

# INTRODUCTION

## I.1 Background

Due to their climatic environment and geological property, disaster risk in ASEAN area is high and it bring number of disasters to ASEAN countries. Approximately 90% of victims of natural disasters are from Asia according in accumulated total of the record from 1984 to 2013.

According to the study conducted by Swiss Re<sup>1</sup>, Asia's metropolitan cities are most at risk from natural hazards. Based on their population exposure to five natural hazards of river flood, earthquake, tsunami, wind storm, and storm surge combined, the top five riskiest conurbations are all in East and Southeast Asia. While at the same time, today, more people move and live in cities from rural areas. By 2050, it is expected that 68 percent of the world's population would live in urban areas. This unprecedented growth of cities, particularly in countries in the ASEAN region cause problems of resource management and land use management and poses a huge challenge to disaster risk management and sustainable development.

Not only being key drivers of economic growth and political, social, and cultural hubs for its own countries, but cities are highly interconnected to the global economic system. When disasters strike such economic centers, the ripple effects can be felt for thousands of miles and years to come. In fact, Great East-Japan Earthquake in Japan Chao Phraya river great flood in Thailand both occurred in 2011 have brought not only human and economic damages but furthermore, the disasters have impacted the regional and world economy by affecting the supply chain. Under the globalization trends in modern society, once a city is hit by a disaster, it causes not only human casualties but also impacts the national, regional and, to some extent, the global economy.

Hence, building urban resilience to disaster and climate risks has become an important issue in ASEAN region, and ASEAN Committee on Disaster Management (ACDM) and ASEAN counties have been addressing disaster risk reduction in regional level

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<sup>1</sup> Sundermann, L., Schelske, O., and Hausmann, P. 2013 Mind the Risk. Zurich: Swiss Re.

## I.2 Outline of the Project

### (1) Goal and Objectives

Based on Concept Note 18 (CN 18) “Building Disaster and Climate Changes in ASEAN Cities” of AADMER Work Programme Phase 2 under ACDM Working Group on Prevention and Mitigation, this project will develop the implementation framework for CN 18. Overall, this project aims to increase the resilience of ASEAN cities to disasters through the following:

- 1) Establishment of a cross-sectoral collaboration mechanism at the regional level to facilitate partnerships among stakeholders in urban development planning and disaster risk reduction and climate risk management;
- 2) Integration of disaster risk reduction and climate change adaptation measures in urban development, land use planning processes, and building regulations; and
- 3) Improvement of the capacities of ASEAN Member States to assess urban risk and implement urban disaster and climate risk management policies and measures.

### (2) Expected Outputs

**Output 1:** Establishment of a regional cross-sectoral collaboration mechanism and formation of partnerships to increase urban resilience in ASEAN;

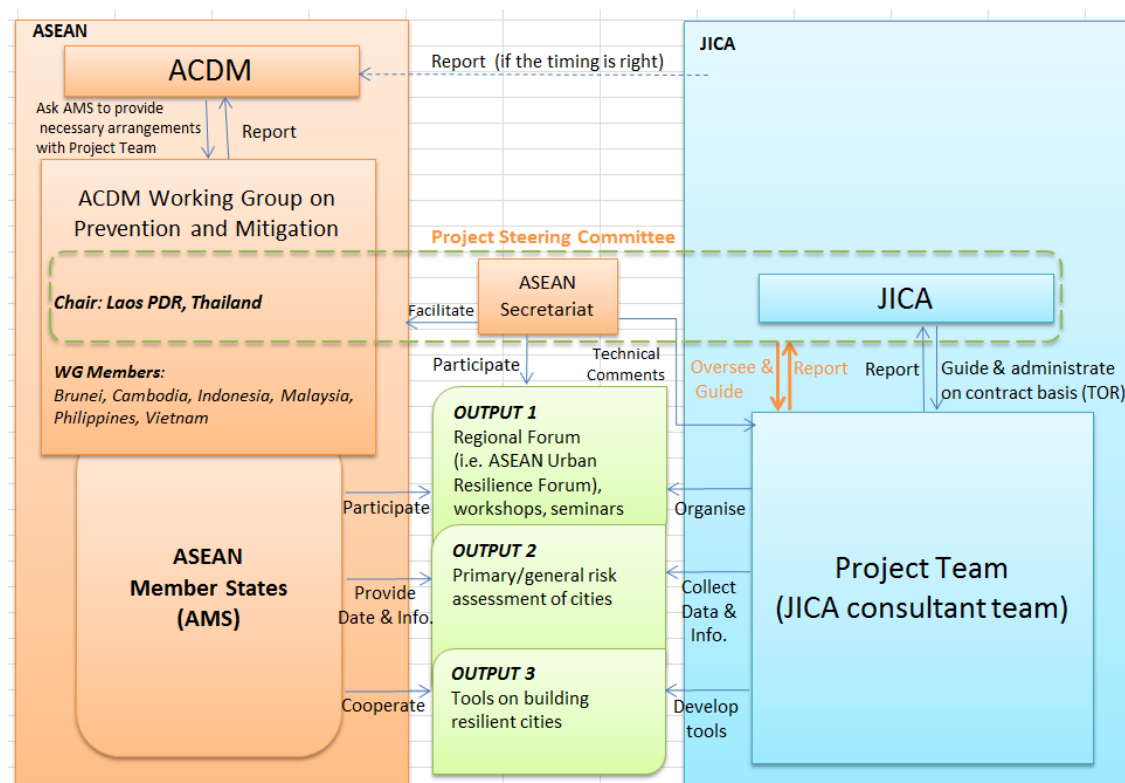
**Output 2:** Evaluation of candidate cities, indicator development for city resilient and commitment and partnership building for the demonstration project on risk assessment of priority cities in ASEAN Member States ; and

**Output 3:** Development of tools on building resilient cities in ASEAN

### (3) Project Area: ASEAN counties (10 member states)

### (4) Management Structure

The management structure of the project is as shown in Figure I.2.1. ACDM, each AMS, ASEAN Secretariat, AHA Centre, and the Project Team (JICA consultant Team) are the stakeholders of the project. The roles of main stakeholders of the project are summarized in Table I.2.1.



Source: Minutes of Meetings on the 1st Meeting of the Project Steering Committee Members for “Building Disaster and Climate Resilient Cities in ASEAN”

**Figure I.2.1 Management Structure of the Project**

**Table I.2.1 Roles of the Relevant Bodies in the Project**

Organization	Roles
The ASEAN Committee on Disaster Management (ACDM)	<ul style="list-style-type: none"> <li>• Overseeing the project (i.e. JICA will report on the progress and result of the project )</li> <li>• Supporting the project team to implement the project by asking member states to give the team necessary arrangements such as for gathering and providing information, gathering participants to any type of meetings, etc. within the responsibility of ACDM ,ASEAN Secretariat or ASEAN Member States</li> <li>• Suggesting the utilization or application of the result of the project to the member states</li> </ul>
Project Steering Committee	<ul style="list-style-type: none"> <li>• Overseeing and providing guidance to the implementation and management of the proposed project on behalf of the ACDM Working Group.</li> <li>• Co-chairs of the ACDM Working Group on Prevention and Mitigation (Lao PDR and Thailand), ASEAN Secretariat, and JICA shall be the members of Project Steering Committee.</li> </ul>
ASEAN Secretariat	<ul style="list-style-type: none"> <li>• Joining the project as a resource organization to provide technical comments on the implementation of the project</li> <li>• Joining the project by participating in important meetings</li> <li>• Provides guidance in the implementation and administration of the project.</li> </ul>
The ACDM Working Group on Prevention and Mitigation	<ul style="list-style-type: none"> <li>• Reviewing and evaluating the progress and result of the project and submits recommendations to ACDM.</li> <li>• Provides guidance and recommendations to the project team.</li> <li>• Co –chairs of ACDM WG on Prevention and Mitigation report the progress and the result of the project at the opportunity of ACDM and other possible means in collaboration with JICA and the project team.</li> <li>• Coordination with own ASEAN Member state to assist the project team in implementation of the activities such as gathering necessary information, if necessary.</li> </ul>

JICA	<ul style="list-style-type: none"> <li>• Recruiting the project team and giving instructions to the Project Team</li> <li>• Preparing the necessary budget to implement the project</li> <li>• Reporting the progress and the result of the project at the opportunity of ACDM and other possible means in collaboration with Co –chairs of ACDM WG on Prevention and Mitigation.</li> <li>• Studying the comments and advice by the members above and giving instruction to the project team</li> </ul>
The Project Team	<ul style="list-style-type: none"> <li>• Implementing the project with the instructions of JICA and guidance by the members above.</li> <li>• Coordinating with members of ACDM Working Group on Prevention and Mitigation within the sphere of the Project Team's Scope of Work in the course of project implementation.</li> <li>• Reporting to the members of the Project Steering Committee.</li> <li>• Coordination of the Project Steering Committee as a secretariat</li> <li>• Participating in meetings of the ACDM and ACDM Working Group on Prevention and Mitigation, as necessary.</li> <li>• Writing the draft progress and final reports of the project.</li> </ul>

Source: Minutes of Meetings on the 1st Meeting of the Project Steering Committee Members for "Building Disaster and Climate Resilient Cities in ASEAN"

### I.3 Project Steering Committee Discussions

After JICA Project Team (consultant team) was formed in November 2015, three project steering committee meetings (PSCs) had been held. The first PSC meeting held on 25-16 June was the meeting before JICA Project Team (JPT) was formed, so both this report and the following reports to be produced in the project do not mention discussions in the first PSC. Table I.3.1 shows the main discussion results of the second PSC held on 3 December 2015, the third PSC meeting held on 7 April 2016, and the forth PSC meeting held on 27 July 2016.

**Table I.3.1 Record of Project Steering Committee Meeting**

Date	Meeting	Contents of Discussion
December 3, 2015	2 <sup>nd</sup> Project Steering Committee	<ul style="list-style-type: none"> <li>• Project Steering Committee members agreed and accepted the Inception Report.</li> <li>• Project Steering Committee members agreed the criteria of selecting cities for preparation of TOR on demonstration project in Output 2 of the Project.</li> <li>• Nomination of national project coordinators of the Project from 10 ASEAN Member States by the ACDM Focal Points was also agreed.</li> <li>• Project Steering Committee members agreed to support the data and information collection by the Project Team.</li> </ul>
April 7, 2016	3 <sup>rd</sup> Project Steering Committee	<ul style="list-style-type: none"> <li>• Project Steering Committee members confirmed the validity of the progress including visit to AMS discussing ASEAN Urban Resilience Forum and Middle Listed Cities for Demonstration Project on Output 2 and data collection surveys for middle listed cities conducted in eight AMS.</li> <li>• Project Steering Committee agreed to share the meeting report of the 3<sup>rd</sup> PSC Meeting to Singapore and Brunei Darussalam, and recommend their participation in the project by sharing best practices on building resilience in urban center.</li> <li>• The committee requested the JICA Project Team to revise the Concept Note on ASEAN Urban Resilience Forum by including the following: <ul style="list-style-type: none"> <li>➢ to identify specific thematic issue on DRR and CCA to be discussed during the Forum be revised to be more concise with clear activities;</li> <li>➢ to link the conduct of the Forum with ADDM, under the leadership of ACDM Chair; etc</li> </ul> </li> <li>• Project Steering Committee members agreed the preliminary idea of the Workshops to be held in the Project.</li> </ul>

July 27, 2016	4th Project Steering Committee	<ul style="list-style-type: none"> <li>Project Steering Committee members confirmed the validity of the progress including evaluation criteria of 2<sup>nd</sup> Preliminary Risk Assessment to narrow down the Middle List to Short List; Hazard, Exposure and Capacity, output image of results on the 2<sup>nd</sup> Preliminary Risk Assessment, Structure of Draft TOR of demonstration project, progress of data collections surveys for middle listed cities conducted in eight AMS, output image of development of Tools.</li> <li>PSC members also agreed on the preliminary idea of the ASEAN Urban Resilience Forum including that ASEC and Host Countries (Co-Chairs) will be the Secretariat of the ASEAN Urban Resilience Forum.</li> <li>PSC members also agreed that the main actor for Database and Website Administration would be AHA Centre.</li> <li>PSC members also agreed the outline of the 1<sup>st</sup> Workshop to be held in the Project.</li> </ul>
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Source: JICA Project Team

## I.4 Current Progress of the Project

Chapters 1 to 3 delineates the current status of each Output. Here, JPT summarizes the current progress for each activity as shown in Table I.4.1 The activities in the table are corresponding to the outputs and activities mentioned in “7. Components of the Project” of Attached Documents for Minutes of Meetings on the first PSC Members for the Project. As of December 2016, 12 months out of 18 months (about 67% of the project period) has passed.

**Table I.4.1 Progress of Main Activities of the Project (As of July 2016)**

Activities	Current Progress and Next Step	Approximate Percentage of Progress
<b>Output 1</b>		
1-1 Conducting regional seminar and workshop	<p><b>Current Progress:</b> JPT assisted to hold the first ASEAN Urban Resilience Forum on July 28, 2016. JPT is revising Concept Note for ASEAN Urban Resilience Forum for the discussion in the Forum. JPT has prepared for 1<sup>st</sup> and 2<sup>nd</sup> Workshop.</p> <p><b>Next Step:</b> JPT will prepare the concrete concept of 3<sup>rd</sup> and 4<sup>th</sup> Workshop and the 2<sup>nd</sup> ASEAN Urban Resilience Forum and coordinate with the concerned stakeholder.</p>	60%
1-2 Communication through the network of the Forum for promoting resilient cities	<p><b>Current Progress:</b> JPT is preparing the draft rules of the Forum. JPT visited NPCs of each AMS in January and February 2016 and November and December 2016. JPT has compiled mailing list of NPCs and prepared outline of website development.</p> <p><b>Next Step:</b> Networking among the concerned members of AMS will be strengthened through holding the Forum, workshops. Website is also to be developed by the 2<sup>nd</sup> ASEAN Urban Resilience Forum.</p>	60%
<b>Output 2</b>		
2-1 Listing urban cities in ASEAN and gathering information	<p><b>Current Progress:</b> JPT has developed long list and middle list for selecting the candidate cities of the demonstration project by preliminary assessing disaster risks of cities in ASEAN. JPT has conducted the 2<sup>nd</sup> Preliminary Risk Assessment and propose shortlisted cities and candidate cities.</p> <p><b>Next Step:</b> JPT will follow up to decide candidate cities for Myanmar and Vietnam, which tentatively decided the candidate cities and would need further internal discussion.</p>	90%
2-2 Development of the draft TOR of the Demonstration Project	<p><b>Current Progress:</b> JPT has examined the items of draft TOR.</p> <p><b>Next Step:</b> JPT will develop draft TOR based on the discussion results of the 1<sup>st</sup> and 2<sup>nd</sup> Workshop and baseline survey results for the candidate cities</p>	40%

<b>Output 3</b>		
3-1 Conducting study on the result or progress of the Resilient Cities Campaign and other ASEAN related initiatives	<b>Current Progress:</b> JPT has collected information on the related activities for building resilient cities by development partners. <b>Next Step:</b> Since analysis of the collected information is not adequate, JPT will continue analyzing the information and extract ideas for developing a guidebook.	70%
3-2 Conducting study on good practices and the lessons learned from past projects or programs related to enhancing resilience of urban cities including developing countries	<b>Current Progress:</b> JPT has collected information on past projects or programs. <b>Next Step:</b> Since analysis of the collected information is not adequate, JPT will continue analyzing the information and extract good practice and lessons learned.	70%
3-3 Conducting a study towards developing a guide to building resilient cities	<b>Current Progress:</b> JPT has reviewed the research papers on fragility curves for earthquake and flood. JPT also prepared the 1 <sup>st</sup> draft of checklist and conducted workshops of trial implementation of the checklist in Bima, Indonesia; Luang Prabang, Lao PDR; and Pathumthani, Thailand. <b>Next Step:</b> JPT will revise the checklists based on the workshops results and comments from PSC members.	70%
3-4 Documentation of tools (Guidebook)	<b>Current Progress:</b> JPT has examined the structure of the guidebook. <b>Next Step:</b> JPT will compile the above outputs from 3-1 to 3-3.	70%

Source: JICA Project Team

## I.5 Composition of Draft Progress Report

This draft progress report consists of the following four chapters and appendixes. Appendixes is the supporting documents for main text of the chapters. The JICA Project Team tries to report the progress of the Project output by output. The number of chapter is corresponding to the number of output from Chapter 1 to Chapter 3, so it means that Chapter 1 mentions the progress of activities for Output 1. Chapter 4 reviews the project activities from November 2015 to December 2016 and previews expected forthcoming activities.

