ASIAN DISASTER REDUCTION CENTER

Visiting Researcher Program

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Final Report

Developing Disaster Risk Reduction Plan in Thailand

ADRC Visiting Researcher

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Chapter 1: Introduction

1.1 Background and Significance

Thailand drive disaster management system by implement the Disaster Prevention and Mitigation Act B.E. 2550 (A.D. 2007) and the National Disaster Risk Management Plan (2021 – 2027) which consolidated disaster risk management and also combined the new thinking and concepts of international and country framework including the Sustainable Development Goals (SDGs), Sendai Framework for Disaster Risk Reduction 2015-2030, Paris Agreement, the National Strategy, and the National Economic and Social Development Plan. That for achieve the vision which is "Thai society has the potential to reduce the existing disaster risk and prevent the new disaster risk efficiently to achieve sustainable safety, stability, and state of disaster resilience of nation.".

1.2 Specific Aims

The aim of the proposed research is to study the disaster risk management and disaster risk reduction plan of Japan which is the important to building the sustainable safety and disaster resilience.

1.3 Expected Results

The expected results are the concept of development the Local Disaster Risk Reduction Plan to prepare people for survive from disaster.

1.4 Scope of study

The research focus on the development the Local Disaster Risk Reduction Plan in Thailand to more practical, efficient, and effective by adapt knowledge and experience from Japan.

Chapter 2: Disaster Management System in Thailand

2.1 General Overview of the Country

2.1.1 Geographical Data

Thailand, officially the Kingdom of Thailand where lies in the heart of Southeast Asia, has a land area of 513,120 sq.km. It is bordered by Myanmar (West & North), Laos (North & East), Cambodia (Southeast), and Malaysia (South). The Thai coastline stretches for 3,219 km along both the Gulf of Thailand on the Pacific side, and the Andaman Sea on the Indian Ocean side. The highest point in Thailand is Doi Inthanon, at 2,565 meters (8,415 feet). The lowest point is the Gulf of Thailand, at sea level. Thailand is divided into four regions; the North, the Central or the Chao Phraya River Basin, the Northeast or the Korat Plateau and the south or the Southern Peninsula. The northern region terrain is mountainous which render this region to be prone to water-related disasters such as flashflood, landslide and debris flow. The northeastern region is an arid area on Korat Plateau and frequently suffers flashflood and inundation during rainy season, severe drought and cold spell during summer and cool season. The central region, the vast fertile land which is dubbed as the "Rice Bowl" of the country often encounters the repeated riverine flood and urban inundation during the rainy season. The southern region terrain is hilly on the west coast and the coastal plain on the east. This part of Thailand has occasionally frequented flashflood, mudslide, tropical storm and forest fire.

Figure 1 : Thailand Map

2.1.2 Climate Information

Thailand's climate is influenced by monsoon winds that have a seasonal character (the southwest and northeast monsoon). The majority of the south as well as the eastern tip of the east have a tropical monsoon climate. Parts of the south also have a tropical rainforest climate.

A year in Thailand is divided into three seasons. The first is the rainy occurs from mid–May to mid–October, which is caused by southwestern wind from the Indian Ocean. Second is winter occurs from mid–October until mid–February. Most of Thailand experiences dry weather with mild temperatures. The last is summer runs from mid–February until mid–May. Due to their inland position and latitude, the north, northeast, central and eastern parts of Thailand experience a long period of warm weather, where temperatures can reach up to 40 °C (104 °F) during March to May, in contrast to close to or below 0 °C (32 °F) in some areas in winter. Southern Thailand is characterized by mild weather year-round with less diurnal and seasonal variations in temperatures due to maritime influences. It receives abundant rainfall, particularly during October to November.

Thailand is among the world's ten countries that are most exposed to climate change. In particular, it is highly vulnerable to rising sea levels and extreme weather events.

2.1.3 Demographic Data

Population Total 66,090,475 (in 2022), about 32.2 million males and 33.8 females. (Department of Provincial Administration, 2023).

The growth rate -0.14 (in 2022), Birth rate 7.6 births/1,000 population, Death rate 9 deaths/ 1,000 population, Life expectancy 77.66 years (male 74.65 years and female 80.83 years), Fertility rate 1.09 children. Thailand become an aged society by 2025. The Fiscal

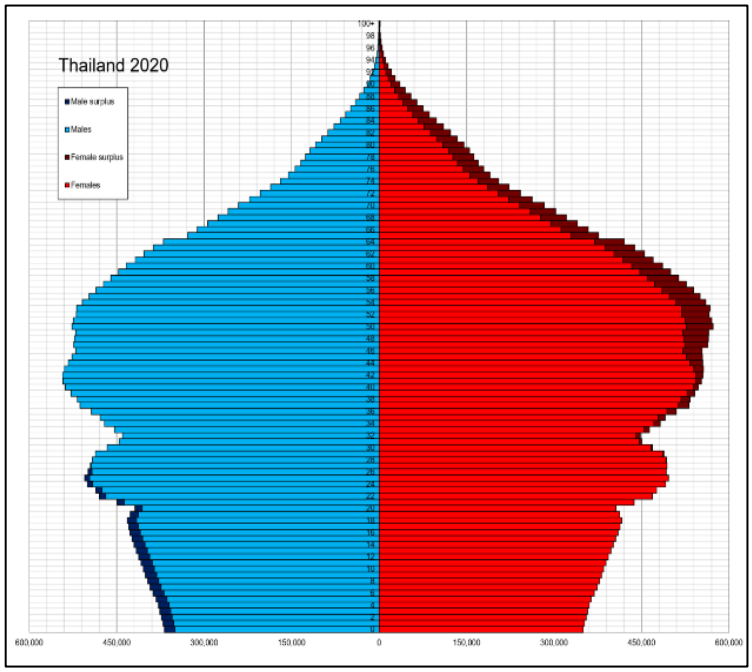

Figure 2 : Thailand's Population between males and females

Policy Office projects that the number of Thais aged 60-plus will increase from 14% in 2016 to 17.5% in 2020, 21.2% in 2025, and 25.2% in 2030 (Bangkok Post 2016).

The national language is Thai. Lao is spoken along the borders with the Lao PDR, Karen languages are spoken along the border with Myanmar, Khmer is spoken near Cambodia and Malay is spoken in the south near Malaysia. Sixty-two 'domestic' languages are officially recognized, and international languages spoken in Thailand, primarily by international workers, expatriates and business people, include Burmese, Karen, English, Chinese, Japanese, and Vietnamese, among others.

The official of religion is Buddhism 93.5%, 5.4% Islam, 1.13% Christianity, 0.02% Hinduism and 0.003% No religion

2.1.4 Administrative Divisions

A hereditary monarch serves as Thailand's head of state. The current King of Thailand is Vajiralongkorn (or Rama X), who has reigned since October 2016.

