanding_of_antimicrobial_resistance

Promsri, C. (2017). Exploring flood disaster preparedness awareness factors through historical flood victims in Bangkok Metropolitan and vicinity by using factor analysis. *International Journal of Academic Research in Business and Social Sciences, 7*(5), 1- 7. Retrieved September 11, 2019, from https://www.semanticscholar.org/paper/Natural-Disaster-Preparedness-Awareness%3A-Literature-Promsri/0e5b60afabe03f8818d5366377f16acd2a4b1ac1

Putta, J., & Poboon, C. (2018). Public disaster prevention and mitigation of local administration organization in Thailand. *Kasem Bundit Journal, 19*(1), 31-44.

Ritchie, J., Lewis, J., & Elam, G. (2003). Design and selecting samples. In J. Ritchie & J. Lewis (Eds.), *Qualitative research practice: A guide for Social Science students and researchers* (pp. 77-108). Wiltshire, Great Britain: The Cromwell Press.

Sena, L., & Woldemichael, K. (2006). *Disaster prevention and preparedness*. Retrieved January 22, 2020, from, https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_science_students/lln_disaster_prev_final.pdf

Shaw, R., Scheyvens, H., Prabhakar, S., & Endo, I. (2016). *Disaster risk reduction for sustainable development* [Issue brief]. Retrieved January, 22, 2020, from https://www.iges.or.jp/en/publication_documents/pub/issue/en/5523/DRR.pdf

Signé, L. (2017). *Policy implementation – A synthesis of the study of policy implementation and the causes of policy failure* [Policy paper]. Retrieved September 14, 2019, from https://www.policycenter.ma/sites/default/files/OCPPC-PP1703.pdf

Smith, K. B., & Larimer, C. W. (2009). *The public policy theory primer*. Colorado: Westview Press.

Srikwan, P. (2017). *Thailand country report 2017*. Retrieved February 16, 2020, from https://www.adrc.asia/countryreport/THA/2017/Thailand_CR2017B.pdf

Strait Times. (2019, September 14). *Thailand's north-east inundated after tropical storm*. Retrieved October 6, 2019, from https://www.straitstimes.com/asia/se-asia/thailands-northeast-inundated-after-tropical-storm

Sørensen, J., Vedeld, T., & Haug, M. (2006). *Natural hazards and disasters: Drawing on the international experiences from disaster reduction in developing countries* [Report]. Retrieved December 13, 2019, from https://www.researchgate.net/publication/242538667_Natural_hazards_and_disasters_Drawing_on_the_international_experiences_from_disaster_reduction_in_developing_countries

Surianto, S., Alim, S., Nindrea, R. D., & Trisnantoro, L. (2019). Regional policy for disaster risk management in developing countries within the Sendai Framework: A systematic review. *Journal of Medical Sciences, 7*(13), 2213-2219. Retrieved January 15, 2020, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6698101/

Techakitteranun, H. (2019, September 16). *Thailand's north-east submerged in floodwater as high as 4 metres, 33 dead*. Retrieved October 26, 2019, from https://www.straitstimes.com/asia/se-asia/thailandsnorth-east-submerged-in-floodwater-as-high-as-4-metres-33-dead

Thomas, V., & López, R. (2015). *Global increase in climate-related disasters*. Manila: Asian Development Bank. Retrieved from November 15, 2019, from https://www.adb.org/sites/default/files/publication/176899/ewp-466.pdf

Tiwari, A. (2015). *The capacity crisis in disaster risk management: Why disaster management capacity remains low in developing countries and what can be done*. Cham: Springer.

Tozier de la Poterie, A., & Baudoin, M. (2015). From Yokohama to Sendai: Approaches to participation in international disaster risk reduction frameworks. *International Journal of Disaster Risk Science, 6*, 128-139. Retrieved March 1, 2020, from https://link.springer.com/content/pdf/10.1007/s13753-015-0053-6.pdf

United Nations. (2005). *Tsunami Thailand one year later*. Retrieved October 25, 2019, from https://reliefweb.int/sites/reliefweb.int/files/resources/89408849FEC99045492570E3001EB6CC-unctttha-tha-22dec.pdf

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. Retrieved October 2, 2019, from https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

United Nations General Assembly. (2016). *Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction*. Retrieved March 6, 2020, from https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf

United Nations Office for Disaster Risk Reduction. (2009). *UNISDR terminology on disaster risk reduction*. Retrieved September 11, 2019, from https://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf

United Nations Office for Disaster Risk Reduction. (2015). *Sendai framework for disaster risk reduction 2015 – 2030*. Retrieved September 4, 2019, from https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf

United Nations Office for Disaster Risk Reduction. (2019). *Strategic approach to capacity development for implementation of the Sendai Framework for Disaster Risk Reduction*. Retrieved September 14, 2019, from https://www.unisdr.org/files/58211_fullconciseguide.pdf

United States Agency for International Development. (2011). *Introduction to disaster risk reduction*. Retrieved September 14, 2019, from https://www.preventionweb.net/files/26081_kp1concepdisasterrisk1.pdf

Voogd, H. (2004). Disaster prevention in urban environments. *European Journal of Spatial Development, 12*, 1-20.

Warfield, C. (n.d.). *The disaster management cycle*. Retrieved September 6, 2019, from https://www.gdrc.org/uem/disasters/1-dm_cycle.html

Water Resources Regional Office 11. (n.d.). *ลุ่มน้ำชี*. Retrieved January 25, 2020, from http://water.dwr.go.th/wrro11/index.php/th/2019-07-23-04-23-51/2019-07-23-04-29-42

Winter, S. C. (2006). Implementation. In B. G. Peters & J. Pierre (Eds.), *Handbook of public policy* (pp. 151-166). Trowbridge: Cromwell Press.

Winter, S. C. (2011). Implementation. In B. Badie, D. Berg-Schlosser & L. Morlino (Eds.), *International encyclopedia of political science volume 1* (pp. 1157-1170). California: SAGE.

Winter, S. C. (2012). Implementation perspectives: Status and reconsideration. In B. G. Peters & J. Pierre (Eds.), *The Sage hand book of public administration* (pp. 131-163). California: SAGE.

Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2003). *At risk: Natural hazards, people's vulnerability and disasters* (2nd ed.). Retrieved March 4, 2020, from https://www.preventionweb.net/files/670_72351.pdf