**Chapter 1:** [Output 1] Establishment of a Regional Cross Sector Collaboration Mechanism and Formation of Partnership

**Chapter 2:** [Output 2] Evaluation of Candidate Cities and Partnership and Commitment Building for Demonstration Project

**Chapter 3:** [Output 3] Development of Tools on Building Resilient Cities in ASEAN

**Chapter 4:** Way Forward

# **CHAPTER 1 : [OUTPUT 1] ESTABLISHMENT OF A REGIONAL CROSS SECTOR COLLABORATION MECHANISM AND FORMATION OF PARTNERHIPS**

## **1.1 Overview of Output 1**

### **1.1.1 Purpose of Output 1: Establishment of regional collaborative mechanism to increase urban resilience in ASEAN**

#### **(1) Background**

The Concept Note 18 (hereinafter CN18) as the framework of the ASEAN Cooperation Project by Japan International Cooperation Agency (hereinafter the Project) describes the objectives and implementation strategies with key activities for three OUTPUTs to be achieved in order to increase the resilience of ASEAN cities to disasters in 10 Member States of ASEAN (hereinafter AMS). In conjunction with the Output 1, the following notes (strategies and activities) illustrated in CN18 are referred as backgrounds of the Output 1.

- Organization of the ASEAN Urban Resilience Forum: This forum will serve as a regional venue for policy formulation, networking, knowledge exchange, and technology transfer among government, private sector, non-government organizations, academe, and other stakeholders.
- Establishment of regional multi-sectoral collaborative mechanism in ASEAN to pursue common goals and further collaborate on urban resilience: A mechanism that will help sustain the momentum and further pursue a collaborative programme in urban resilience will be formed at the regional level among key stakeholders, particularly with the private sector.

#### **(2) Objective of Output 1**

One of the objectives to achieve increasing resilience of ASEAN cities to disasters, the objective of Output 1 is “Establishment of a collaborative mechanism at the regional level to facilitate partnerships among stakeholders in urban development planning and disaster and climate risk management.

### **1.1.2 Scope of Works for Output 1**

According to the Project Proposal by JICA as the project framework, activities of the Output 1 to be implemented are stipulated in the scope of works of Output 1 as follows.

- Conduct of regional seminar and workshops
- Communication through the network of the forum for promoting resilient cities

## 1.2 Establishment of ASEAN Urban Resilience Forum and Holding Workshop

### 1.2.1 Establishment of ASEAN Urban Resilience Forum

JICA Project Team (JPT) supports establishment of ASEAN Urban Resilience Forum for concerned stakeholders from 10 ASEAN Member States (AMS). ASEAN secretariat, Lao PDR and Thailand as co-chairs of ASEAN Committee on Disaster Management (ACDM) on Prevention and Mitigation (P&M) Working Group (WG), are expected to lead and coordinate with other AMS. JPT has supported to make a draft concept and plan of ASEAN Urban Resilience Forum, collect ideas and opinions from each AMS, and prepare the necessary materials for discussions including draft concept note of the forum and draft Terms of Reference for the forum secretariat.

### 1.2.2 Holding ASEAN Urban Resilience Forum meeting

JPT will plan and support to hold ASEAN Urban Resilience Forum meetings, in total two times during the project period. Through these two time forums, the basic direction and framework of the ASEAN Urban Resilience Forum will be discussed. Expected schedule of the forum meetings are shown in Table 1.2.1.

**Table 1.2.1 Expected Schedule and Agendas of Forum Meetings**

Forum meeting	Expected period	Venue	Expected agenda
First forum meeting	July 28 2016	Bangkok	<ul style="list-style-type: none"> <li>• Introduction to CN 18</li> <li>• Relation between Forum and CN 18</li> <li>• Discussion on direction of ASEAN Urban Resilience Forum</li> <li>• Presentation/speech by resource persons from JICA and UNISDR</li> </ul>
Second forum meeting	March 2017*	To be decided	<ul style="list-style-type: none"> <li>• Sharing overall outputs of the project (Phase 1) supported by JICA</li> <li>• Discussion on how to build resilient cities in ASEAN</li> <li>• Utilization of Outputs of CN18</li> <li>• Presentation/speech by resource persons from JICA and UNISDR</li> </ul>

\*: JPT will propose to change the timing of the 2nd forum meeting from March 2017 to May 2017.

Source: JICA Project Team

The first ASEAN Urban Resilience Forum was held on July 28 2016 in Bangkok, Thailand. The number of participants are 33 from Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippine, Singapore, Thailand, and Vietnam. Some NGOs and CSOs in Thailand also attended the forum.

**Table 1.2.2 Results of the First Forum Meeting**

Forum meeting	Expected period	Venue	Agenda
First forum meeting	July 28 2016	Bangkok	<ul style="list-style-type: none"> <li>• Introduction to CN 18</li> <li>• Relation between Forum and CN 18</li> <li>• Discussion on direction of ASEAN Urban Resilience Forum</li> <li>• Presentation/speech by resource persons from JICA and UNISDR</li> <li>• Group discussion of the issues of building urban resilience</li> </ul>

Source: JICA Project Team



### 1.2.3 Development Action plan for ASEAN Urban Resilience Forum

#### (1) Development of the basic idea of action plan

Based on Concept Note (CN 18), JPT has developed the basic idea of action plan for ASEAN Urban Resident forum including 1) road map, 2) outline of the forum, 3) proposed annual action plan, 4) possible management/secretariat bodies, 5) image of cooperation and demarcation with UNISDR, and 6) draft terms of forum membership. The concept of the action plan has been accepted by National Project Coordinator (NPC) in each AMS in February 2016.

The outline of concept of action plan is shown in Table 1.2.3

**Table 1.2.3 Outline of Action Plan**

Items	Contents
1. Road map	<p><u>It shows an image of stepwise development of role of the forum</u></p> <ul style="list-style-type: none"> <li>- By 2016, as startup periods, the forum will facilitate following activities among members.               <ul style="list-style-type: none"> <li>&gt; Knowledge Sharing</li> <li>&gt; Information Sharing on Disaster Risk Reduction and Climate Change Adaptation</li> <li>&gt; Urban Resilience Learning</li> </ul> </li> <li>- By 2018, as development periods, the forum activities will go further. It is expected that each member state brings and share their progress. It is also expected that they have more members from wider and multi sectors.</li> <li>- Meantime, it supposed that demonstration projects will be implemented in model cities, and the findings from demonstration project will be shared in the forum.               <ul style="list-style-type: none"> <li>&gt; Progress Sharing among Member States</li> <li>&gt; Multi-Sectoral Dialog on Urban Resilience</li> <li>&gt; Shared Learning from Urban Resilience Model Project</li> </ul> </li> </ul>
2. Outline of the forum	<p><u>As Outline of the forum</u>, the JPT proposes, the forums' Objective, Stakeholders, Location of Secretariat, Period of activities, Organization structure, Operation bodies (Secretariat), and possible budget sources.</p> <p><i>Note: the JPT has proposed ideas and possible form of each items, but some of them need to be concretized in realistic ways.</i></p>
3. Proposed annual action plan	<p><u>Annual Action Plan (Propose base)</u> will show the time schedule of each major stakeholders of the forum in proposed/ as example base. The forum will hold the annual seminar and the annual meeting of core members as major activities. ACDM will be the high-level decision maker to discuss important issues. The role and action of ASEAN Secretariat will be coordinator among the forum and ACDM. The forum secretariat will in charge of planning, operation, and management of the forum activities.</p>
4. Possible management /secretariat bodies	<p><u>As options for possible management/secretariat bodies</u>, 1) consultant, 2) AADMER Partnership Group etc. (CSOs), and 3) Rotation of Annual Operation among each ASEAN Member States could be suggested. The JPT indicates characteristic features, merit and demerit of each possible option.</p>
5. Image of cooperation and demarcation with UNISDR	<p><u>Close cooperation with UNISDR will be expected to the forum.</u></p> <p>While UNISDR will (already has) provide direction and basic idea of resilience of cities and database of cities' activities, the forum will provide regional official platform for mutual support by establishing and operating organization, framework within and among AMS, and utilizing UNISDR's information and channels and following up through Forum</p>
6. Draft terms of forum membership	<p><u>The proposed contents of Draft terms of forum membership are shown as mentioned in 1.3.1</u></p>

Source: JICA Project Team

(2) Development of draft Concept Note and TOR for Setting Secretariat of ASEAN Urban Resilience Forum

In order to prepare the documents for discussion towards establishment of ASEAN Urban Resilience Forum, JPT has developed the draft Concept Note of ASEAN Urban Resilience Forum and draft TOR for setting secretariat for ASEAN Urban Resilience Forum and consulted with Project Steering Committee (PSC) members at the meeting held in April 2016. The summary of draft Concept Note is shown in Table 1.2.4 and the summary of draft TOR is shown in Table 1.2.5.

**Table 1.2.4 Summary of the Draft Concept Note**

Contents	Summary
Introduction	The ASEAN Agreement on Disaster Management and Emergency Response (AADMER) was ratified by all the ASEAN Member States in 24 December 2009. Concept Note 18: Building Disaster and Climate Resilient Cities in ASEAN has been set under the Strategy and Priorities for AADMER Work Programme Phase 2 (2013-2015). It addresses key issues on ensuring the resilience of cities and urban centers to disaster and climate risks.
Background	Urban centers and cities are recognized as growth areas of a country. Large populations reside in cities. Businesses are usually located in these areas, which pump prime the local and national economy. These private companies and industries are connected with cities in other countries, within and outside ASEAN. Recently, there are increasing concern on the impact of mega disasters. Clearly, mutual economic dependence between and among cities is intensifying, and a disaster that occurs in one city would impact another country as well as the regional economy. The urban resilience to disasters is hence important agenda that we need to concern with regional aspect of all the AMS. From November 2015, JICA is conducting a project of “Building Disaster and Climate Resilient Cities in ASEAN” with cooperation of ACDM to support some components of Concept Note 18. In this project, they will support to establish ASEAN URBAN RESILIENT FORUM. But the forum needs a sustainable body for future operation.
Objectives	a. Providing shared learning opportunities about disaster and climate change risks in ASEAN cities for ASEAN member states and relevant stakeholders and; b. Shared learning opportunities about measures and implementation for disaster risk reduction especially from the aspect of urban planning. c. Making cross-sectoral collaboration mechanism at the regional level to facilitate partnerships among stakeholders in urban development planning and disaster risk reduction and climate risk management
Expected Outputs	a. Establishment of an operation and management body for the Forum (the Forum Secretariat) b. Annual Seminar c. Website for 1) knowledge and experience sharing, 2) as a communication tool among the Forum member and with other related organization and campaign and also 3) public relation tools for the Forum activities.
Activities	a) For the Forum as collaboration mechanism <Short term> 1) DRR&CCA Information Sharing 2) Urban Resilience Learning 3) Activities, Knowledge & Learnings Sharing <Middle term> 1) Shared Learning from Urban Resilience Model Project 2) Progress Sharing among Member States 3) Multi-Sectoral Dialog on Urban Resilience <Long term> 1) Multi-Sectral Framework on Urban Resilience 2) Realization of DDR on Regional Cross-Border Mega Disaster

Contents	Summary
	b) For the seminar 1) Development of Annual Work Plan with schedule and coordination arrangement 2) Plan and operation of the seminar including coordination among the ASEAN Member States and inviting resource persons. (The Forum secretariat will be in charge of planning and operation, and ACDM P&M WG will be in charge of approval and decision making.) 3) Making a Report of the initial results of the seminar. c) For the website 1) Upload the Forum report to the website. 2) Collect news and activities from the Forum members and upload the website. Materials to be uploaded shall be prepared by the Forum Members, 3) Facilitate interaction among the Forum Member through website. <i>Note: the website will be established and started up by JICA Project</i>
Participants	a. The Forum secretariat will be in charge of organizing the seminar, writing a seminar report and public relation activities through website. b. Two (2) representatives from each ASEAN Member State would be invited to attend the seminar c. Appropriate resource persons from non-governmental sector such as international organization, NGO/NPO, CSOs, and Academia will be invited to the seminar d. The Forum member will be registered by the Forum secretariat with report to ACDM P&M WG. All member can participate in the seminar. Expected member: Cities in ASEAN Member States, international organizations, NGO/NPO, CSOs, Academia, and Private Sectors.
Expected Source of Budget	a. Cost for Forum management, the seminar, and website operation and maintenance will be covered by ADDMER Fund. b. Cost for each project proposed by the Forum member as a pilot project of the Forum will be covered by international fund.
Arrangement	a. Round-trip flights and hotel accommodations for government officers will be covered by each ASEAN member states since it will be jointly held with event for ADDM. . b. Round-trip flights and hotel accommodations for resource persons will be covered by the Forum with ADDMER Fund. c. Round-trip flights/any transportation fee and hotel accommodations for other seminar participants will be covered by participants themselves. d. A draft agenda shall be circulated to ACDM P&M WG prior to the seminar.

Source: JICA Project Team

**Table 1.2.5 Summary of draft TOR for Secretariat of the ASEAN Urban Resilience Forum**

Contents	Summary
Results to be achieved	1. Annual Work Plan with schedule and coordination arrangement 2. Report of the initial results of the forum seminar and workshop 3. Website update and other public relation activities
Detailed description of tasks	1. Management of member registration 2. Organizing the forum seminar and workshop including planning, operation, arrangement and coordination of participants, and relative administrative work for the forum seminar and workshop 3. Coordination with the management board and ASEAN secretariat 4. Updating the website including to develop PR material or news etc. 5. Other administrative work which is needed for the forum operation
Professional experience and qualifications	1. More than 5 years experiences to work with government officials or international organizations 2. Fluent English skills in reading, writing, listening and speaking.

Source: JICA Project Team

## (3) Study and consultation of possible budget source for future CN.18 activities

In the 4<sup>th</sup> PSC held on 27<sup>th</sup> July 2016, it was proposed by ASEC to utilize AADMER fund. AADMER fund is the only one fund source which ASEAN has for implementing AADMER working program.

In November 2016, after personnel changes of all member of ASEC/DMHA, JPT had a meeting with ASEC and confirmed the outline of AADMER Fund. As AADMER fund is a replenishment fund depending on voluntary contribution currently only from ASEAN Member States, and other AADMER program will also request for the AADMER FUND, it has uncertainty in terms of amount of allocated budget and sustainability if activities continue. Therefore, ASEC and JPT agreed in the meeting that possibility of seeking support from other partner to support the activities should be considered as an alternative option for ensuring the budget for future CN.18 activities.

## Outline of AADMER FUND

- The fund voluntary contributions only from AMS (According to AADMER FUND regulations, contribution is open to other partners both public and private, but so far contribution has been done only from ASEAN Member States.)
- Basic rule of usage AADMER fund is that a program has to get approval by ASEAN Member States in advance then need to be checked whether any sufficient budget in the fund
- There is no ceiling budget for the proposal which requesting financing from AADMER FUND. The basic points is the approval of ASEAN Member States and the availability of fund. If there is not an adequate funds to cover, some of the agreed program will be made adjustment based on the priority level of the programs to be funded.
- Each year, many proposals requested financing from AADMER fund.

ASEC and JPT also agreed that ASEC will explain about the condition of utilization of AADMER FUND and proposed possible options including utilization of AADMER FUND and getting supported from other partners in the 5<sup>th</sup> PSC, and asking opinions and initiative of Co-Chairs of P&M WG. JPT will support to make a proposal based on detailed information of AADMER FUND regulation under cooperation and consultation with ASEC.

## (4) Future task in this project

Options of budget source for future CN.18 activities should be proposed and discussed with PSC. Discussion will be done in the 5<sup>th</sup> PSC. The proposal is now under preparation and consultation between ASEC and JPT. It could be options for mid-term and short-term as each option has advantage and disadvantage in terms of certainty, sustainability, and size of budget. The current level and future goal of independence of the forum should also be considered in order to ensure viability.

Both long term action plan and short term action plan need to be given more concrete shape, with opinions of JICA and ACDM P&M WG. JPT will consult with PSC members on further action and coordination as next step for detailed development of the action plan after the discussion of options for budgeting.

**1.2.4 Holding Workshops**

JPT will plan and hold workshops, in total four times. JPT will be a moderator basically on introduction

and discussion about project (intermediate) outputs. Participants from each AMS are requested to actively participating in the workshop by expressing their ideas and opinions. Table 1.2.6 shows the expected schedule and agenda of workshops.

**Table 1.2.6 Expected Schedule and Agendas of Workshops**

Workshops	Expected period	Expected agenda
1 <sup>st</sup> Workshop (Disaster Risk Assessment)	December 2016	<ul style="list-style-type: none"> <li>• Introduction to Disaster Risk Assessment</li> <li>• Procedure of disaster risk assessment</li> <li>• Necessary information for disaster risk assessment</li> <li>• Plan and measures based on disaster risk assessment results</li> <li>• Economic evaluation by utilizing disaster risk assessment</li> </ul>
2 <sup>nd</sup> Workshop (Toward Mainstreaming Disaster Risk Reduction in Land Use and Development Planning)		<ul style="list-style-type: none"> <li>• Role of Land Use / Development Planning in Disaster Risk Reduction (DRR)</li> <li>• Relationship urban planning and DRR</li> <li>• Role of disaster risk assessment for Urban Planning</li> <li>• Land Use and Development Planning coping with Natural Hazards (Tsunami, Earthquake, Flood, Cyclone)</li> </ul>
3 <sup>rd</sup> Workshop (Checklist for Urban Planning Officials)	March 2017	<ul style="list-style-type: none"> <li>• Structure, items of checklist</li> <li>• Utilization of checklist including dissemination to local governments and collect the results by national government</li> <li>• Incentives for utilization of checklist</li> </ul>
4 <sup>th</sup> Workshop (Checklist for DRR officials)		<ul style="list-style-type: none"> <li>• Structure, items of checklist</li> <li>• Utilization of checklist including dissemination to local governments and collect the results by national government</li> <li>• Incentives for utilization of checklist</li> </ul>

Source: JICA Project Team

## 1.3 Facilitation for Enhancing Networking among Stakeholders

### 1.3.1 Development of Terms of Forum Membership

JPT has developed the proposed items of Terms of Forum Membership as shown in Table 1.3.1. The draft terms here will be discussed in the 1<sup>st</sup> and 2<sup>nd</sup> ASEAN Urban Resilience Forum.