Thailand's current Prime Minister is Gen. PRAYUT Chan-ocha, was appointed prime minister in August 2014.

The country comprises 76 provinces (changwat, singular and plural) and Bangkok (special administrative area); Amnat Charoen, Ang Thong, Bueng Kan, Buriram, Chachoengsao, Chai Nat, Chaiyaphum, Chanthaburi, Chiang Mai, Chiang Rai, Chon Buri, Chumphon, Kalasin, Kamphaeng Phet, Kanchanaburi, Khon Kaen, Krabi, Lampang, Lamphun, Loei, Lop Buri, Mae Hong Son, Maha Sarakham, Mukdahan, Nakhon Nayok, Nakhon Pathom, Nakhon Phanom, Nakhon Ratchasima, Nakhon Sawan, Nakhon Si Thammarat, Nan, Narathiwat, Nong Bua

Figure 3 : Provinces of Thailand

Lamphu, Nong Khai, Nonthaburi, Pathum Thani, Pattani, Phangnga, Phatthalung, Phayao, Phetchabun, Phetchaburi, Phichit, Phitsanulok, Phra Nakhon Si Ayutthaya, Phrae, Phuket, Prachin Buri, Prachuap Khiri Khan, Ranong, Ratchaburi, Rayong, Roi Et, Sa Kaeo, Sakon Nakhon, Samut Prakan, Samut Sakhon, Samut Songkhram, Sara Buri, Satun, Sing Buri, Sisaket, Songkhla, Sukhothai, Suphan Buri, Surat Thani, Surin, Tak, Trang, Trat, Ubon Ratchathani, Udon Thani, Uthai Thani, Uttaradit, Yala, Yasothon.

The provinces are divided into 878 districts (amphoe), 7,255 rural administrative subdistricts (tambon), 75,086 villages (mooban).

Types of government administrations are the central, provincial and local.

2.2 Disaster in Thailand

Thailand has been affected by a variety of natural disasters whole the year including floods, landslides, drought, earthquakes, tsunamis, heat waves, forest fires, and epidemics, as well as man-made disaster such as industrial accidents and chemical accidents as in the figure 4 which showed Disaster Seasoning in Thailand. However, flooding is the natural hazard with the most significant impact on human life, livelihoods, and the economy for the country. The occurrence of droughts has increased in recent years due to the effects of the El Niño-Southern Oscillation (ENSO) cycle, which brings drier-than-average rainfall conditions. Drought has adversely impacted the country's agriculture sector, which employs around one third of the country's workforce.

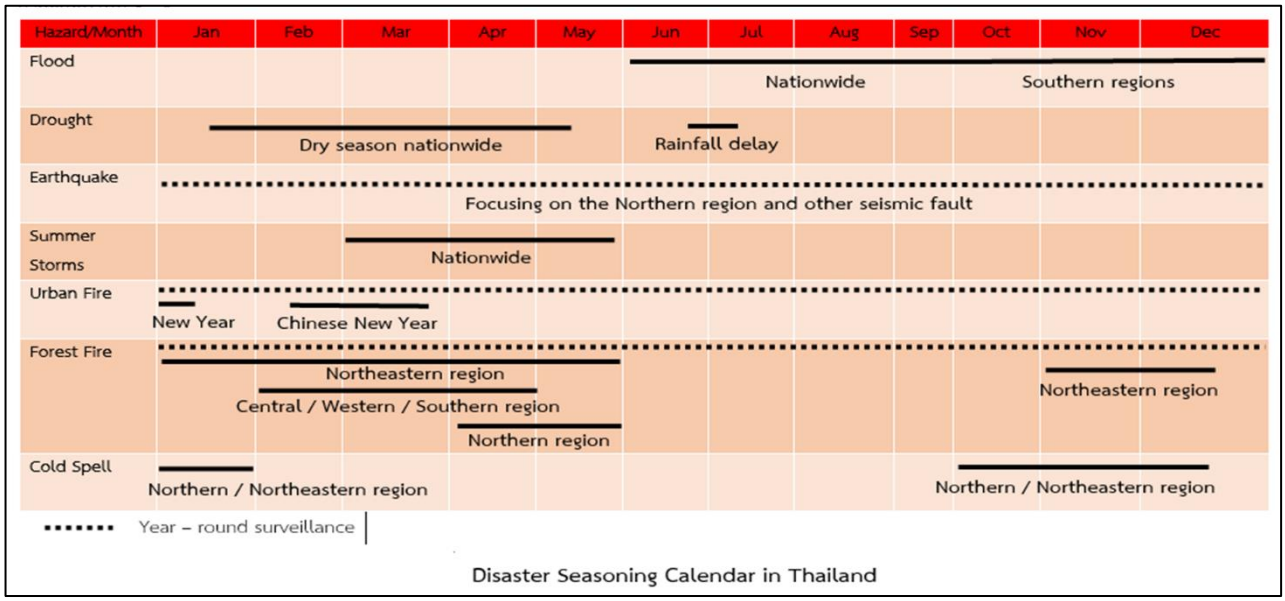

Figure 4 : Disaster Seasoning Calendar in Thailand

To mitigate the impacts of disasters, Thailand's Government has implemented various measures, such as building flood control systems, improving early warning systems, and raising public awareness about disaster preparedness. Nevertheless, the country remains vulnerable to future disasters, and ongoing efforts are needed to reduce the risks and impacts of such event.

2.3 Disaster Risk Management System in Thailand

2.3.1 Disaster Risk Management Principles

Disaster Risk Management Cycle is a theory of disaster risk management for dealing with disaster that is difficult to predict the results. It is a unique and non-linear therefore must be carried out in a circular manner continuously and cannot separate particular parts in each process. As a result, Disaster Risk Management is a Holistic Approach for sustainable safety from prevention and mitigation, preparedness, respond, relief, and recovery. The operation in each period of time, the disaster may have overlapping during the operation depend on the level of disaster.

Figure 5 : **Disaster Risk Management Cycle**

2.3.2 Disaster Risk Management Mechanisms

At Policy Level

1) National Disaster Prevention and Mitigation Committee

This committee has been tasked with the following functions, among others, to formulate national disaster management policy; integrate public – private partnerships for the development of efficient and affective disaster management system, etc.; as stipulated under the provisions of Article 6 and 7 of Disaster Prevention and Mitigation Act B.E. 2550 (2007).

2) National Safety Council

The main functions of this council are, among others, to propose the national safety policy; propose practice guidelines and has a responsibility to undertake inter – agency coordination. The composition and functions of this council have been set out in the Prime Minister's Office Regulation on National Safety B.E. 2538 (1995), and addendum.

3) National Disaster Warning System Management Committee

The main functions of this committee are, stipulate measure, policy, and plan for national disaster warning system management. That propose to be a framework for relevant agencies. The composition and functions of this committee have been set out in the Prime Minister's Office Regulation on National Disaster Warning System Management B.E. 2552 (2009) and addendum B.E. 2562 (2019).

At Operational Level

The government setup the Emergency Operation Center (EOC) which is the center of administration and coordination of relevant agencies in disaster risk management during normal condition and expected to occur disaster. EOC is responsible for the supervision and coordination between various sectors as well as determine the structure, duties and assign various missions to the operational officers. In additional, to create a guideline or operation manual in accordance with the Level of Activation and provide a place and facilities for operations. The organization is in each level, as follows and the figure 6

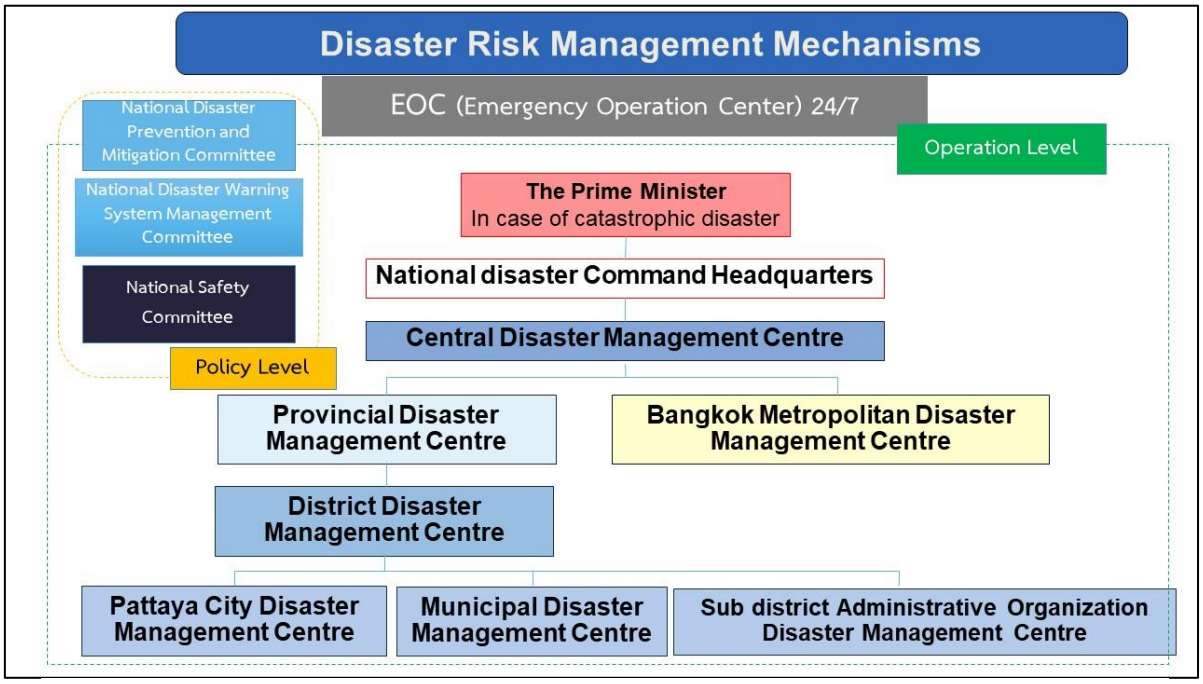

Figure 6 : Disaster Risk Management Mechanisms

1) National Disaster Command Headquarter

As a national command and control facilities this headquarters has responsibilities to direct, oversee, and coordinate the emergency management practices of all lower disaster management centers. The Minister of Ministry of Interior has been designated as the National Incident Commander, and the Permanent Secretary for the Ministry of Interior to be the Deputy National Incident Commander.

In case of large – scale incident management (level 3), the Minister of ministry of Interior will assume the role and responsibility of National Incident Commander, whilst in case of catastrophic incident management, the Prime Minister or the Deputy Prime Minister whom assigned by the Prime Minister will assume the National Incident Commander's role and responsibility.

2) Central Disaster Management Center

Department of Disaster Prevention and Mitigation is required to set up the Central Disaster Management Centre, and the Director – General of this Department has been designated as the Central Incident Commander. Its functions and authority are set forth as follows:

2.1) In a non-emergency situation: coordinates and integrates the emergency response information, resources, and plans of all relevant government agencies in order to ensure the overall state of readiness for handling any type of potential disaster.

2.2) Likelihood of disaster: undertakes full scale preparation for potential response operations, keeps a close watch on the disaster situation, conducts data analysis and rapid situation assessment, disseminates early warning message as well as reporting and providing recommendations to the National Incident Commander as the Prime Minister as the case may be for the purpose of making decisions related to disaster relief and emergency response operations to be jointly conducted by all participating agencies in a coordinated and seamless manner.

2.3) During a disaster: directs, integrates, and coordinates the joint response operations for small – (level 1) and medium scale (level 2) disasters. In this context, the Central Disaster Management Centre is required to take responsibilities for directing, conducting disaster situation assessment and providing technical support and assistance to the National Incident command Headquarters; keeping a close watch on the disaster situation and disseminating early warning massage; and providing information and recommendations to the National Incident Commander for the purpose making any decision on raising the level of the disaster incident to level 3 (large – scale incident), and to the Prime Minister or to the Deputy Prime Minister whom assigned by the Prime Minister in case of the upgrade to level 4.

Nevertheless, the Central Disaster Management Center is required to continue acting as the constituent part of in the Emergency Response Coordination Centre under the National Disaster Command Headquarters in case of the upgrade to level 3 and level 4.

3) Provincial Disaster Management Center

The center has been tasked to direct, control, provide support for and coordinate disaster risk management efforts within the respective provincial jurisdiction. In this connection, the provincial governor has been designated as the Provincial Incident Commander, the vice – provincial governor whom assigned by the provincial governor and chairman of the provincial administrative organization have been designated as Deputy Provincial Incident Commanders.

4) District Disaster Management Center

As a district command and control center, it has been tasked to direct, provide support for and coordinate disaster management efforts of local administrative organizations located in its jurisdiction, as well as performing any function as assigned by the provincial governor or by the Provincial Disaster Management Centre. The chief district officer has been designated as the District Incident Commander.