**Table 1.3.1 Draft Terms of Forum Membership**

Item	Summary
1. Name of Forum	The Name of the Forum is “ASEAN Urban Resilience Forum”.
2. Objective	a. Providing shared learning opportunities about disaster and climate change risks in ASEAN cities for AMS and relevant stakeholders and; b. Shared learning opportunities about measures and implementation for disaster risk reduction especially from the aspect of urban planning. c. Making cross-sectoral collaboration mechanism at the regional level to facilitate partnerships among stakeholders in urban development planning and disaster risk reduction and climate risk management
3. Membership	Following organizations can be a member of the forum: 1) Central government of each AMS, 2) City government in ASEAN, 3) Private sectors, 4) Academic institutions and researchers, 5) International/Local NGOs/NPOs, 6) CSOs, 7) Any other related organizations. They need to get approved by ACDM P&M WG to have a membership.
4. Supporting Member	Private companies could be a supporting member of the forum. They are expected to contribute supporting membership fee. <i>Note: Incentives of contribution should be discussed and finalized.</i>
5. Structure	The structure of the forum will be 1) ACDM P&M WG as the highest decision-making body, 2) ASEAN Secretariat as coordinator between the forum and each ASEAN member state, 3) the forum Secretariat as planning, operation and management body, and 4) each members and supporting members.
6. Decision-making board	ACDM P&M WG will make an important decision mainly for activities and membership of the forum.
7. Secretariat	The forum Secretariat will be in charge of planning, operation and management of annual activities and publication of the forum.
8. Other Relative Members	The members of the forum are expected to attend the annual forum meeting and also provide information about their activities toward making a resilient city to be shared among the forum.
9. Decision-Making Process	Item on agenda to be discussed in the forum could be proposed by any member of the forum to the forum secretariat. The forum secretariat will formulate an opinion on the proposed issue and consult with ACDM P&M WG through ASEAN Secretariat with ACDM P&M WG will make a final decision on the proposed issue.
10. Annual Forum	The ASEAN Urban Resilience Forum (conference) will be held annually with participation of member of the forum.
11. Annual Meeting	The Annual Meeting will be held annually to discuss and make a plan for yearly plan for the forum objectives and activities. The member of the annual meeting will be ACDM P&M WG, ASEAN Secretariat and the forum secretariat.
12. Budgeting	Budget source of the forum is to be specified. <i>NOTE: Proposed possible budget sources are AADMER Fund. It needs deeper discussion to consider separately as budget for any project-based activities and as budget for the forum operation and management.</i>
13. Language	The official language in the forum will be English.
14. Miscellaneous Provisions	Other rules not specified from 1 to 13 will be compiled.

Source: JICA Project Team

### 1.3.2 Developing Mailing List

Mailing list is being developed to be one of the communication tools for the forum and the project activities for building disaster and climate resilient cities in ASEAN. JPT has compiled the list of 13 National Project Coordinators (NPC) with their contact address, based on the information from ASEAN Secretariat. Since these are personal information and should be protected, this report does not disclose the name and email address of NPC.

**Table 1.3.2 List of NPC**

Nation	Designation	Organization
Brunei Darussalam	Special Duties Officer Grade II, Public Relations Officer	International Affairs, National Disaster Management Centre (NDMC)
Cambodia	Officer	Preparedness and Training Department, National Committee for Disaster Management (NCDM)
	Officer	Information and Relations Department, National Committee for Disaster Management (NCDM)
Indonesia	Director	National Disaster Prevention and National Disaster Management Authority (BNPB)
Lao PDR	Director	National Disaster Management Office, Social Welfare Department, Ministry of Labour and Social Welfare (MOLSW)
	TBA	Department of Disaster Management and Climate Change, Ministry of Natural Resources and Environment (MONRE)
Malaysia	Director for Mitigation	Policy Preparedness Division, National Disaster Management Agency (NADMA)
Myanmar	Deputy Director	Coordination and Research Division, Relief and Resettlement Department, Ministry of Social Welfare (RRD)
Philippines	Assistant Chief	Plans and Programs Division of the Office of Civil Defense, National Disaster Risk Reduction and Management Council of the Philippines (OCD)
Singapore	Director	Strategic Planning Department, Singapore Civil Defence Force (SCDF)
Thailand	Policy and Plan Analyst	Research and International Cooperation Bureau, Department of Disaster Prevention and Mitigation (DDPM)
Viet Nam	Deputy Director	Department of Natural Disaster Prevention and Control (DNDPC), Directorate of Water Resources, Ministry of Agriculture and Rural Development (MARD)
	Deputy head	Science and International Cooperation Division- Department of Natural Disaster Prevention and Control (DNDPC), Directorate of Water Resources Ministry of Agriculture and Rural Development (MARD)

Source: JICA Project Team

In order to develop mailing list for networking, JPT drafted the mailing list of ASEAN Urban Resilience Forum (AURF), based on the participants' list of the 1<sup>st</sup> AURF held in Bangkok, on July 28, 2016. Since these are personal information and should be protected, this report does not disclose the name and email address of attendants of AURF.

**Table 1.3.3 Mailing List of AURF**

Nation	Designation	Organization
Brunei Darussalam	N/A	N/A
Cambodia	Deputy Director	Information and Relations, National Committee for Disaster Management(NCDM)
	Executive Assistance to Senior Minister	Information and Relations, National Committee for Disaster Management(NCDM)
	Official	Information and Relations, National Committee for Disaster Management(NCDM)
	Deputy Director	Information and Relations, National Committee for Disaster Management(NCDM)
Indonesia	Deputy Director	National Authority for Disaster Management (BNPB)
	Analyst of Structural Mitigation	National Authority for Disaster Management (BNPB)
	Head Section for Disaster Risk	National Authority for Disaster Management (BNPB)

Nation	Designation	Organization
	Management	
	Analyst of Disaster Mitigation	National Authority for Disaster Management (BNPB)
Lao PDR	Director General of Social Welfare Department	National Disaster Management Office, Social Welfare Department, Ministry of Labour and Social Welfare (MOLSW)
	Technical and Cooperation Officer of Social Welfare Department	Ministry of Labour and Social Welfare
	Technical Officer of Social Welfare Department	Ministry of Natural Resource and Environment.
	Technical Officer of Department of Disaster Management and Climate Change	Department of. Disaster Management and Climate Change, Ministry of Natural Resources and Environment (MONRE)
Malaysia	Assistant Director	National Disaster Management Agency(NADMA)
	Assistant Director	National Disaster Management Agency(NADMA)
	Town and Country Planning Officer	Federal Department of Town and Country Planning Peninsular Malaysia
Myanmar	Director of Relief and Resettlement Department	Ministry of Social Welfare, Relief and Resettlement
	Planning Officer	Ministry of Social Welfare, Relief and Resettlement
	Assistant Director	Mandalay City Developemt Committee
	Assistant Chief Engineer/ Visiting Professor of Yangon Technological University	Yangon City Developemt Committee
Philippines	N/A	N/A
Singapore	Chief Inspectorate	Singapore Civil Defence Force, Ministry of Home Affairs
	Operations Readiness Officer of 1st SCDF Division	Singapore Civil Defence Force, Ministry of Home Affairs
Thailand	Director of Research and International Cooperation Bureau	Research and International Cooperation Bureau, Department of Disaster Prevention and Mitigation (DDPM)
	Director of International Cooperation Division	Research and International Cooperation Bureau, Department of Disaster Prevention and Mitigation (DDPM)
Thailand	Civil Engineer, Senior Professional Level	Research and International Cooperation Bureau, Department of Disaster Prevention and Mitigation (DDPM)
	Foreign Relations Official, Professional Level	Research and International Cooperation Bureau, Department of Disaster Prevention and Mitigation (DDPM)
	Plan and Policy Analyst, Professional Level	Research and International Cooperation Bureau, Department of Disaster Prevention and Mitigation (DDPM)
	Plan and Policy Analyst	Research and International Cooperation Bureau, Department of Disaster Prevention and Mitigation (DDPM)
	Plan and Policy Analyst	Research and International Cooperation Bureau, Department of Disaster Prevention and Mitigation (DDPM)
	Director General of Bangkok Fire and Rescue Department	Bangkok City
	Civil Engineer, Professional Level	Department of Public Works and Town & Country Planning
Viet Nam	Head of Department	Binh Dinh Water resource Department
	Director	Department of Agriculture and Rural Development of Bac Lieu
	Head of Department	Sonla Water resource Department
	Vice manager of Science, International cooperation division	Department of natural disaster prevention and control



Nation	Designation	Organization
ASEAN Secretariat	N/A	Disaster Management & Humanitarian Assistance Division
AHA Centre	Senior Disaster Monitoring & Analysis Officer	Operations Division

Source: JICA Project Team

First, the contact address and information of governmental persons should be formulated in a excel list and utilized for networking among officers in charge of disaster management in AMS. After that, the contact address of other participants should be added and formulated as a list to disseminate the progress of the Project by JPT. To disseminate the information timely and to manage/update the list adequately, it would be also effective to use Social Networking Service (SNS) linked to the Project's website in addition to the mailing list. It should be a further discussion in PSC, how far this mailing list will be open and how to organize the mailing list.

### 1.3.3 Development of Website

JPT will develop the Project's website, which will be hand over to the ASEAN Urban Resilience Forum (AURF) after the Project, as one of the communication tools to disseminate the progress and useful information for urban resilience. The outline of prospected website was discussed in 4<sup>th</sup> PSC on July 27, 2016, and PSC members came to the conclusion that AHA Centre should be a main actor. Based on this result, JPT discussed with AHA Centre how the website should be. The outline of prospected website is shown in Table 1.3.4.

**Table 1.3.4 Outline of Prospected Website**

Objectives	<ul style="list-style-type: none"> <li>➤ To disseminate progress of the Project</li> <li>➤ To provide a platform for networking among officials in charge of disaster management in AMS</li> </ul>
Contents	<ul style="list-style-type: none"> <li>➤ Schedule and report of the recent activities, such as PSC meeting, ASEAN Urban Resilience Forum, Workshop, etc.</li> <li>➤ Guideline and Check List as Outputs</li> <li>➤ Information/examples collected in the survey</li> <li>&lt;In Future&gt; <i>*Followings are opinions of the 1st AURF participants from AMS</i></li> <li>➤ Method and process to formulate Urban Resilience Plan with related information such as hazard map, flood risk, research, etc.</li> <li>➤ Database related to disaster management; exposure, satellite photo, city profile</li> </ul>
Function	<ul style="list-style-type: none"> <li>➤ Link Collection to websites related to urban resilience in ASEAN region.</li> <li>➤ Form for Post/Contribution to update the data</li> <li>➤ Web Board for AURF</li> </ul>
Effect	<ul style="list-style-type: none"> <li>➤ Promotion of opinion exchange/ knowledge sharing among persons in charge of disaster management, especially urban resilience in AMS</li> </ul>
Directory	<ul style="list-style-type: none"> <li>➤ Independent website *Available to jump from AHA Centre's website</li> </ul>
Maintenance	<ul style="list-style-type: none"> <li>➤ Administrator: AHA Centre</li> <li>➤ Moderator for update: ASEC</li> </ul>

Source: JICA Project Team

JPT should make further discussion with PSC members on the following issues;

- Contents/Functions to be developed from the viewpoint of active usage among relevant organizations

- Moderator to update the contents responsibly
- Fund to maintain the website

In addition, JPT has developed the facebook page of the Project, in order to distribute the project progress. According to AHA Centre's opinion, AURF is basically for closed members, so there is no need to promote widely in public. In addition, there will be some problem such as administrator/moderator, duplication of the contents and so on. Therefore, they recommended using the facebook just for an alternative site until establishment of CN.18's website. The operation of the facebook page is also open to discussion with PSC members.

### 1.3.4 Establishment of Management Board and Networking after the Project

JPT has proposed the possible options of Management Board i.e. 1) Consultant, 2) AADMER Partnership Group etc. (CSOs), and 3) Rotation of Annual Operation among each AMS. Regarding the management bodies of the forum, it was recommended by PSC members in the 3<sup>rd</sup> PSC, to have AHA centre together with the co-chairs of ACDM WG on P&M as secretariat of the forum.

Based on the discussion in 3<sup>rd</sup> PSC, PSC member discussed on the formation of Management Board in the 4<sup>th</sup> PSC held on 27<sup>th</sup> July, 2016, and formation and each roles were confirmed as Table 1.3.5.

However, since ASEC has frequent business trips to ASEAN countries and moreover they have frequent position transfer, it has a concern in regard to if they are fully capable for continuous and seamless performance as Forum Secretariat. Thus it is recommended to get strong support from supporters especially International Organization, at least in short term.

**Table 1.3.5 Formation of Management Board**

Position	Member	Roles
Forum Secretariat	Co-Chairs of P&M WG	- Planning overall subject of the Seminar
	ASEC	- Planning overall subject of the Seminar - Coordination with ACDM WG on P&M - To be contact point for invitee and participants for logistic arrangement
Supporters	AHA Center	- Planning detailed subject of the Seminar and provide information resource - Making documents for the forum if needed - Making reports
	International Organizations	- Knowledge sharing - (Financial Support)

Source: JICA Project Team

### 1.3.5 Promotion for Active Networking among Persons involved in Forum

JPT has conducted the following activities for active networking among persons involved in the forum.

- Issuing project newsletters four times;
- 1<sup>st</sup> Round Visiting to NPCs
- 2<sup>nd</sup> Round Visiting to NPCs

**(1) Issuing Project Newsletters**

The 1st newsletter reported the launching of the Project in December 2015, and the 2nd reported the progress of the Project including the formulation of long list and middle list in April 2016. The newsletters were distributed to PSC members, NPCs, ACDM WG members on P&M, and other concerned officials in each AMS during PSC meetings, ACDM WG meeting on P&M, and visiting NPCs in AMS.

**(2) 1st Round Visit to NPCs (26 January 2016 to 24 February 2016)**

In this visit, not only that outline and progress of the Project were shared, but also the cooperation between JPT and each NPC was established. JPT hereby continued to exchange views with NPCs after the visit and formulated the draft of long list and middle list. In order to promote the active networking among officials involved in the forum, the following activities should be conducted;

- Providing an opportunity for networking in the forum meeting;

Time for introduction of attendants, presentations by relevant organizations will be set in 1<sup>st</sup> ASEAN Urban Resilience Forum.

- Transmitting and sharing information periodically by mailing list and updating website;

**(3) 2nd Round Visit to NPCs**

The 2nd round visit to eight AMS also has conducted between November 2016 and early December 2016. Main objectives of the visit are to share the progress of the project, to explain the results of the 2<sup>nd</sup> preliminary disaster risk assessment for selecting candidate cities for demonstration project, to discuss the shortlisted cities and candidate city based on the results and NPCs opinions related with the national policies and priorities. Introducing checklists and preview of workshop for trial implementation of the checklists was also one of the agenda for Indonesia, Lao PDR, and Thailand.

## **1.4 Issues and Way Forward on Output 1**

**(1) Further Activities and Issues on ASEAN Urban Resilience Forum**

After this project assisted by JICA, ASEAN including AMS, ASEAN Secretariat, and AHA Centre, is supposed to sustain and operate the forum. To ensure the sustainability, the following issues should be tackled in the following project activities. JPT will consult with PSC members on further action and coordination as next step for detailed development of the action plan of the forum.

- To raise fund and find source of budget

Raising fund is critical issue to sustain the forum. In the 3rd PSC, AADMER Fund is proposed as one of the funding sources. It needs deeper discussion to consider separately as budget for any project-based activities and as budget for the forum operation and management as follows.

- a. Cost for Forum management, the seminar, and website operation and maintenance will be covered by ADDMER Fund.
- b. Cost for each project proposed by the Forum member as a pilot project of the Forum will be covered by international fund.

- To prepare Action Plan towards 3<sup>rd</sup> ASEAN Urban Resilience Forum

To ensure the sustainability, action plan towards 3<sup>rd</sup> ASEAN Urban Resilience Forum is needed. The details such as the demarcation between Lao PDR and Thailand, what actions co-chairs should take, etc. should be planned as action plan.

## (2) Further Activities and Issues on Networking among AMS

The 1<sup>st</sup> ASEAN Urban Resilience Forum was held on July 28. Having the forum is one of the activities to promote networking among AMS, but other means for the promotion such as website development and mailing list needs to be taken. To develop the website, the following issues to be solved to sustain the networking after the assistance by JICA is completed.

- To decide moderator

The 4th PSC agreed that AHA Centre is in charge of technical management of the website. However, who should be moderator who check the validity of posts/comments of web forum and the contents and delete the invalid posts/comments.

- To secure maintenance cost of website

To maintain and update the website, maintenance cost such as server, labor cost, etc. is needed. How to secure maintenance cost of the website should be discussed in the 5th Project Steering Committee.

## CHAPTER 2 : [OUTPUT2] EVALUATION OF CANDIDATE CITIES AND PARTNERSHIP AND COMMITMENT BUILDING FOR DEMONSTRATION PROJECT

### 2.1 Overview of Output 2

#### (1) Background

As the concept note 18 (CN18) describes the demonstration project as one of key activities for “Output 2”, it aims at promoting and enhancing local urban administrations or cities in terms of planning for urban resilience particularly in the area of risk-sensitive urban development, land use management plans and investment programs through building the most cost effective risk reduction and adaptation measures.

The candidate cities on several high-risk cities in ASEAN for the demonstration project would be selected based on the preliminary risk assessments described in this chapter, in which the framework of the demonstration project would be also formulated as its Terms of Reference in this project.

#### (2) Scope of Works for Output 2

According to the Project Proposal by JICA as the project framework, activities of the Output 2 to be implemented are stipulated in the scope of works of Output 2 as follows.

##### *1) Listing the candidate cities in ASEAN for the demonstration project through the risk assessment*

Based on the available information gathered for basic information of cities in ASEAN Members of States and information for the risk assessment by natural hazards, risk assessment will be conducted in selected priority cities in the next phase of the project. A long list of cities in ASEAN Member States is prepared according to population, social and economic indicators, etc., as well as significant economic places, critical facilities and infrastructure.

##### *2) Formulation of Terms of Reference (TOR) for the demonstration projects*

In order to implement the demonstration project in further stage after the project supported by JICA, the activities of “Output 2” includes formulation of TOR for the project as the framework to define scope of works, responsible and implementation body and necessary institutional arrangement for the project. How to formulate draft TOR will be discussed in the later section of 2.6.

## 2.2 Approaches for Evaluation of Candidate Cities for Demonstration Project

### 2.2.1 Evaluation Methodology of Candidate Cities

In the process for evaluation, the candidate cities to be selected for the demonstration project are considered as high-risk cities with typical natural hazards in the 10 Member States of ASEAN (AMS). The principles for the evaluation are described in item (1).

(1) Principles for evaluation for the candidate cities of the demonstration project

- **Representativeness** of natural hazards in ASEAN, which cities have been suffered frequently by them and their socio-economic conditions been damaged considerably. However it should be noted that types of natural hazards are limited to natural hazards affects directly peoples and assets of cities excluding hazards uncountable damages physically and spatially (e.g. forest fire, draught, etc).
- **Replicability** to apply demonstration project to similar cities in AMS, where cities with small and medium-size population are majority and predominant among all urban municipality or cities in AMS
- **Sustainability and preparedness** for effective demonstration of the project in terms of capacity and project experiences on disaster risk reduction and management, which a demonstration project as a good practice might be able to be achieved successfully and influenced to other cities.
- **Significance of economic exposure** such as agglomerated industrial areas in cites to be protected from hazard risks, where several countries in AMS had been suffered by natural hazards on economic assets and activities not only at local level but also national level in the past.
- **Others** such as data availability of basic information and data for current socio-economic status, hazards data and records, development plans and land use plans, and presence of hazard management organizations could be pre-conditions, and also national and regional significance in conjunction of policy and strategy of each member's state are considered for selection.

(2) Evaluation method through preliminary risk assessments for cities with typical natural hazards in AMS

In order to select candidate cities in the members' countries, the preliminary risk assessment is adopted to the evaluation method to identify considerable cities for the demonstration project by three indicators of "intensity level of natural hazard dangers", "scale of exposure" and "level of capacity", taking account of gradual evaluation process due to data availability in city level information. Each indicator for the evaluation is defined and considered as follows taking account of the United Nations Office for Disaster Risk Reduction (UNISDR) Terminology 2009<sup>1</sup>.

- **Natural hazards** are dangerous phenomenon or condition generating sometimes loss of life, injury, property damages, loss of livelihoods and services, social and economic disruption, or environmental damage in AMS represented by flood, cyclone (or typhoon, monsoon) wind,

<sup>1</sup> 2009 UNISDR Terminology on Disaster Risk Reduction/UN, UNISDR

cyclone surge and earthquake and tsunami, of which hazard information covering entire areas of AMS in certain level of secondary and quantitative data is available.

- **Exposure** is an indicator to assess potential damage that exposed peoples and assets (e.g. buildings, infrastructure, any other physical matters) may incur in a given event by natural hazards. These can be combined with the specific vulnerability of the exposed elements or assets to any particular hazard to estimate the quantitative risks associated with that hazard in the area of interest.
- **Capacity** in this chapter is defined by infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management. Capacity also may be described as capability. The capacity gaps are identified for further action for disaster risk management in city which its capacity can be assessed by quantitative information and data.

(3) Definition of city to be applied to the project

The term of “city” covering in this project can be defined as an urban status administration of local governments according to each AMS administrative definition, although there might be some gaps among them in terms of population or their definitions. Table 2.1.1 shows each adopted administrative status for “city” of this project.

2,431 local governments including rural and urban administration are observed in the AMS according to desk-top information (e.g. countries’ web-site and documents). Based on the definition of “city” afore-mentioned, cities in those local governments to be under consideration for the evaluation of demonstration project are covered by 817 local governments as urban administration indicated in Table 2.2.1.

**Table 2.2.1 Adopted Administrative Status of the City in AMS for the Project**

Country	Abbreviation	Administrative Status	Local Language	Local Government
1.Brunei Darussalam	BRN	Municipal Council	Lembaga Bandaran	4
2.Cambodia	KHM	City	Krong	24
3. Indonesia	IDN	City	Kota	98
4. Lao PDR	LAO	District	Muang	26
5. Malaysia	MYS	City Council/ Municipal Council	Majlis Bandaraya / Majlis Perbandaran	36
6. Myanmar	MMR	Township	--	330
7. Philippines	PHL	City	City	145
8. Singapore	SGP	There is no typical local government except Community Development Council for the government program operation.		49
9. Thailand	THA	City Municipality	Amphoe Mueang	44
10. Viet Nam	VNM	Provincial City / Town	TPTTT / TX	61
Total (Urban Local Government)				817

Note: Abbreviations are adopted by the list of countries’ abbreviation of the United Nation

Source: JICA Project Team

## 2.2.2 Overall Evaluation Process and Criteria of Candidate Cities for Demonstration Project

### (1) Overall process and steps of the preliminary risk assessment

According to the principle and method for the preliminary risk assessment (PRA) mentioned in the previous section, 817 cities are evaluated by three factors in principle in order to select candidate cities for the demonstration project, although factors are based on different levels of data in the gradual evaluation steps. There are three steps to narrow the range of selection from whole cities to final candidate cities (at least three cities to one city in each country) in consideration with efficient and available data collection for the cities.

In case of natural hazard information in AMS, the Global Risk Data Platform (GRDP /UNEP) by the United Nations Environment Programme - Global and Regional Integrated Data-Geneva (UNEP GRID/Geneva) and the United Nations Office for Disaster Risk Reduction (UNISDR) and some updated data by the Global Risk Report-UNISDR (GAR-UNISDR) could be one of the most efficient and suitable data source for the assessment in terms of data homogeneity and accessibility covering all members' countries.

In addition to GRDP/UNEP information, data collection is implemented by desk-top surveys (e.g. web-site) for basic or general information of cities and field surveys by the sub-contract survey in each member's state. On the other hand, the evaluation process would take in account of interactions by each country with recommendation on some candidate cities within each country under their considerations. The process is briefed in the followings including Table 2.2.2 and detailed assessments are described in the further sections.

- **STEP 1:** First Preliminary Risk Assessment (1<sup>st</sup> PRA) for “Middle List Cities”

The 817 cities listed in the long list extracted from all local governments in AMS are assessed by two factors of their higher intensity and risks of key potential natural hazards risks and considerable exposures vulnerability (regional infrastructure: seaport and airport) and cities recommended by each member's country to narrow the long list down to the middle list of cities.

- **STEP 2:** Second Preliminary Risk Assessment (2<sup>nd</sup> PRA) for “Short List Cities”

The selected cities as the middle list are assessed by three factors of natural hazards, exposure and capacity based on data from the survey on cities to narrow them down to short listed cities through discussions and recommendation by each member's state.

- **STEP 3:** Evaluation for candidates on “Short List Cities”

The cities are finally evaluated and selected as candidates for the demonstration projects through discussions and recommendation by each member's state in consideration with consistency with the principles of the demonstration project.



**Table 2.2.2 Overall Steps and Assessment and Evaluation Process for the Selection of Candidates for the Demonstration Project**

Assessment	Preparation	STEP-1	STEP-2	STEP-3	Selection
		1 <sup>st</sup> PRA for Middle List	2 <sup>nd</sup> PRA for Short List	Evaluation for Candidate Cities	
Hazard Risk	Data Collection**	●	●	--	--
Exposure		●	●	--	--
Vulnerability		--	●	--	--
Coping Capacity		--	●	--	--
Project Principles Consistency		--	--	●	--
Major data source	--	GRDP/UNEP** / Data Collection***	GRDP/UNEP Data Collection***/ Survey Data****	All available data	--
Each Member's State involvement		Recommendation	Recommendation	Discussion and Recommendation	--
Cities to be assessed		Long List Cities	Middle List Cities	Short List Cities	Candidates
Numbers of LGU	2,431*	817	56	(20~30)	(3~8)

Note: \*\*GRDP/UNEP: UNEP-GRID/Geneva, UNISDR, \*\*\*Data collection mainly through desk-top (web-site documents, satellite imageries), \*\*\* the data gathering survey through sub-contract conducted by JICA Project Team, \*The number of 2,431 includes all local governments (rural and urban) and 817 cities among local governments are covered for the preliminary risk assessment.

Source: JICA Project Team

## (2) Methodology of Assessment and Evaluation

Assessments of 1<sup>st</sup> PRA and 2<sup>nd</sup> PRA, and final evaluation are taken by quantitative analysis in principle through scoring elements by grade in relation to criteria. In addition, based on the assessment results of each city scored by grades (e.g. 5~1 points), discussions are/were held with each AMS representative (National Project Coordinator: NPC) in order to review and recommend cities if they have other candidates of cities. Detailed scoring methods in each step are described in further sections.

## (3) Assessment and Evaluation Criteria in Each Step

Criteria for the assessments and evaluation are set in consideration with applicability in each step analysis. In case of STEP-1(1<sup>st</sup> PRA), homogeneity and availability of data is considerable conditions to cover and assess 817 cities, and information based on the sub-contract surveys for the selected cities could allow more detailed criteria in STEP-2 (2<sup>nd</sup> PRA).

Qualitative criteria for STEP-3 are applied to final selection of candidates for which decision making is required by member's state and relevant stakeholders through evaluation of consistency with the evaluation principles of demonstration project. Table 2.2.3 describes each assessment and evaluation criteria in each work step.

**Table 2.2.3 Applicable Criteria in Each Step for Assessments and Evaluation**

Assessment / Evaluation	STEP-1	STEP-2	STEP-3
	1 <sup>st</sup> PRA	2 <sup>nd</sup> PRA	Evaluation for Candidate Cities
	Criteria for Middle List	Criteria for Short List	Criteria for Candidates
Hazard Risk	<ul style="list-style-type: none"> <li>• Earthquake (intensity)<sup>1</sup></li> <li>• Tsunami (frequency)<sup>1</sup></li> <li>• Flood (estimated risk)<sup>1</sup></li> <li>• Tropical cyclones surge (frequency)<sup>1</sup></li> <li>• Tropical cyclones wind (estimated risk)<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Natural hazard s/risks data based on each city data<sup>3</sup></li> <li>- Earthquake/Tsunami/Flood</li> <li>- Tropical cyclones surge/wind</li> </ul>	---
Exposure	<ul style="list-style-type: none"> <li>• Population<sup>2</sup></li> <li>- Excluding national capital cities</li> <li>- Over 10,000 population</li> <li>- Percentile 90%</li> <li>• Physical exposures<sup>2</sup></li> <li>- Location of regional ports</li> <li>- Location of regional airports</li> <li>• Economic exposure<sup>2</sup></li> <li>- Major industry areas</li> </ul>	<ul style="list-style-type: none"> <li>• Population</li> <li>- Potentially affected population<sup>3</sup></li> <li>- Population density/growth rate<sup>2/3</sup></li> <li>• Physical exposures</li> <li>- Potentially affected regional infrastructure<sup>3</sup>(road, port, airport)<sup>3</sup></li> <li>• Economic exposure</li> <li>- Potentially affected GRDP/UNEP<sup>3</sup></li> <li>- Potentially affected industrial areas<sup>3</sup></li> </ul>	---
Capacity	Not applicable	<ul style="list-style-type: none"> <li>• Urban planning and institution<sup>3</sup></li> <li>• Community resilience<sup>3</sup></li> <li>• Capable disaster response system<sup>3</sup></li> <li>• Information and communication<sup>3</sup></li> <li>• Urban utilities system<sup>3</sup></li> <li>• Logistics and transportation system<sup>3</sup></li> <li>• Medical care and rescue system<sup>3</sup></li> <li>• Evacuation and shelter system<sup>3</sup></li> <li>• Quick recovery system<sup>3</sup></li> <li>• Others<sup>3</sup></li> </ul>	---
Consistency to Principles of Project	---	---	<ul style="list-style-type: none"> <li>• Representativeness</li> <li>• Replicability</li> <li>• Sustainability and preparedness</li> <li>• Economic significance and others in line with national policies</li> </ul>

Note: Data Resources

1 GRDP/UNEP: UNEP-GRID/Geneva, UNISDR

2: Data collection mainly through desk-top (web-site documents, coordinates by satellite imageries=google earth)

3: Survey data mainly through the data gathering survey through sub-contract conducted by JICA Project Team in each AMS

Source: JICA Project Team

### 2.2.3 Natural Hazard Conditions in ASEAN

#### (1) Key major natural hazards

The ASEAN region, geographically located in Southeast Asia, belongs to tropical climate zone except the northern parts of Lao PDR, Myanmar and Vietnam that belongs to temperate climate zone. The region receives plentiful precipitation in general, while precipitation decreases to extremely lower levels in regions where dry and wet seasons are apparent. In addition, typhoons or cyclones develop in the area of the Pacific off the Philippines or Bengal Bay, respectively. Such climate background is a cause of natural disasters such as floods, storms and drought in the ASEAN region.

From a geological point of view, the ASEAN region is composed of three tectonic plates, i.e., the Eurasia Plate, Philippine Ocean Plate and Australia Plate. Collision of these tectonic plates causes earthquakes/tsunamis and volcano eruptions. Further, the volcanic geology susceptible to erosion together with plentiful rainfall causes sediment disasters in Indonesia and Philippines where volcanoes

are present. All these natural conditions provide the background of natural disasters that have struck the ASEAN region. Based on the Emergency Events Database (EM-DAT)<sup>2</sup>, in ASEAN regions, there are mainly seven types of hazards in terms of numbers of occurrence between 1980~2011; earthquake including tsunami, flood, sediment disaster (wet), sediment disaster (dry), storm, volcano, and drought.

## (2) Earthquake and tsunami in ASEAN

As the earthquake-related disaster, this project targets two hazards, namely, earthquake and tsunami. In this section, the characteristics and past significant events of these hazards in the ASEAN region are explained.

### 1) Earthquake

As Figure 2.2.4 illustrates the past seismic activities, ASEAN is a region of varying high seismic hazard. Especially, Philippines and Indonesia where locate near tectonic plates had a lot of earthquake in past. Most proportion of earthquake casualties in ASEAN region occurred in the two countries (Table 2.2.4). In addition, though there has been no such significant damage, Myanmar has Sagaing fault which has possibility of causing devastating damage and earthquake hazard map of Figure.2.2.1 shows high seismic risk in Myanmar.