5) Municipal Disaster Management Center

As a municipal command and control center, it has been tasked to direct, provide support for, and coordinate disaster management efforts of the respective municipality as well as functioning as emergency response unit during an actual disaster, along with developing the

Municipal Disaster Risk Management Action Plan in line with the Provincial Disaster Risk Management Plan and the District Disaster Management Plan. In addition, this center has been tasked to provide support and assistance to the Provincial Incident Commander and the District Incident commander as being assigned, including provision of assistance and support to the neighboring or adjacent local administrative organizations related to the implementation of disaster risk management activities upon their requests. The municipal mayor has been designated as a Local government Incident Commander.

6) Sub District Administrative Organization Disaster Management Center

As a sub district administrative organization command and control center, it has been tasked to direct, provide support for, and coordinate disaster risk management efforts of the respective sub – district as well as functioning as emergency response unit during an actual disaster, along with developing the Subdistrict Disaster Risk Management Action Plan in line with the Provincial Disaster Risk Management Plan and the District Disaster Management Plan. In addition, this Centre has been tasked to provide support and assistance to the neighboring or adjacent local administrative organizations related to the implementation of disaster management activities upon their requests. The chairman of subdistrict administrative organization has been designated as the Local government Incident Commander.

7) Bangkok Metropolitan Disaster Management Center

This center has been tasked to direct, control, and coordinate disaster risk management efforts within its jurisdiction; to develop action plan based on its vulnerability and exposure to specific hazards in line with the Bangkok Metropolitan Disaster Risk Management Plan; as well as providing technical assistance support for implementation of disaster risk management activities and functioning as emergency response unit when actual disasters occur within its jurisdiction. The governor of Bangkok Metropolitan Administration, as the Bangkok Metropolitan Incident Commander has been tasked to perform duties and responsibilities as stipulated in item (3) of Disaster Prevention and Mitigation Act B.E. 2550 (2007). All this, the administrative component as well as duties and responsibilities of this center will be subject to the governor of Bangkok Metropolitan Administration approval.

8) Pattaya City Disaster Management Center

As Pattaya City command and control center, it has been tasked to direct, provide support for, and coordinate disaster management efforts of Pattaya City as well as functioning as emergency response unit during an actual disaster, along with developing Pattaya City Disaster Management Action Plan in line with the Provincial Disaster Risk Management Plan and the District Disaster Risk Management Plan. In addition, this Centre has been tasked to provide support and assistance to the Provincial Incident Commander and the District Incident Commander as being assigned, including provision of assistance and support to the neighboring or adjacent local administrative organizations related to the implementation of disaster management activities upon their requests. The mayor of Pattaya City has been designated as the Local Government Incident Commander.

2.3.3 Role and Function for Collaborative DRM

The agencies of the ministries and the relevant primary agencies have been assigned specific roles and responsibilities relating to disaster risk management to perform in an integrated and coordinated manner including 28 ministries and organizations.

Department of Disaster Prevention and Mitigation (DDPM) is the lead agency at the central level designed to deal with whole spectrum of disaster risk management activities as stipulated under Article 11 of Disaster Prevention and Mitigation Act B.E. 2550 (2007). Its primary duties and responsibilities encompass the following:

1) To develop and submit the National Disaster Risk Management Plan to the National Disaster Prevention and Mitigation Committee to seek further Cabinet approval.

2) To encourage and arrange for the conduct of research and development to identify the measures for enhancing efficiency of disaster risk management practices.

3) To implement disaster management activities, coordinate operational efforts with, and provide support and assistance to relevant state agencies, local administrative organizations as well as private sector partners in relation to disaster risk management.

4) To provide immediate disaster relief assistance to people have been harmed or affected by disasters.

5) To provide advices and consultation as well as training on disaster risk management to state agencies, local administrative organizations, and private sector partners.

6) To monitor, inspect, and evaluate the implementation of the National Disaster Risk Management Plan.

2.3.4 Laws and Regulations

The Disaster Prevention and Mitigation Act B.E. 2550 (2007) has served as the principal legal mechanism for disaster risk management practices in Thailand. The Act stipulate the National Risk Disaster Management Plan which is on the basic of global and national framework such as Sustainable Development Goals, Sendai Framework for Disaster Risk Reduction 2015 – 2030, Paris Agreement, National Strategy 2018 – 2037, and The National Economic and Social Development Plan. In addition, there are other relevant law/regulation/notification/directive from other ministries to combine for disaster risk management.

Chapter 3: Disaster Risk Management Plan in Japan and Thailand

3.1 Disaster Risk Management Plan in Japan

Disaster Countermeasures Laws and Acts in Japan which is **The Basic Act on Disaster Management**. The Basic Act outlines the government's responsibilities and procedures for responding to and managing natural disasters and addresses all of the disaster phases of prevention, mitigation and preparedness, emergency response as well as recovery and reconstruction with roles and responsibilities among the national and local governments clearly defined. It also requires the establishment of a Disaster Management Council, which is responsible for coordinating disaster response efforts.

Figure 7 : Outline of the Basic Act on Disaster Management

Disaster Management Planning System in Japan consists with plan 5 levels as the figure 8 including

1. Basic Disaster Management Plan: This plan is the highest-level plan and constitutes the basis for disaster management activities prepared by the National Disaster Management Council based on the Disaster Countermeasures Basic Act.

2. Disaster Management Operation Plan: This is a plan made by each designated government organization and designated public corporation based on the Basic Disaster Management Plan.

3. Prefectural Disaster Management Plan: This is a plan made by each Prefectural, subject to local circumstances and based on the Basic Disaster Management Plan.

4. Municipal Disaster Management Plan: This is plan made by Municipal Disaster Management Council, subject to local circumstances and based on the Basic Disaster Management Plan.

5. Community Disaster Management Plan: This is disaster management activities plan at the community level which is established by residents and businesses jointly on a voluntary basis.