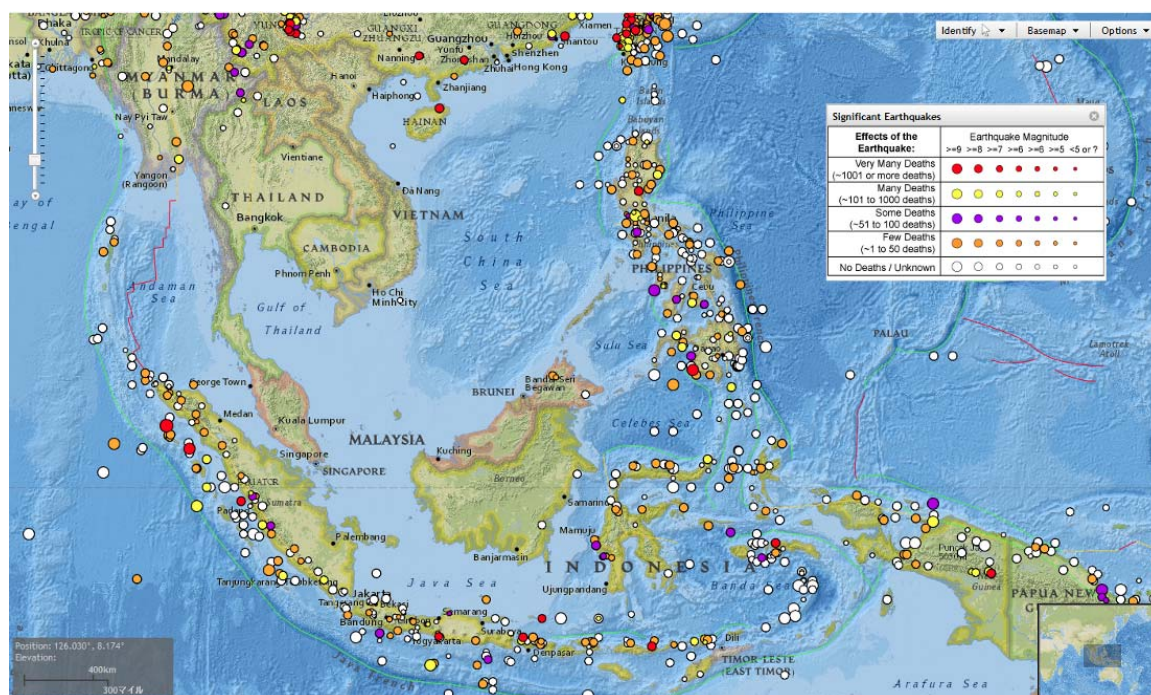
**Table 2.2.4 Earthquakes with 1,000 or more deaths in ASEAN region (since 1900)**

No.	Date UTC	Location	Magnitude	Deaths
1	20/01/1917	Bari, Indonesia	-	1,500
2	16/08/1976	Mindanao, Philippine	7.9	8,000
3	16/07/1990	Luzon, Philippine	7.7	1,621
4	12/12/1992	Flores Region, Indonesia	7.5	2,500
5	26/12/2004	Sumatra, Indonesia	9.1	*227,898
6	23/08/2005	Northern Sumatra, Indonesia	8.6	1,313
7	26/05/2006	Yogyakarta, Indonesia	6.3	5,749
8	30/09/2009	Southern Sumatra, Indonesia	7.5	1,117

Note: \*: includes deaths from resulting tsunami, UTC: Coordinated Universal Time

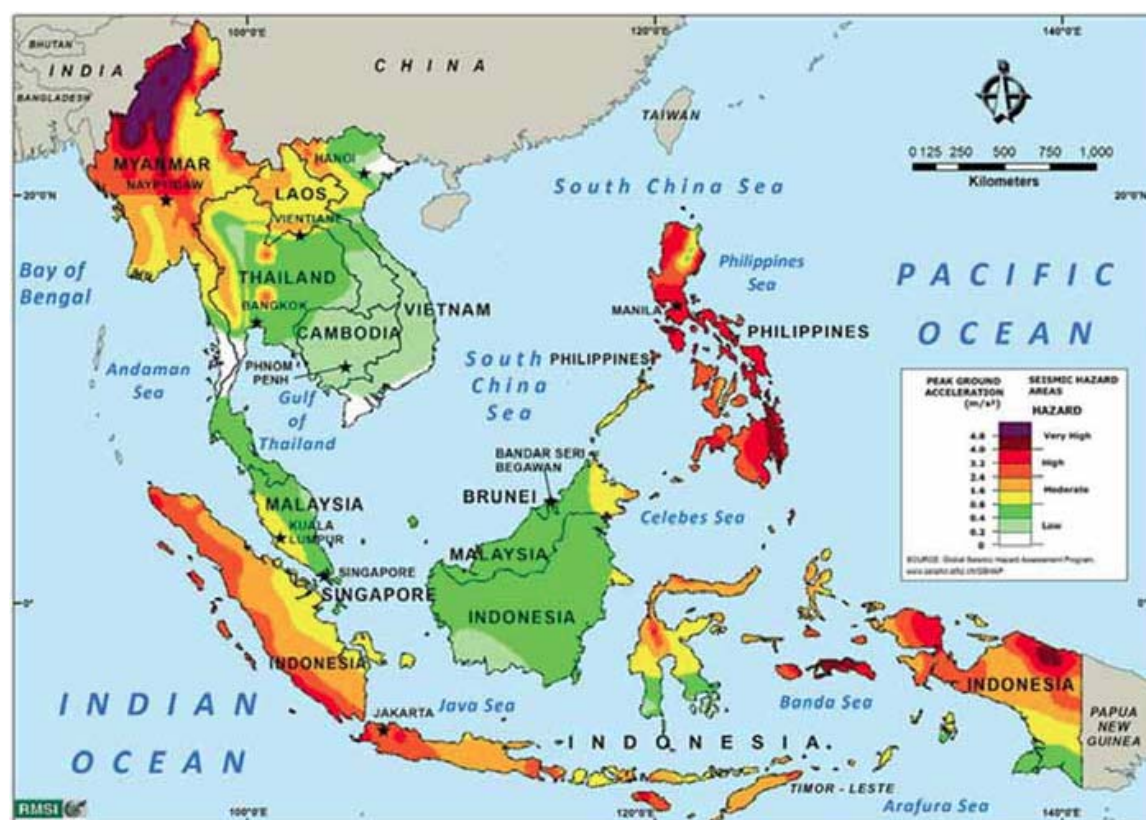
Source: JICA Project Team based on EM-DAT

<sup>2</sup> EM-DAT: The OGD/CRED International disaster database: [www.emdat.be](http://www.emdat.be) - Université Catholique de Louvain - Brussels – Belgium



Source: JICA Project Team based on the National Oceanic and Atmospheric Administration

**Figure 2.2.1 Past significant seismic activities in ASEAN region**



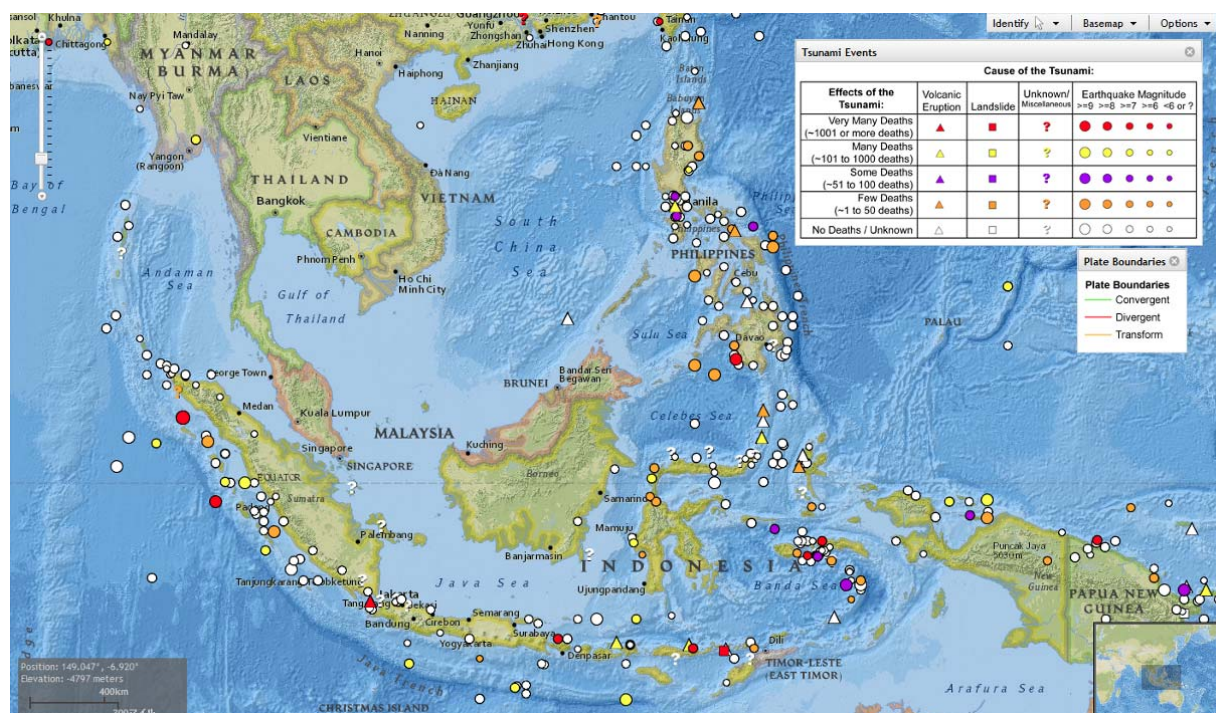
Source: JICA Project Team based on the Global Seismic Hazard Assessment Program (GSHAP) 1998

**Figure 2.2.2 Earthquake hazard map of ASEAN**



## 2) Tsunami

The Indian Ocean tsunami that occurred on December 26, 2004 is the worst tsunami ever recorded, in terms of lives lost according to the United State Geological Survey (USGS). The earthquake-generated tsunami affected 14 countries, including Indonesia, Thailand, Myanmar, Malaysia of ASEAN countries, and this event killed about 174,500 people in the 14 countries. Besides this event, Philippines had a lot of tsunami event in the past as Figure. 2.2.2 shows and the possibility of future significant event and damage should be paid attention.



Source: JICA Project Team based on the National Oceanic and Atmospheric Administration

**Figure 2.2.3 Past significant tsunami events in ASEAN region**

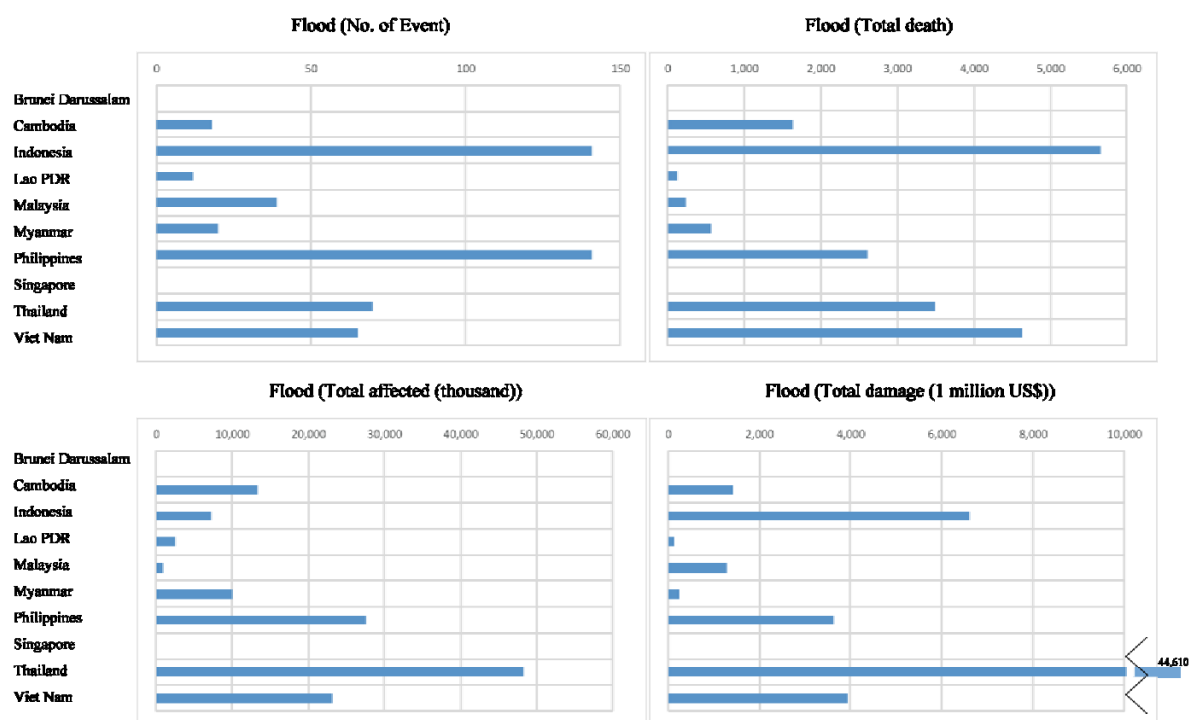
### (3) Flood and water hazards in ASEAN

In terms of water related hazard, there are five types; flood, flash flood, drought, storm, and sediment disasters by rainfall. JPT consulted on the 2nd Project Steering Committee meeting (3 December, 2015), flood, cyclones/typhoon wind, and cyclones/typhoon surge is determined to be considered in this project.

Based on EM-DAT, for the last three decades, the outline of flood in ASEAN is summarized in Figure 2.2.4. A lot of people were affected and even killed in Indonesia, Philippines, Thailand, and Viet Nam. Almost all countries are considered to be flood-prone countries. In addition, Thailand is remarkable in the graph of estimated total damage cost that is due to the flood disaster in August - December 2011.

### (4) Storm

The outline of storms for the last three decades is summarized in Figure 2.2.5. Storms occur most frequently in Philippines followed by Viet Nam, affecting lot of people and causing death. In Myanmar, though the frequency of storm is not so high as compared with the Philippines and Viet Nam, the death and estimated damage cost were considerably high. In particular, the number of death exceeded to 100,000 due to Cyclone Nargis in May, 2008.



Note: The data collection from 1986 to 2015, created in June 2016, from “EM-DAT” (<http://www.emdat.be>)

Source: JICA Project team based on EM-DAT.

**Figure 2.2.4 Outline of Flood Disaster for 30 years**



Note: The data collection from 1986 to 2015, created in June 2016, from “EM-DAT” (<http://www.emdat.be>)

Source: JICA Project Team based on EM-DAT.

**Figure 2.2.5 Outline of Storm Disaster for 30 years**

## 2.3 1<sup>st</sup> Preliminary Risk Assessment for Middle List Cities

### 2.3.1 Basic Status of Long List Cities (817 cities)

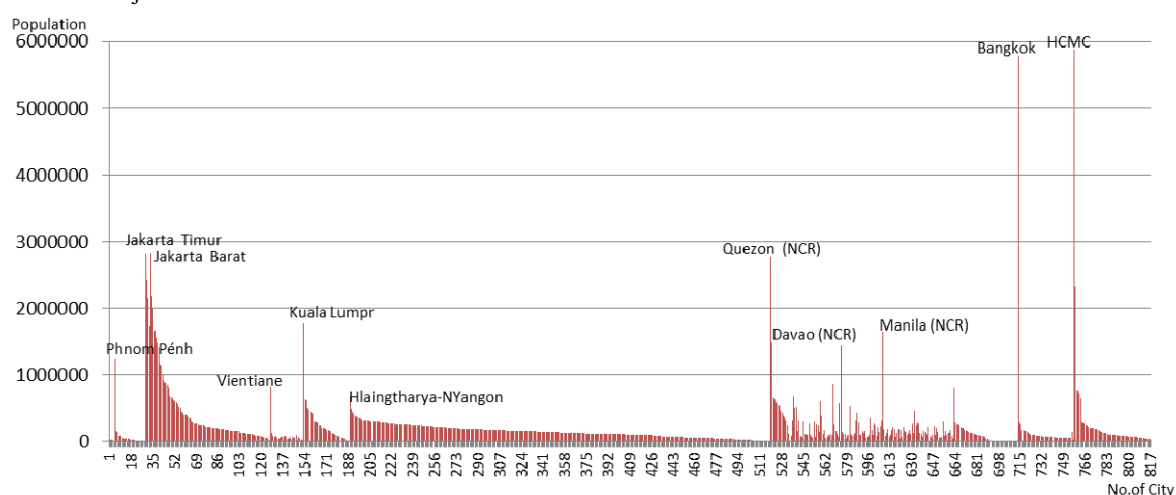
#### (1) Distribution and population of the long list cities in AMS

The 817 cities as “long list cities” are identified and extracted by urban administrative status local governments in AMS. Those cities include numbers of population from the capital city or the secondary cities with the largest population in each country (e.g. Ho Chi Minh City (HCMC): 5,880 thousand populations) to the smallest population city such as Injanyang township in Myanmar (1,732 populations). Reflecting the different administration system of AMS in numbers of the cities, there are considerable gaps of city population between large population countries such as Myanmar, Philippines and Indonesia and others, while average numbers of city population range widely around 20,000 populations to around 500,000. Detailed data of the long list cities are indicated in Appendix 3.

**Table 2.3.1 Character of Long Listed Cities in AMS**

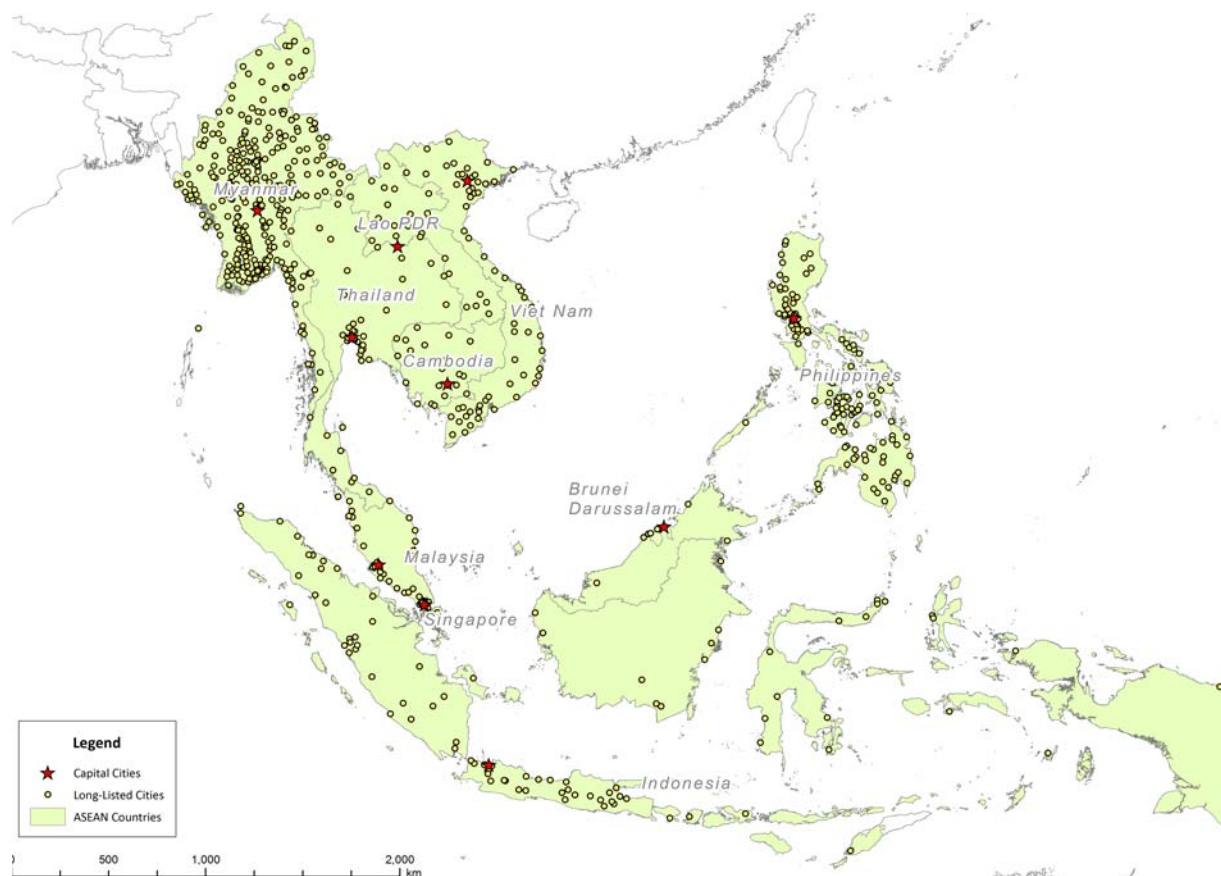
AMS (code)	Number of Cities	Population Indicators (,000)			Administration	Available Data Year
		Max-Min	Average	Median		
BRN	4	21~13	19	21	Municipal Council (District Capital)	1991
KHM	24	1,243~4	96	35	City	2008
IDN	98	2,834~33	498	222	City	2010
LAO	26	820~23	93	68	District	2015
MYS	36	1,768~17	265	180	City Council/ Municipal Council	2010
MMR	330	688~1	152	139	Township	2014
PHL	145	2,761~6	254	151	City	2010
SGP	49	293~0.01	79	48	Community Development Council	2015
THA	44	5,782~21	225	77	City municipality	2014
VNM	61	5,880~34	291	99	Provincial City / Town	2009
Total	817	5,880~0.01	222	130	--	--

Source: JICA Project Team



Source: JICA Project Team

**Figure 2.3.1 Distribution of Long Listed Cities (817 cities) in AMS**



Source: JICA Project Team

**Figure 2.3.2 Geographical Distribution of Long Listed Cities (817 cities) in AMS**

(2) Considerable exposures to be assessed

*1) Key regional infrastructure*

In line with economic alliance formulation by the establishment of ASEAN Economic Community (AEC) in 2015, the connectivity by regional infrastructure in ASEAN has become one of key priority programs to be enhanced by more efficient and effective logistics, and to be improved by resilient system when natural hazards are happened. In recent years, some regional infrastructures have been suffered by natural hazards and brought enormous damages on the regional economic activities.

When cities are assessed in terms of vulnerability of exposures against potential natural hazards, regional infrastructure represented by seaports and airports as considerable exposures are considered in the context abovementioned whether those infrastructure serve a city or not. Major regional seaports and airports serving international passengers and regional goods transportation in AMS are identified as shown in Figure 2.3.3.



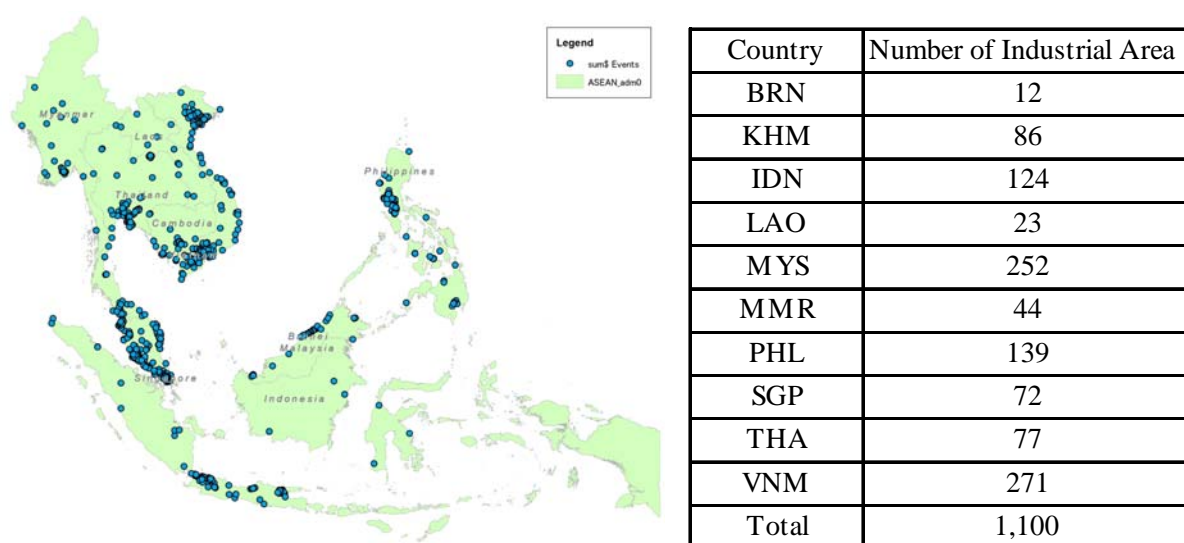


Source: JICA Project Team

**Figure 2.3.3 Major Seaports and Airports in AMS**

## 2) Agglomerate industrial areas

As another considerable exposure, an economic exposure is taken by agglomerate industrial area, in consideration with lessons learnt from past disasters on industrial areas where deteriorated regional supply chain by floods affected considerable damages in ASEAN economic activities. In this section, the certain level of industry area by large scale of property (more than 1~2 ha) and modern type of industry area is considered to choose them through reviews on industrial estate lists and visual analysis of satellite imageries of AMS.



Source: JICA Project Team

**Figure 2.3.4 Agglomerate Industrial Areas in AMS**

## 2.3.2 Assessment of Long List Cities for Middle List Cities

### (1) Preconditions of the 1<sup>st</sup> PRA

#### 1) *Representative natural hazards and risks as primary assessment criteria in AMS*

As mentioned in the previous section 2.2.3, natural hazards typically happened in AMS are considered as considerable risks to affect exposures. Types of natural hazards are identified as “earthquake”, “tsunami”, “flood” and “wind by tropical cyclones wind and surge including monsoon and typhoon” for the 1<sup>st</sup> PRA, utilizing published natural hazard data with some risk assessment data by UNEP/UNISDR. The further sections describe in detail.

And it should be noted that draught and other natural hazards for the assessment are excluded as following reasons.

- Draught is one of the complexed phenomena of natural hazard events where they often happen at a long term and wide range damages on local areas. Therefore their scientific researches are still not established internationally yet for assessment. In this condition, cities cannot be assessed by these events of which spatial data for exposure vulnerability are not available.
- Other natural hazards by volcano eruption are also excluded, because they happen in limited countries with those potential natural hazards in AMS, and wildfires are not considered also as natural hazards on cities (urban area) critically affected. On the other hand, there are no integrated data and sources at cities level in AMS.

#### 2) *Cities as typical scale of population in AMS*

As briefed in the previous section 2.2.2, cities in the long listed cities are considered by appropriate scale of populations for 1<sup>st</sup> PRA according to the principles for the demonstration project. The followings are criteria to narrow down through identification of cities consistent with the principles.

- City at medium scale population in AMS: The capital cities and small cities under 10,000 populations are excluded in principle in order to fit with the principle for demonstration project.
- Number of cities within 90% percentile in each AMS: top 5% numbers of cities with largest population and bottom 5% cities are excluded in order to identify representative cities in AMS in terms of predominant population scale in the long list cities.

#### 3) *Stakeholder’s review and modification*

As mentioned in the previous section 2.2.2, the results of cities assessed and selected preliminarily by quantitative scoring are reviewed by each member state of AMS through discussions with NPC. Taking account of appropriateness by local information and conditions in each state of AMS, list of cities assessed for the middle list cities are modified and finalized.

### (2) Key Exposures Status by Numbers and Location on the Cities for Vulnerability Assessment

Regional seaports and airports as key exposures were assessed by their considerable magnitude in terms of proximity to city as vulnerability against natural hazards by indicators shown in Table 2.3.2.

In other words, regional infrastructure was considered by magnitude of socio-economic linkage between the city and them.

In a similar way of the key infrastructure, agglomerate industrial areas were assessed by their vulnerability in consideration with distance from city and numbers of agglomerate industrial areas. And both of indicators were scored by grade (1~3) as shown in Table 2.3.2.

**Table 2.3.2 Measurement Indicators and Scoring Grade for Key infrastructure and Agglomerate Industry Area**

Key exposures		Scoring Grade by Conditions			
		3 points	2 points	1 point	0 point
Key Infrastructure	Regional airport (A)	Located within 10 km (A+S)	Within 10 km either A or S	Within 10 ~20 km range (A+S, A or S)	No facilities
	Regional seaport (S)				
Agglomerate Industrial Area		Located within 10 km by multiple areas	Within 10 km by single area only	Within 10 ~20 km range by single or multiple	No facilities

Source: JICA Project Team

### (3) Assessment of Earthquake & Tsunami on the Cities

For 1<sup>st</sup> PRA, earthquake and tsunami hazard are evaluated by the data which is based on Global Risk Data Platform (GRDP/UNEP) and previous study result. The index used for assessment is shown in table below.

**Table 2.3.3 Hazard index for 1<sup>st</sup> Preliminary Risk Assessment**

Item	Index	Unit	Mesh size
Earthquake	Peak Ground Acceleration(PGA)	Gal	0.1 degree
Tsunami	Tsunamis frequency	Percentage	0.0083 degree

Source: JICA Project Team

Earthquake hazard data of GRDP/UNEP is based on GSHAP dataset. Index represents expected PGA (Peak Ground Acceleration) with 10% exceedance probability in 50 years. This GSHAP data is not so detailed at local level, but ASEAN region is evaluated comprehensively with same methodology. Therefore, this dataset was picked up for the hazard assessment on the 1<sup>st</sup> preliminary assessment.

On the other hand, tsunami hazard data of GRDP/UNEP is based on the data of the Global Assessment Report on Risk Reduction (GAR) designed by International Centre for Geo-hazards /NGI. Index represents expected affected percentage of each mesh over a minimum return period of 500 years.

Based on these data, hazard index value of each long city was extracted on GIS from the maximum hazard index among meshes within approximately 10km radius of the city coordinates.

### (4) Flood & Other Water Hazards and Risk on the Cities

#### 1) Characters of flood and other water hazards

Floods are not able to be explained by one parameter, not only rainfall. Floods usually result from a combination of meteorological, hydrological and hydraulic extremes, such as extreme

precipitation (rainfall), infiltration into the ground, runoff from ground surface and underground and flows in and/or over river channels, lakes, ponds, ground surface, etc.

In ASEAN countries, floods are the most frequently occurring destructive natural events affecting both rural and urban region. Also, there are several types of floods as shown in Table 2.3.4. In this study, mainly the flood is considered as urban flood defined in Table 2.3.4.

**Table 2.3.4 Type and Cause of Floods**

Types of flooding	Causes		Onset time	Duration
	Naturally occurring	Human induced		
Urban flood	Fluvial (river), Coastal, Flash, Pluvial (overland), Groundwater	Saturation of drainage and sewage capacity, Lack of permeability due to increased concretization, Faulty drainage system and lack of management	Varies depending on the cause	From few hours to days
Pluvial and overland flood	Convective thunderstorms, severe rainfall, breakage of ice jam, glacial lake burst, earthquakes resulting in landslides	Land used changes, urbanization, Increase in surface runoff	Varies	Varies depending upon prior conditions
Coastal (Tsunami, storm surge)	Earthquakes, Submarine volcanic eruptions, Subsidence, Coastal erosion	Development of coastal zones, Destruction of coastal natural flora (e.g., mangrove)	Varies but usually fairly rapid	Usually a short time however sometimes takes a long time to recede
Groundwater	High water table level combined with heavy rainfall, Embedded effect	Development in low-lying areas; interference with natural aquifers	Usually slow	Longer duration
Flash flood	Can be caused by river, pluvial or coastal systems; convective thunderstorms; GLOFs	Catastrophic failure of water retaining structures, Inadequate drainage infrastructure	Rapid	Usually short often just a few hours
Semi-permanent flooding	Sea level rise, land subsidence	Drainage overload, failure of systems, inappropriate urban development, Poor groundwater management	Usually slow	Long duration or permanent

Source: Cities and Flooding 2012, pp 56-57

Water hazard events in general have a probability of occurrence within a specified period within a given area, and have a given intensity. Therefore these assessments require the studies related to analysis of physical aspects and phenomena through the collection of historical or near real time records. In this study, therefore, only authorized data is used as hazard assessment.

## 2) Assessment of flood and other water hazards on the cities

For 1<sup>st</sup> PRA, the cities on the long list were assessed by conditions of flood, tropical cyclones including monsoon and typhoon by wind (storm) and surge in each state of AMS. GRDP/UNEP data as the secondary data were used for 1<sup>st</sup> PRA, which are open source data by UNEP/GRID-Geneva in association with UNISDR. Data source is summarized as following Table 2.3.5. It should be noted that the data base of GRDP/UNEP is considered useful to evaluate and compared on a same assumption for hazard assessment although data years are not latest (2015/2016) and some evaluation process and methodology are not publicized clearly.

**Table 2.3.5 Flood and Water Hazard Assessment by GDPR Data**

Items	Data utilized for 1st PRA	Source
Cyclones	Assessment data of tropical cyclones mortality risk in the ASEAN region by 5 grades evaluation	UNEP/GRID-Geneva/UNISDR
Cyclones storm surges		
Floods	Assessment data of flood mortality risk in the ASEAN region by 5 grades evaluation	

Source: Web page on Global risk data platform (<http://preview.grid.unep.ch/>)

(5) Quantitative Assessment of Natural Hazard Risks and Exposure Vulnerability on the Cities

1) *Natural hazards (risks) assessment at the cities*

The cities in the long list were assessed by the score of which each different value was given by the 5km grid units. In other words, the locations of cities identified by coordinates were automatically given by score of the grid of GRDP/UNEP through GIS spatial analysis.

2) *Scoring for Natural hazards' assessment*

The assessment and index for the natural hazard and the exposure vulnerability resulted from works in (2), (3) and (4) were evaluated in a integrated manner through their normalization process taking account of weight factor given higher scores to the factors of natural hazard points (by ten-point scale of score), while exposure vulnerability by three-point scale of score. Table.2.3.6 shows overall criteria for scoring values including criteria of the exposure vulnerability.

**Table 2.3.6 Criteria for Assessment Scoring of Cities in AMS**

Rank in All Cities in the Long List	Scoring Point
Top 20% ranking cities	10 points
20~40%	8 points
40~60%	6 points
60~80%	4 points
Bottom 80~100%	2 points
No hazard possibility*	0 points

Note: \*only in the case of tsunami hazard

Source: JICA Project Team

3) *Consideration with overall assessment of the cities*

Each score of the natural hazards and the exposure vulnerability were assessed and listed as draft priority cities for the middle city list taking account of the following considerations.

- *Cities representing each typical natural hazard:* Each type of natural hazard may have own and appropriate disaster mitigation measure to maximize the effectiveness coping with particular characteristic of natural hazard. Therefore scores of each natural hazard are not integrated in order to select typical cities for each typical natural hazard

- *Referential scores for vulnerability of exposures:* The scoring values for vulnerability of key exposures (regional seaport and airport, agglomerate industrial area) are considered as referential values.