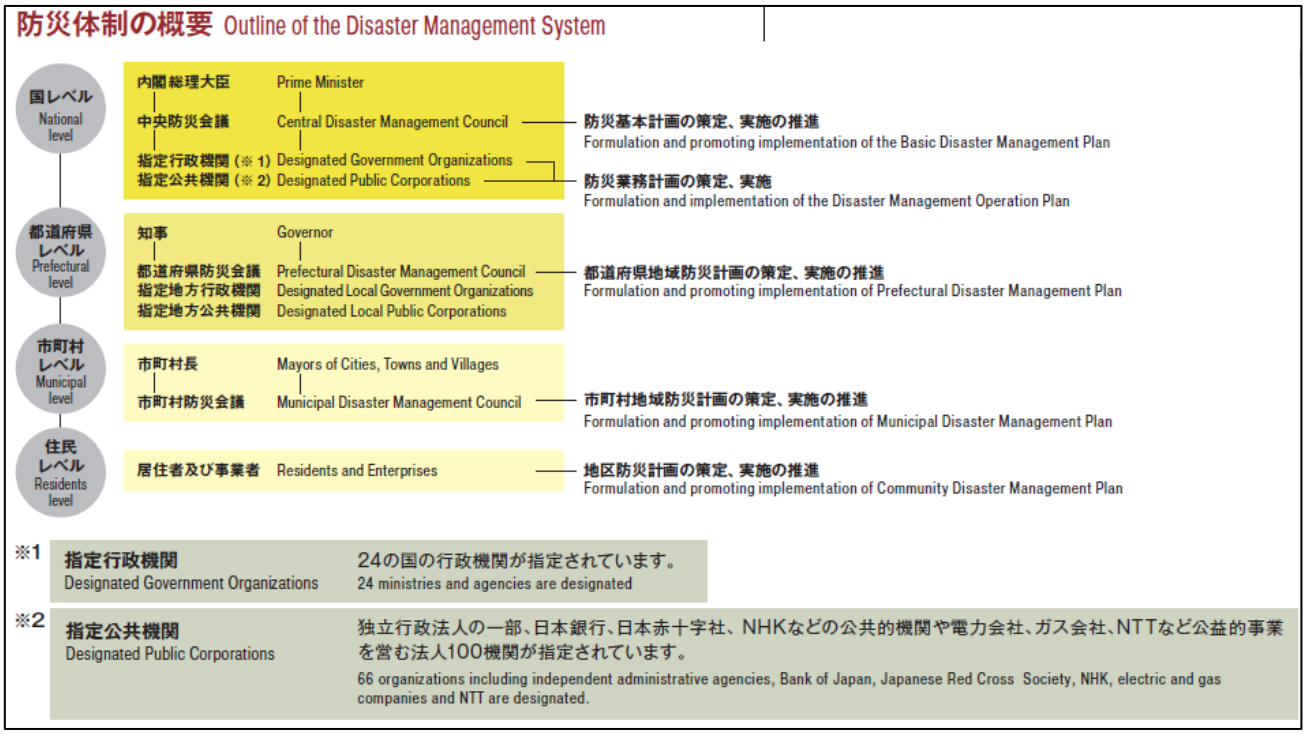

Figure 8 : Outline of the Disaster Management System

The Basic Disaster Management Plan is the master plan and basis Disaster Risk Management activities in Japan and forming a foundation for the Disaster Management Operations Plan and Local Disaster Management Plan. The Basic Management Plan is prepared by the National Disaster Management Council in accordance with Article 34, Paragraph 1 of the Basic Act on Disaster Management, and "must be reviewed each year in the light of the findings of scientific research pertaining to disasters and disaster management, conditions of disasters that have occurred, and the effect of emergency disaster control measures taken against the disasters, and… when found necessary," the Council is to revise it. Since its establishment in 1963, this plan has been reviewed every year based on the Basic Act on Disaster Management and revised when deemed necessary. Therefore, the plan was revised entirely in 1995 based on the experiences of the Great Hanshin-Awaji Earthquake. It defines responsibilities of each entity such as the national and local governments, public corporations and other entities. It consists of various plans for each type of disaster, where specific countermeasures to be taken by each entity are described according to the disaster management phases of prevention and preparedness, emergency response, as well as recovery and reconstruction. Further, based on the lessons learned from the Great East Japan Earthquake, a new chapter was created in December 2011, for Tsunami Disaster Countermeasures. In recent years, lessons from disaster responses and developments in measures as well as responses to the COVID-19 have been taken into account for the revisions.

As the Figure 9, the Basic Disaster Management Plan was revised in May 2021 based on the amendment of the Basic Act on Disaster Management. There are 4 major revisions, First, a review of the Major Disaster Management Headquarters such as the rule to designate the Prime Minister as its Chief. Second, creation of individual evacuation plans for smooth and prompt evacuation of municipalities. Third, integration of evacuation recommendation and evacuation instruction into a single evacuation instruction. Last, matters related to wide-area evacuation such as conclude support agreement with other municipalities in case of large-scale and wide-area disaster. Moreover, there are other revisions based on recent Policy Developments such as promote digitalization of disaster response operations, ensure smooth evacuation of person requiring special care by utilizing welfare shelters, and promote disaster prevention efforts in advance and response to complex disaster.