#### 4) Final Evaluation of Cities for Middle List

Based on the result of quantitative assessment, the draft middle list cities were reviewed by each NPC of AMS and there were some necessary modification reflected by their concerns through confirmations by relevant city authorities in each AMS.

#### (6) Final List of Middle List Cities

The results of 1<sup>st</sup> PRA (1st Preliminary Risk Assessment) are shown in the following tables of Table 2.3.7 as a summary table and each list for the country from Table 2.3.8 to Table 2.3.15. The major findings are briefed as follows. Appendix 4 shows the Middle List Cities with each assessed score in detail.

- 56 cities (6.8 % out of total cities) among AMS countries are selected from the long list cities (817 cities).
- Selected cities are distributed mainly in Myanmar, and followed by Indonesia, Malaysia, Philippines and Vietnam in terms of numbers of cities affected by absolute numbers of cities in the long list cities.
- Number of cities with “Flood” (34 cities; 60 % of the total selected cities) is predominant followed by cities with Tsunami where earthquake is presumed as incidental events in such Indonesia, Myanmar Malaysia and Philippines.
- Some cities in AMS having multi-natural hazard potentials are not specified in consideration with the principles of demonstration project and expected conditions by difficult counter mitigation measures against multi-hazard and their probability. Therefore cities with potential multi-natural hazards are listed by a represented natural hazard.
- Since the disaster risk in Brunei Darussalam and Singapore is smaller than other AMS, the cities in these countries are not listed in the middle list.

**Table 2.3.7 Summary of Middle List Cities by the 1st Preliminary Risk Assessment**

AMS	Number of Cities with Typical Natural Hazards and Risks Type					Total
	EQ	Tsunami	Flood	CY-wind	CY-surge	
BRUNEI DARUSSALAM	-	-	-	-	-	0
CAMBODIA	-	-	3	-	-	3
INDONESIA	3	3	3	-	-	9
LAO PDR	-	-	3	-	-	3
MALAYSIA	-	2	4	-	-	6
MYANMAR	3	5	4	-	-	12
PHILIPPINES	1	1	4	3	-	9
SINGAPORE	-	-	-	-	-	0
THAILAND	-	-	5	-	-	5
VIET NAM	-	-	9	-	-	9
Total	7	11	34	3	0	56

EQ: earthquake, CY Wind: Tropical cyclones wind/storm including typhoon, monsoon, CY Surge: Tropical cyclones surge including typhoon, monsoon

Source: JICA Project Team



Source: JICA Project Team

**Figure 2.3.5 Distribution of Middle Listed Cities by Natural Hazard Type in AMS****Table 2.3.8 CAMBODIA Middle List Cities by the 1st Preliminary Risk Assessment**

Potential Major Natural Hazard Risks	District Capital (City/Town: Krong)	Key Exposures (City & Surroundings)	
		Population	Infrastructure & Industry
Flood	1. Phnom Penh	1,242,992	1 SEZ and 15 industrial areas, International Airport
	2. Battambang	140,533	2 industrial areas, Local airport (closed)
	3. Kampong Cham	47,300	2 industrial areas

Source: JICA Project Team

**Table 2.3.9 INDONESIA Middle List Cities by the 1st Preliminary Risk Assessment**

Potential Major Natural Hazard Risks	City/Town: Kota	Key Exposures (City & Surroundings)	
		Population	Infrastructure & Industry
Flood	Semarang	1,672,999	19 industrial areas (L), Local airport /seaport
	Samarinda	797,006	2 industrial areas (L), Local airport
	Gorontalo	197,970	Local airport/seaport
Earthquake	Ambon	395,423	Local airport /seaport
	Bitung	202,204	5 industrial areas (s), Seaport
	Bima	156,400	Local airport /seaport
Tsunami	Bandar Lampung*	1,167,101	2 industrial areas, Local airport/seaport
	Denpasar	880,600	Tourism resorts, Int'l airport /seaport
	Banda Ache	249,499	1 industrial area (planned), Int'l airport/seaport

Note: \* Multi-hazard of both flood and tsunami is to be considered for Bandar Lampung.

Source: JICA Project Team

**Table 2.3.10 LAO PDR Middle List Cities by the 1st Preliminary Risk Assessment**

Potential Major Natural Hazard Risks	District: Muong	Key Exposures (City & Surroundings)	
		Population	Infrastructure & Industry
Flood	1.Takhek	90,800	3 industrial areas, Domestic airport (thai)
	2.Luangprabang	90,300	Tourism site (WH), International Airport
	3.Pakxane	45,000	Not specifically

Source: JICA Project Team

**Table 2.3.11 MALAYSIA Middle List Cities by the 1st Preliminary Risk Assessment**

Potential Major Natural Hazard Risks	District	Key Exposures (City & Surroundings)	
		Population	Infrastructure & Industry
Flood	1.Kuala Terengganu	343,284	2 industrial areas, Local airport/local river port
	2.Sibu	247,995	1 industrial area, Local airport
	3. Kuala Muda (Sungai Petani)	456,605	6 industrial areas
Tsunami	4. Timur Laut (George Town)	520,242	7 industrial areas, tourism (WH), Int'l airport/seaport
	5. Kota Setar (Alor Setar)	366,787	15 industrial areas, Local airport
	6.Langkawi	94,997	International Airport, Seaport, Tourism Resorts

Source: JICA Project Team



**Table 2.3.12 MYANMAR Middle List Cities by the 1st Preliminary Risk Assessment**

Potential Major Natural Hazard Risks	Township (mojone)	Key Exposures (City & Surroundings)	
		Population	Infrastructure & Industry
Flood	1.Kale	307,194	1 industrial area, Local airport
	2.Nyaung-U	239,947	Historic tourism area, Local airport
	3.Kyimyindaing-WY	111,514	8 industrial areas, Int'l airport / river port
Cyclone Wind*/ Cyclone Surge**	4.Mrauk-U*	189,630	--
	5.Rathedaung**	111,974	Not specifically
	6.Hakha*	48,352	--
Earthquake	7.Myingyan	276,096	1 industrial area
	8.Amarapura	237,618	International Airport
	9.Pwintbyu	163,692	Not specifically
Tsunami	10.Kyaukpyu	165,352	1 SEZ industrial area, Local airport / seaport
	11.Toungup	158,341	Not specifically
	12.Manaung	56,966	Local airport

Source: JICA Project Team

**Table 2.3.13 PHILIPPINES Middle List Cities by the 1st Preliminary Risk Assessment**

Potential Major Natural Hazard Risks	City	Key Exposures (City & Surroundings)	
		Population	Infrastructure & Industry
Flood	1.Butuan	309,709	6 industrial areas, Local airport, seaport
	2.Meycauayan	199,154	4 industrial areas
	3.Cavite	101,120	8 industrial areas, Int'l & air base / seaport
Cyclone Wind*/ Cyclone Surge**	4.Iloilo*	424,619	3 industrial areas, Local airport / seaport
	5.Dagupan*	163,676	3 industrial areas, Local river port
	6.Laoag*	104,904	Local airport
Earthquake	7.Mandaue	331,320	10 industrial areas, Int'l airport / seaport
	8.Batangas	305,607	5 industrial areas, Seaport
	9.Olongapo	221,178	8 industrial areas, Navy air base / seaport

Source: JICA Project Team

**Table 2.3.14 THAILAND Middle List Cities by the 1st Preliminary Risk Assessment**

Potential Major Natural Hazard Risks	Province (Changwat ) / District (Amphoe)	Key Exposures (City & Surroundings)	
		Population	Infrastructure & Industry
Flood	1. Pathum Thani / Pathum Thani	220,154	1 industrial areas
	2. Rayong / Rayong	364,544	7 industrial areas, Int'l airport / seaport
	3. Nan / Wiang Sa	67,861	Local Airport
Cyclone Wind*/ Cyclone Surge**	4. Nakhon Si Thammarat / Pak Phanrang*	85,487	Local Airport
	5. Songkla / Ranot*	62,220	Local Airport /seaport

Note: \* Monsoon surge is potential major natural hazard risks for Nakhon Si Thammarat and Songkla.

Source: JICA Project Team

**Table 2.3.15 VIETNAM Middle List Cities by the 1st Preliminary Risk Assessment**

Potential Major Natural Hazard Risks	Prov. City (TP/TTT)/ District Town (TX)	Key Exposures (City & Surroundings)	
		Population	Infrastructure & Industry
Flood	1.Hue	302,983	WH tourism site, Int'l airport / Local river port
	2.Hoi An	69,222	WH tourism site, Local river port
	3.Anh Khe	63,118	2 industrial areas
Cyclone Wind*/ Cyclone Surge**	4.Dong Hoi**	76,058	3 industrial areas, Local airport / river port
	5.Ha Thin**	63,415	Not specifically
	6.Song La*	56,848	Local airport
Tsunami	7.Qui Nhon	255,463	6 industrial areas, Local airport / seaport
	8.Ha Long	201,990	5 industrial areas, WH tourism, Seaport
	9.Bac Lieu	109,529	Not specifically

Source: JICA Project Team

## 2.4 2<sup>nd</sup> Preliminary Risk Assessment for Short List Cities

### 2.4.1 Methodology of 2nd Preliminary Risk Assessment for the Short List Cities

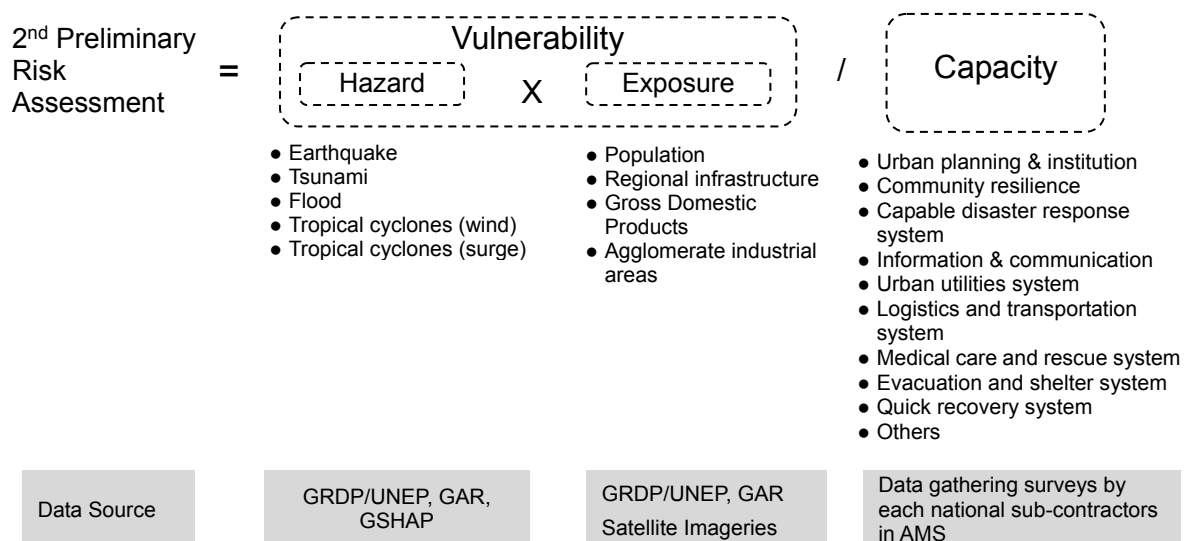
The 2<sup>nd</sup> preliminary risk assessment (2<sup>nd</sup> PRA) aims to narrow the middle list cities down to the short list cities followed by the step of final selection of candidate cities for the demonstration project in AMS. This is assessed by the baseline data of which information in conjunction with natural hazards, hazard management activities, organization and other relevant data were collected by the field surveys in AMS by local consultants.

As aforementioned in the section 2.1.3, 2<sup>nd</sup>PRA aims at assessing middle listed cities by three factors of hazard, exposure and capacity on each city through utilization of data in combination with the data

gathering survey outputs by the sub-contractors in each AMS, and open-data sources (GRDP/UNEP and GAR) in principle, taking account of data homogeneity and availability at city level in AMS.

In this assessment, factors of hazard and exposure are considered as “Vulnerability” which can be defined by how assets exposed to risks are affected by natural hazards. Figure 2.4.1 illustrates applied formula for the 2<sup>nd</sup> PRA.

And it should be noted that this assessment is examined by comparative evaluation scoring within each state of AMS rather than absolute scoring of whole countries of AMS taking account of variety of socio-economic conditions such as population range and scale of cities in AMS.



Source: JICA Project Team

**Figure 2.4.1 Formula of 2<sup>nd</sup> Preliminary Risk Assessment for Short List Cities**

## 2.4.2 Vulnerability Assessment at the Middle List

As aforementioned in the section 2.4.1, Vulnerability Assessment evaluates based on the hazard factor and the exposure factor. In this section, (1) explains the natural hazard elements and (2) explains the exposure factor. In addition, (3) illustrates the methodology for the Vulnerability Assessment using these two elements. Finally, (4) shows the result of this assessment.

### (1) Natural hazard elements for Vulnerability assessment

The hazard data used for second preliminary risk assessment (2<sup>nd</sup> PRA) is following five items. The indicator and data source for each hazard is described as below.

Hazard	Indicator	Data source
Earthquake	PGA (475 year)	GSHAP
Tsunami	Run up (a frequency 500-year)	GAR
Flood	Flooding depth with a frequency 50-year	GAR
Cyclone/ surge	Flooding depth with a frequency 50-year	GAR
Cyclone/ wind	Record from 1975 to 2007	GRDP

Description each indicator for 2<sup>nd</sup> PRA;

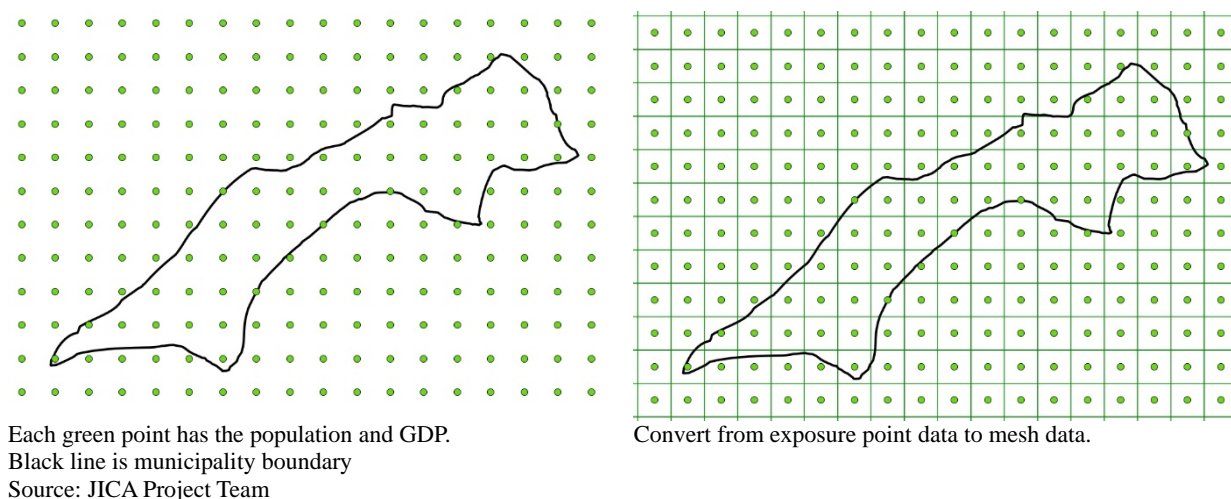
Earthquake:	Earthquake hazard is evaluated in Peak Ground Acceleration (PGA). During an earthquake when the ground is shaking, it also experiences acceleration. PGA is common indicator to express the hazard. Frequency is applied for 475-years (10% in 50 years) as common scale on the basic idea of the expected largest earthquake in the operation period of the building. If PGA is large, the building is likely to collapse. In this study, the threshold of building damage is that PGA is more than 200 gal, and the indicator sets 200, 400, 600 and more than 600 gal.
Tsunami:	Tsunami hazard is evaluated in the extent where is inundated by run-up with 500-year return period. Since GAR data does not clarify the inundation depth, the run-up extent is applied for.
Flood:	Flood hazard has two aspects; a scale of flood and inundation depth. The inundation depth data from GAR is available for 25, 50, 100, 200, 500 and 1000-years return period. In this study, the target flood is primary for 50-years return period, or/and secondly for 100-years return period. The plan for river improvement is designed in entire basin area, however this study focus on the city as point. One city can't handle the flood which is more than 25 years, generally. Also, in this study, the target hazard is not only large one. Therefore, river improvement and river indicator do not have to match for each other. Inundation depth is related to human assets, house assets, road and logistic assets, economical assets and ecological assets. In this study, the target assets are not specified then, the inundation depth is set as 0.0 m.
Cyclone/ wind:	The cyclone wind data from GAR is available for 50, 100, 250, 500 and 1000 years return period. As well as flood hazard, the frequency is set 50-years return period. Cyclone/wind hazard is evaluated in wind speed. Unit of wind speed is km per hour. The threshold of damaged is set more than 90 km/h (= 25 m/s), and the indicator sets 135, 180 and more than 180 km/h.
Cyclone/surge:	Cyclone/surge hazard is evaluated the historical data as well as 1st preliminary risk assessment with GRDP data. Based on the historical data from 1975 to 2007, the extent is evaluated as Tsunami indicator.