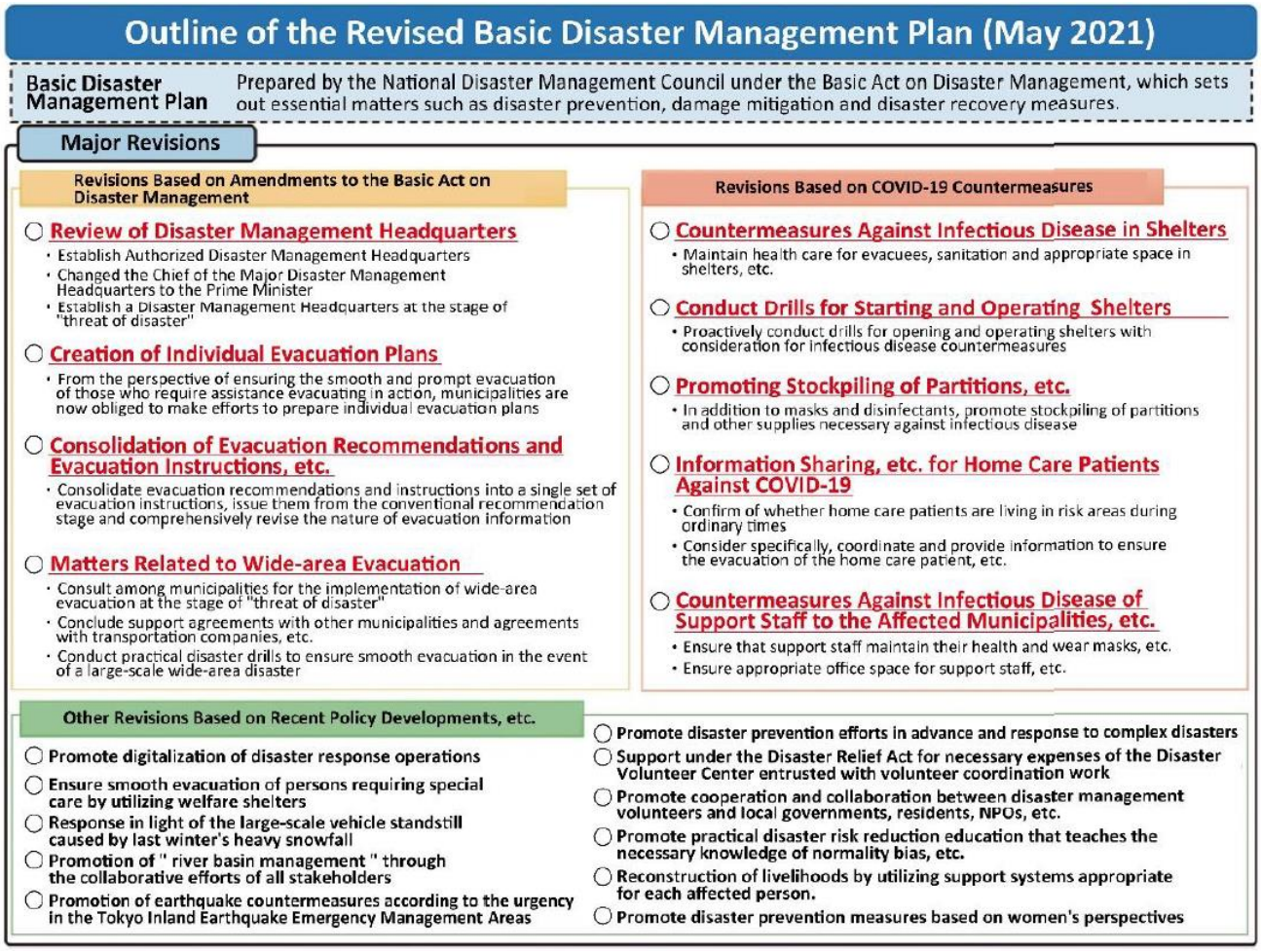

Figure 9 : Outline of the Revised Basic Disaster Management Plan (May 2021)

Prefecture Plan on Disaster Risk Reduction is a comprehensive disaster risk reduction plan that is developed by each of Japan's 47 prefectures, with the aim of reducing the risk and impact of natural disasters in their respective regions. The plan includes measures to enhance disaster prevention and mitigation, improve disaster response and recovery, and promote community-based disaster risk reduction.

The Prefecture Plan typically includes the following elements:

- Risk Assessment: A detailed analysis of the potential risks in the prefecture, including the probability and potential impact of various types of natural disasters.

- Disaster Prevention and Mitigation: This involves measures to reduce the risk of natural disasters occurring, such as reinforcing infrastructure, building seawalls, and promoting land-use policies that are less prone to disaster.

- Disaster Response and Recovery: This includes measures to ensure that emergency responders are prepared to respond to disasters quickly and effectively, such as training exercises, developing evacuation plans, and stockpiling emergency supplies.

- Community-Based Disaster Risk Reduction: This involves working with local communities to raise awareness about the risks of natural disasters and promoting measures that can be taken at the community level to reduce the impact of disasters.

The Prefecture Plan is updated regularly, or when disaster happen to ensure that it remains up to date with the latest risks and developments in disaster risk reduction technology and strategies. It is an essential tool in Japan's efforts to reduce the impact of natural disasters and to build a more resilient society.

For example, the Hyogo Prefecture Regional Disaster Management Plan has the purpose to promote comprehensive and systematic disaster management and to protect the live, bodies and property of the citizens from disaster. This plan developed based on the four concepts as following:

1) Promoting disaster mitigation measures.
2) Promoting DRR through the combined efforts of self-help, mutual aid and public assistance.
3) Establishing a new disaster culture which is passing on the experiences of damage and recovery and reconstruction from past disaster, such as the Great Hanshin-Awaji Earthquake, take lesson learned from them, and conduce to methods of DRR in local communities.
4) Promoting DRR by the collaboration across stakeholder.

The Hyogo Prefecture Regional Disaster Management Plan also emphasis on the important issues such as strengthening disaster readiness, rapid supply of goods and dispatch of personal to affected areas, smooth and safe evacuation, victim support system, cooperation with private sector in normal time, and smooth and rapid recovery.

The structure of the Hyogo Prefecture Regional Disaster Management Plan including: General Provision, Disaster Prevention Plan, Disaster Emergency Response Plan, and Disaster Recovery Plan.

Community Disaster Management Plan: In order to encourage and promote proactive disaster management activities among residents (including both individual and corporate residents) in a given area based on the spirit of self-help and mutual help, and to enhance the disaster management capabilities of the area in a bottoms-up manner, it is stipulated that a community disaster management plan, featuring the community level disaster management activities, may be prescribed in the municipal disaster management plan. In developing a community disaster management plan, more active and proactive participation of the area residents is necessary at an early stage of such development. As such, it is stipulated that the area residents may jointly make a proposal (proposed plan) to the municipal disaster management council that a community disaster management plan be stipulated in the municipal disaster management plan. Thus far, the plans reflected in the community disaster management plans are that of 37 prefectures, 140 municipalities and 2,030 communities, and the actions for developing the Community Disaster Management Plans have been taken in 5,181 communities from 310 municipalities, in 47 prefectures. (as of April 1, 2021).

3.2 Disaster Risk Management Plan in Thailand

As the Disaster Prevention and Mitigation Act B.E. 2550 [A.D. 2007] Section 44 “In case of any changes of disaster prevention and mitigation facts as specified in disaster prevention and mitigation plans under this act, or if those plans have been used for five years. Those responsible persons who oversee the formulating of plan shall have to revise or review that plan rapidly.”. The National Disaster Risk Management Plan 2015 has been used complete it’s period, so the National Disaster Prevention and Mitigation Committee work on to revise the new plan. The plan has been completely revised and the cabinet has approved the National Disaster Risk Management Plan 2021 – 2027 on 5 July 2022.

National Disaster Risk Management Plan 2021 – 2027 has the purpose to be a concept of operation in handing national disaster management actions for all relevant agencies. The Plan consolidated the National Strategy, the National Economic and Social Development Plan, Disaster Risk Management Framework as SMART DRM for 3s : SEP – SDGs – SFDRR which is Sufficiency Economy Philosophy, Sustainable Development Goals and Sendai Framework for Disaster Risk Reduction 2015 – 2030 that for achieve the vision which is “Thai society has the

potential to reduce the existing disaster risk and prevent the new disaster risk efficiently to achieve sustainable safety, stability, and state of disaster resilience of nation.”. The plan consists of two parts; effective disaster risk reduction and standardized disaster management with an important goal to drive the management of country meet the standard and ready for emergency situations.

National Disaster Risk Management Plan 2015

National Disaster Risk Management Plan 2021 – 2027

Figure 10 : Thailand’s National Disaster Risk Management Plan

First part of the National Plan consists with 3 strategies including emphasize on disaster risk reduction, enhancing efficiency of disaster risk management system and implement of technology and innovative approaches in disaster risk management, and promoting international partnership in disaster risk management.

Another part of the National Plan consists with 2 strategies including integrated emergency management and improving the efficiency for sustainable recovery.

The Plan will serve as a tool for reducing the impact of disaster, realizing disaster risk management standards in every community as well as for further integrating disaster risk reduction thinking and methods into the national sustainable development process. In addition, the Plan is a master plan for provinces and districts to develop the Provincial/

District Disaster Risk Management Plans, as well as Provincial/District Multi-Hazard Specific Action Plans on Disaster Risk Management for the purpose of directing, coordinating, and providing support for disaster management efforts of the local administrative organization.

There are **Provincial Disaster Risk Management Plans** in 76 Provinces and Bangkok Metropolitan Disaster Risk Management Plan. These plans aim to reduce the risk of disasters and their impact on communities by identifying and assessing potential hazards, outlining prevention and mitigation strategies, and establishing response and recovery protocols.

The Provincial Plan are developed and implemented by the Provincial Disaster Prevention and Mitigation Offices in collaboration with other relevant agencies and stakeholders, including local government units, civil society organizations, and the private sector.

Each Provincial Plan typically includes the following components:

- Hazard and Risk Assessment: This involves identifying the types of hazards that may occur in the province and assessing their likelihood and potential impact.

- Prevention and Mitigation measures: This section outlines the strategies and measures that will be put in place to reduce the risk of disasters, including measures to strengthen infrastructure, land use planning, and early warning systems.

- Emergency Response and Preparedness: This section outlines the protocols and procedures for responding to disasters, including the roles and responsibilities of different agencies and stakeholders, evacuation plans, and search and rescue operations.

- Recovery and Rehabilitation: This section outlines the measures that will be taken to restore essential services, infrastructure, and livelihoods in the aftermath of a disaster.

- Budget and Resource allocation: This section outlines the funding and resources required to implement the Provincial Plan, including the allocation of resources to different agencies and stakeholders.

The Provincial Plan are updated and reviewed every year to ensure their information is up-to-date and promptly use in each province.

For example, the draft of Provincial Disaster Risk Management Plan for the latest revised of National Disaster Risk Management Plan consist with seven chapters as the following:

Chapter 1 - General principle including summary of the National Disaster Risk Management Plan and Disaster Risk Management Principle.

Chapter 2 – Disaster Situation and Trend in the province including the general information, disaster statistic and disaster seasoning calenda of the province.

Chapter 3 – Disaster Risk Reduction measure including risk assessment and DRR measure.

Chapter 4 – Preparedness including preparing equipment and human resources, preparing evacuation, disaster warning, preparing evacuation center, emergency response exercise, and collaborate all stakeholder.

Chapter 5 – Emergency Management including emergency response and relief.

Chapter 6 – Disaster Recovery including rehabilitation and doing the lesson learn.

Chapter 7 – Implementation including monitoring and evaluation.

Chapter 4: Key findings and Recommendations

There are some challenges for developing Local DRR Plan in Thailand. The example as the following:

- Some planning staffs in local office are not really understanding about DRR and how to do the Local DRR Plan.
- Do not have the lecture or guideline on how to do the Local DRR Plan for Local staffs.
- Do not know the different of National DRR Plan and Local DRR Plan.
- Local Staffs get the draft document which explains Local DRR Plan, what topic should include in each chapter and also a very short brief on it.
- Stakeholders' knowledge is difference that might rely on their main responsibility task.

According to the lecture on 8 steps Practical Method for Developing Local DRR Strategies/Plans toward the achievement on the Global Target of the Sendai Framework for DRR that mentions about the practical Local DRR Plan should as the following:

- The National Governments should monitor the process on formulation of Local DRR Plans carefully to avoid simple replications of a template plan. Local contexts are different such as urban and rural, socio-economic situations, types and distribution of hazards, land use, governance, finance, etc.

- The Local DRR Plan should provide experiences and lessons learned to establish a tailor-made method for disseminate useful knowledge to other areas effectively.

- A process that uses for make a trail development of a Local DRR Plan is "8 steps" which is the practical and feasible method to develop a local disaster risk reduction (DRR) strategy/ plan with concrete measures for investment.

- The 8 steps enable leaders and planners of local governments especially in high-risk areas, to formulate or improve their local DRR plans to promote investment and the steady implementation of measures to reduce residual risks.

The most recommendation for the solution to make the Local DRR Plan is more practical is apply "the 8 steps" that will help the relevant staffs and agencies to under the planning process for DRR Local Plan step by step.

The 8 steps for Local DRR Plan explain as the following;

Step 1: Collecting local hazard information

- The first step is to identify the potential hazards that could impact the community, including natural hazards and human-made hazards such. That because when hazard and exposure marge, it is considered as a "risk" which is the purpose of Local DRR Plan.

- Refer to hazard information prepared by national or higher authorities.

- In case of insufficient hazard information, utilize historical disaster records instead, for efficiency in term of time and budget.

Step 2: Understanding local disaster risks

- Find out the critical condition areas such as people, public buildings, critical infrastructure, and health and welfare facilities. It should identify and prioritize risks which has large scale impact.

- Using Land use map to check where people live and where critical infrastructures are located.

- Using City development plan and its progress report to see possible future risks.

Step 3: Confirming DRR plans by national and other authorities

- Confirming on other existing plans or future plans to reduce the identified risk areas.

- Refer to urban plans and DRR plans developed by national governments and confirm the main structural measures in each disaster types.

Step 4: Identifying residual risks considering time-scale

- Identify remaining risk after/during planned measures are implemented.

- Identify the change in remain risks corresponding to time-series.

- Understanding the remain risks and optimizing future planning and identifying priority actions.

Step 5: Listing all necessary DRR measures by local government

- List up possible measures for mitigation and preparedness which including short-term, midterm and long-term measures and both structural and non-structural measures.

- Refer to other related plans by local governments to compile into a Local DRR Plans.

Step 6: Prioritizing DRR measures

- Carefully thinking about measure which is the most holistically effective by develop a shortlist to reduce remain risks in consideration of feasibility, cost-effectiveness, financial resources, etc.

- Seek the best balance of structural and non-structural measures.

- Obtain consensus with stakeholders and government endorsement of the developed plans.

- Which are the next critical measures to reduce risks?

- How can these measures be actually implemented?

Step 7: Arranging budget allocation in necessary level

- Find a strategy for prioritized measures to be implemented.

- Identify responsible organization to bear the expenses of implementation. In case of lack of budget, actions are necessary to seek for internal or external funds.

Step 8: Implementing DRR measures and reviewing periodically

- Local government need to understand the implementation approach, such as processes and systems for implementing developed plans, progress monitoring, revision methods of plans, consider the system for implementation, monitoring, and plan revision.

- In many countries established a council to coordinate disaster risk reduction between stakeholders in the implementation system. It is necessary to clarify the authority, members, and management system of the council.

- It is necessary to share the process for implementation with all organizations involved in the plan, and implement the plan in a cooperative and coordinated manner.

- Monitoring is a mechanism for checking the progress of the plan, identifying the causes of any delays in progress, and improving implementation approach.

- Review is an approach to determine whether the current plan is appropriate. For that, examine the assumptions established at the beginning of the plan development and various changes in circumstances surrounding the plan. Since the circumstances surrounding the plan usually change over time, it is necessary to conduct periodic reviews at appropriate intervals. In addition, when a major disaster occurs or when new issues are identified, make revisions and amendments flexibly and promptly.

In addition, to learn from experiences of Japan on disaster risk reduction will assist local to know what they should to plan for DRR. The one of good examples is Ohkouzu watershed and diversion channel. The Ohkouzu watershed is an artificial river created to protect the Echigo Plain in 1922. The Ohkouzu watershed is created as a derivative of the Shinano River. The Shinano River is a river that flows across Niigata Prefecture and Nagano Prefecture, with a total length of 367 km and an annual volume of 15.3 billion. The Echigo Plain was surrounded by the mountains and the sand dunes on the Sea of Japan side, and once the Shinano River overflows, the flood water lost its destination and drifts across the Echigo Plain. Due to repeated floods of the Shinano River had caused devastating damage to the Echigo Plain, not only robbing people's homes and forced them to take shelter on the water, but also caused dysentery and other diseases that claimed a lot of precious lives. The Ohkouzu watershed was created to eliminate this damage. With the repeated petition activities for the measures and budget allocation, as well as overcoming many difficulties in construction work for cutting mountains, the Ohkouzu Diversion Channel was finally opened. It has the role of protecting the Echigo Plain from flood damage by letting some of the Shinano River flow into the Sea of Japan before it enters the Echigo Plain. In addition, in order to adjust the amount of water flowing into each river, a movable weir was built in the Ohkouzu diversion channel, and a wash weir was built in the main Shinano river. The Ohkouzu watershed irrigates the Echigo Plain and continues to protect it from flood damage.

Figure 11 : Whole View of Ohkouzu Diversion Channel

The Echigo Plain receives various benefits from the Ohkouzu diversion channel. In particular, rice cultivation, transportation, and land use have developed. Due to the passage of water through the Ohkouzu Diversion Channel, the water level in the lower reaches of the Shinano River has decreased and drainage has improved. In addition, flood control safety in the lower Shinano River basin has improved dramatically. Along with this, the arable land along the Shinano River was reborn as one of the most beautiful fields in Japan, highways and bullet trains were built, and residential land was developed. The Ohkouzu watershed was the cornerstone of the development of the Echigo Plain and continues to support people's lives today.

Due to aging, the wash weir was rebuilt in 2002 and the movable weir was rebuilt in 2014. Since 2019, the Ohkouzu Diversion Channel Repair Project began, and improvement works are still ongoing to respond to the increased flood risks due to the climate change.

Chapter 5: Conclusion

Thailand is rated as the medium risk country and ranked 75th out of 191 countries from Country Report 2023 based on risk assessment of Index for Risk Management (INFORM) Platform. There are National Policy Framework to deal with risk disaster as the Disaster Prevention and Mitigation Act B.E. 2550 (2007) provide legal framework for DRR which is National Disaster Risk Management Plan (2021 – 2027). The National Plan describes a concept of operation to guide DRM operationalization across level and sectors and emphasize on enhancing DRM capacity, effective and integrated crisis management system, adaptation of innovation and technology in DRM, efficiency of recovery system and promoting with multi agency and multi sectoral approached as well as strengthening international cooperation. The National Plan is a master plan for provinces and districts to develop the Provincial/ District Disaster Risk Management Plans which aim to reduce the risk of disasters and their impact on communities by identifying and assessing potential hazards, outlining prevention and mitigation strategies, and establishing response and recovery protocols.

There are some challenges of developing Local DRR Plans in Thailand such as DRR understanding and knowledge, Local DRR Plan guideline, and difference understanding on DRR of stakeholders. Therefore, to develop the local DRR plan need to understand the Basic disaster risk reduction principle to all level of planning staffs and also all the relevant agencies who is a member of planning committee and person in charge of disaster risk reduction. Then, it should adapt 8 steps to develop local DRR plans step by step including 1) Conducting a risk assessment to identify hazards and vulnerabilities, 2) Identifying and prioritizing local disaster risk, 3) identifying stakeholders who will be involved in the plan, 4) Identifying residual risk considering time-series, 5) Listing all necessary DRR measures by local governments, 6) Prioritizing DRR measures, 7) Establishing a budget for the DRR plan, and 8) Implementing DRR measures and reviewing periodically. The 8 steps help to create a comprehensive plan to reduce the impact of disasters, enhance the resilience of the community, and improve response capacity.

In addition, learning from experience of Japan is also a good way that local assist in develop local DRR plan, for example, Okozu watershed and diversion channel which reduce risk from Flood damage. The process and lesson learn will strengthen local DRR plan is more practical, efficient, and effective with knowledge and experience.

References

Cabinet Office, Government of Japan. (2021). *Disaster Management in Japan*. Tokyo, Japan: Director General for Disaster Management of Japan.

Cabinet Office, Government of Japan. (2022). *White Paper Disaster Management in Japan*. Japan: Cabinet Office, Government of Japan.

DDPM. (2011). *The Disaster Prevention and Mitigation Act B.E. 2550 (2007) and relevant supportive legislations.* Bangkok: Department of Disaster Prevention and Mitigation.

DDPM. (2015). *National Disaster Risk Management Plan.* Bangkok: Department of Disaster Prevention and Mitigation.

DDPM. (2022). National Disaster Risk Management Plan 2021 - 2027. Bangkok: Department of Disaster Prevention and mitigation.

Department of Provincial Administration (2023). Administrative Information. Available from : https://www.dopa.go.th/main/web_index

INFORM RISK (2023). Country Report 2023 - Scores. Available from: https://web.jrc.ec.europa.eu/ dashboard/INFORMRISKCOUNTRYPROFILE2023/?no-header=1&v-vISO3=THA&no-scroll=1

Hyogo Prefecture Disaster Prevention Council (2022). *Hyogo Prefecture Regional Disaster Management Plan (Wind and flood damage countermeasures plan)*. Japan.

Japan International Cooperation Agency. *8 STEPS Practical Method for Developing Local DRR Strategies/Plans*. Disaster Risk Reduction Group, Global Environment Department, Japan International Cooperation Agency.

Kamito City Disaster Prevention Council (2022). *Kobe City Regional Disaster Prevention Plan Common Edition*. Kobe Japan.

ShinanoRiver Ohkouzu Meseum (2023). Available from: https://www.hrr.mlit.go.jp/ shinano/ohkouzu/museum.html