## (2) Exposure elements for Vulnerability assessment

In this study, the target assets for exposure element are defined as human assets and physical assets. Human assets represent population. Physical assets represented Gross Domestic Product (GDP) as an economic indicator, agglomerate industrial area, and regional infrastructure to consider spreading damage by the disaster. The regional infrastructure data is defined the seaport and airport.

GAR data (population and GDP) is prepared by point data. The point data were converted to the point data 5 km mesh data. To estimate the population and GDP, this mesh data and municipality overlaps for evaluation.

- Step 1: Convert the point data to mesh data (Figure 2.4.2)
- Step 2: Overlap the municipality boundary
- Step 3: Calculate the values within/on boundary by dividing rate of population of the target municipality.

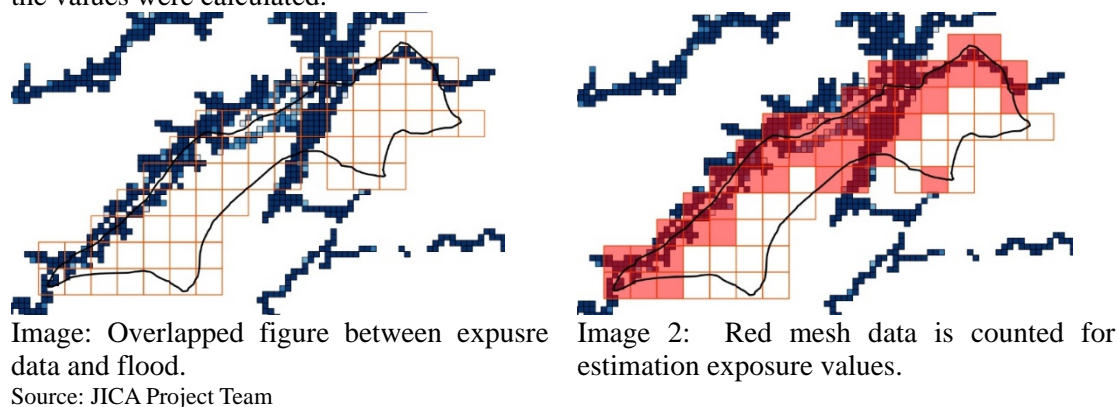


**Figure 2.4.2 Conversion from Exposure Point Data to Mesh Data**

Infrastructure: Industrial area, airport and seaport are evaluated for infrastructure data.

### (3) Methodology of Vulnerability Assessment with Exposure and Hazard

According to exposure, these data were evaluated by mesh data and can be calculated within/on the municipality boundary. As well as hazard data, it can be evaluated by mesh data. Using GIS software, the values were calculated.



**Figure 2.4.3 Image of Estimating Exposure Values**

#### (A) Earthquake and Cyclone/wind

To estimate the exposure population and GDP with the different hazard, earthquake and cyclone/wind should be covered using weighing function since these indicator has value range.

Even the different hazard, the equivalent value should be considered. Weighing function is applied the following Table 2.4.1.

*e.g. for earthquake hazard;*

*Exposure population = (population affected by over 600 gal) x 1.0 + (population affected by from 400 to 600 gal) x 0.8 + (population affected by from 300 to 400 gal) x 0.5 + (population affected by from 200 to 300 gal) x 0.2*

**Table 2.4.1 Weighting Coefficient of Earthquake and Cyclone/Wind**

Earthquake		Cyclone/wind	
Hazard	Population	Hazard	
PGA (gal)	Weight	Wind speed (km/h)	Weight
200 - 300	0.2	90 – 135	0.5
300 – 400	0.5	135 – 180	0.75
400 – 600	0.8	Over 180	1.0
Over 600	1.0		

Source: JICA Project Team

**(B) Agglomerate Industrial Areas and Regional Infrastructure**

As well as 1<sup>st</sup> preliminary risk assessment, the municipality has the agglomerate industrial areas and regional infrastructure. Those items are checked whether locations are within 10km/20km buffer from the municipality center, and are pointed depend on their numbers and distance as the following table.

**Table 2.4.2 Points for Evaluating Agglomerate Industrial Areas and Regional Infrastructure**

Number of the Items	Distance from Center of the Municipality	Points
More than two	10 km	3
One	10 km	2
More than one	10 -20 km	1
None	20 km	0

Source: JICA Project Team

**(4) Assessment Result of Exposure for the Middle List Cities**

The calculation result for each country are tabulated in the following Table 2.4.3.

**Table 2.4.3 Result of Exposure of Earthquake, Tsunami and Infrastructure for 2nd Preliminary Risk Assessment**

ID	Country	City Name	Population	Earthquake			Tsunami			AIA****	RI*****
				Ex-Pop*	Pop-Rate**	Ex-GDP***	Ex-Pop	Pop-Rate	Ex-GDP		
1	KHM	Battambang	140,533	0	0%	0	0	0%	0	0	0
2	KHM	Kampong Cham	47,300	0	0%	0	0	0%	0	0	0
3	KHM	Phnom Penh	1,242,992	0	0%	0	0	0%	0	1	3
4	IDN	Banda Aceh	249,499	47,404	19%	744	185,414	74%	2,908	0	1
5	IDN	Bandar Lampung	1,167,101	233,210	20%	2,958	438,239	38%	5,520	0	2
6	IDN	Bitung	202,204	0	0%	0	169,907	84%	838	0	2
7	IDN	Denpasar	880,600	154,814	18%	765	288,601	33%	1,427	0	1
8	IDN	Gorontalo	197,970	0	0%	0	10,735	5%	236	0	0
9	IDN	Ambon	395,423	196,988	50%	873	384,192	97%	1,708	0	0
10	IDN	Bima	156,400	30,906	20%	572	59,995	38%	1,320	0	0
11	IDN	Kota Semarang	1,672,999	0	0%	0	0	0%	0	3	3
12	IDN	Samarinda	797,006	0	0%	0	495	0%	6	0	0
13	LAO	Luangprabang	90,300	0	0%	0	0	0%	0	0	2

14	LAO	Pakxane	45,000	0	0%	0	0	0%	0	0	0
15	LAO	Thakhek	90,800	0	0%	0	0	0%	0	2	0
16	MYS	Kota Setar	186,433	0	0%	0	10,369	6%	588	3	0
17	MYS	Timur Laut	500,000	0	0%	0	435,415	87%	29,832	3	1
18	MYS	Kuala Terengganu	255,518	0	0%	0	176,106	69%	8,385	3	0
19	MYS	Langkawi kedha	94,777	0	0%	0	81,571	86%	1,976	3	1
20	MYS	Sibu	167,427	0	0%	0	1,051	1%	40	3	0
21	MYS	Kuala Muda	174,962	0	0%	0	2,185	1%	101	3	0
22	MMR	Amarapura	237,618	172,608	73%	1,253	0	0%	0	2	0
23	MMR	Hakha	48,352	26,390	55%	120	0	0%	0	0	0
24	MMR	Kale	348,573	278,860	80%	998	0	0%	0	2	0
25	MMR	Kyaukpyu	165,352	0	0%	0	134,800	82%	540	0	2
26	MMR	Kyimyindaing	111,514	0	0%	0	12,324	11%	389	3	2
27	MMR	Manaung	56,966	0	0%	0	34,629	61%	186	0	0
28	MMR	Mrauk-U	189,630	37,570	20%	164	15,220	8%	67	0	0
29	MMR	Myingyan	276,096	138,048	50%	964	0	0%	0	2	0
30	MMR	Nyaung-U	239,947	66,854	28%	396	0	0%	0	0	0
31	MMR	Pwinbyu	163,692	37,980	23%	210	0	0%	0	0	0
32	MMR	Rathedaung	111,974	16,779	15%	174	72,195	64%	750	0	0
33	MMR	Taungup	158,341	0	0%	0	63,374	40%	185	0	0
34	PHL	Batangas City	305,607	86,268	28%	396	96,867	32%	444	3	2
35	PHL	Butuan City	309,709	244,123	79%	4,002	20,977	7%	192	0	0
36	PHL	Cavite city	101,120	46,700	46%	115	101,120	100%	249	3	1
37	PHL	Dagupan City	163,676	78,542	48%	1,219	35,850	22%	544	0	0
38	PHL	Iloilo City	424,619	57,783	14%	1,008	0	0%	0	0	2
39	PHL	Laoag City	104,904	47,826	46%	637	26,489	25%	363	0	2
40	PHL	Mandaue City	331,320	66,264	20%	1,331	95,578	29%	1,927	3	3
41	PHL	Meycauayan	199,154	99,577	50%	7,158	20,927	11%	443	3	1
42	PHL	Olongapo City	221,178	34,742	16%	152	166,067	75%	765	3	3
43	THA	Pak Phanang	85,487	0	0%	0	16,937	20%	613	0	0
44	THA	Pathum Thani	154,412	0	0%	0	0	0%	0	3	0
45	THA	Ranot	62,220	0	0%	0	10,683	17%	433	0	0
46	THA	Rayong	56,010	0	0%	0	19,284	34%	3,359	1	0
47	THA	Wiang Sa	67,861	0	0%	0	0	0%	0	0	0
48	VNM	Anh Khe	63,118	0	0%	0	0	0%	0	0	0
49	VNM	Bac Lieu	109,529	0	0%	0	13,148	12%	42	0	0
50	VNM	Dong Hoi	76,058	0	0%	0	7,069	9%	32	2	0
51	VNM	Ha Long	201,990	0	0%	0	193,708	96%	450	3	2
52	VNM	Ha Tinh	63,415	0	0%	0	4,386	7%	54	0	0
53	VNM	Hoi An	69,222	0	0%	0	48,921	71%	363	2	0
54	VNM	Hue	302,983	0	0%	0	0	0%	0	1	0
55	VNM	Qui Nhon	255,463	0	0%	0	203,954	80%	1,855	3	0
56	VNM	Son La	56,848	1,212	2%	2	0	0%	0	0	0

\*Ex-Pop: Exposure Population, \*\*Ex-Rate: Exposure Population Rate, \*\*\*Ex-GDP: Exposure GDP, \*\*\*\*AIA: Agglomerate Industrial Area Points, \*\*\*\*\*RI: Regional Infrastructure Points

Source: JICA Project Team

**Table 2.4.4 Result of Exposure of Flood, Cyclone/Wind and Cyclone/Surge for 2nd Preliminary Risk Assessment**

ID	Country	City Name	Population	Flood			Cyclone/Wind			Cyclone/Surge		
				Ex-Pop	Pop-Rate	Ex-GDP	Ex-Pop	Pop-Rate	Ex-GDP	Ex-Pop	Pop-Rate	Ex-GDP
1	KHM	Battambang	140,533	140,533	100%	473	0	0%	0	0	0%	0
2	KHM	Kampong Cham	47,300	47,300	100%	223	0	0%	0	0	0%	0
3	KHM	Phnom Penh	1,242,992	1,229,819	99%	5,531	0	0%	0	0	0%	0
4	IDN	Banda Aceh	249,499	217,095	87%	3,405	0	0%	0	0	0%	0
5	IDN	Bandar Lampung	1,167,101	0	0%	0	0	0%	0	0	0%	0
6	IDN	Bitung	202,204	0	0%	0	0	0%	0	0	0%	0
7	IDN	Denpasar	880,600	0	0%	0	53,264	6%	263	0	0%	0
8	IDN	Gorontalo	197,970	169,810	86%	3,876	0	0%	0	0	0%	0
9	IDN	Ambon	395,423	0	0%	0	0	0%	0	0	0%	0
10	IDN	Bima	156,400	0	0%	0	41,018	26%	719	0	0%	0
11	IDN	Kota Semarang	1,672,999	0	0%	0	0	0%	0	0	0%	0
12	IDN	Samarinda	797,006	709,164	89%	9,136	0	0%	0	0	0%	0
13	LAO	Luangprabang	90,300	82,976	92%	1,113	45,150	50%	579	0	0%	0
14	LAO	Pakxane	45,000	44,937	100%	2,185	22,500	50%	1,093	0	0%	0
15	LAO	Thakhek	90,800	90,446	100%	2,471	45,633	50%	1,239	0	0%	0
16	MYS	Kota Setar	186,433	180,382	97%	12,502	0	0%	0	0	0%	0
17	MYS	Timur Laut	500,000	0	0%	0	0	0%	0	0	0%	0
18	MYS	Kuala Terengganu	255,518	48,496	19%	2,123	0	0%	0	0	0%	0
19	MYS	Langkawi kedha	94,777	0	0%	0	0	0%	0	0	0%	0
20	MYS	Sibu	167,427	23,696	14%	1,389	0	0%	0	0	0%	0
21	MYS	Kuala Muda	174,962	33,517	19%	2,436	0	0%	0	0	0%	0
22	MMR	Amarapura	237,618	216,678	91%	1,543	0	0%	0	0	0%	0
23	MMR	Hakha	48,352	11,200	23%	51	18,157	38%	83	0	0%	0
24	MMR	Kale	348,573	315,297	90%	1,128	0	0%	0	0	0%	0
25	MMR	Kyaukpyu	165,352	0	0%	0	82,676	50%	334	165,351	100%	668
26	MMR	Kyimyindaing	111,514	0	0%	0	0	0%	0	111,514	100%	3,826
27	MMR	Manaung	56,966	0	0%	0	28,805	51%	155	51,158	90%	275
28	MMR	Mrak-U	189,630	178,450	94%	780	94,815	50%	415	99,303	52%	434
29	MMR	Myingyan	276,096	178,089	65%	1,345	0	0%	0	0	0%	0
30	MMR	Nyaung-U	239,947	113,865	47%	763	92,239	38%	579	0	0%	0
31	MMR	Pwinbyu	163,692	132,003	81%	730	81,846	50%	452	0	0%	0
32	MMR	Rathedaung	111,974	40,544	36%	421	67,208	60%	698	101,961	91%	1,059
33	MMR	Taungup	158,341	132,467	84%	387	79,171	50%	231	156,238	99%	456
34	PHL	Batangas City	305,607	0	0%	0	305,607	100%	1,402	0	0%	0
35	PHL	Butuan City	309,709	251,969	81%	4,515	232,282	75%	3,783	183,197	59%	3,563
36	PHL	Cavite city	101,120	0	0%	0	101,120	100%	249	0	0%	0
37	PHL	Dagupan City	163,676	53,663	33%	783	163,676	100%	2,540	163,676	100%	2,540
38	PHL	Iloilo City	424,619	0	0%	0	318,464	75%	5,516	0	0%	0
39	PHL	Laoag City	104,904	96,954	92%	1,350	104,904	100%	1,407	80,276	77%	1,200
40	PHL	Mandaue City	331,320	0	0%	0	331,320	100%	6,657	0	0%	0



41	PHL	Meycauayan	199,154	0	0%	0	199,154	100%	14,315	0	0%	0
42	PHL	Olongapo City	221,178	0	0%	0	221,178	100%	997	0	0%	0
43	THA	Pak Phanang	85,487	85,407	100%	3,535	0	0%	0	0	0%	0
44	THA	Pathum Thani	154,412	0	0%	0	0	0%	0	0	0%	0
45	THA	Ranot	62,220	15,917	26%	626	0	0%	0	0	0%	0
46	THA	Rayong	56,010	20,389	36%	3,213	0	0%	0	0	0%	0
47	THA	Wiang Sa	67,861	46,771	69%	783	0	0%	0	0	0%	0
48	VNM	Anh Khe	63,118	51,692	82%	160	47,339	75%	144	0	0%	0
49	VNM	Bac Lieu	109,529	109,529	100%	308	0	0%	0	0	0%	0
50	VNM	Dong Hoi	76,058	13,635	18%	30	57,044	75%	215	64,518	85%	246
51	VNM	Ha Long	201,990	0	0%	0	151,493	75%	352	197,701	98%	459
52	VNM	Ha Tinh	63,415	63,415	100%	759	47,561	75%	569	63,415	100%	759
53	VNM	Hoi An	69,222	61,278	89%	442	51,917	75%	376	69,217	100%	502
54	VNM	Hue	302,983	302,983	100%	1,137	227,237	75%	853	263,781	87%	1,016
55	VNM	Qui Nhon	255,463	87,596	34%	675	191,597	75%	1,720	18,402	7%	52
56	VNM	Son La	56,848	5,153	9%	8	28,424	50%	193	0	0%	0

Source: JICA Project Team

### 2.4.3 Capacity Assessment at the Middle List

#### (1) Factors for Capacity Assessment from the Survey Results

Capacity covering infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes in city can be assessed by quantitative information and data from the data gathering surveys. Table.2.4.5 shows the contents and the number of questionnaire item collected through this survey.

**Table 2.4.5 Contents and Number of Questionnaire Items**

Attachment No.	Contents	Number of questionnaire items
Attachment 3 (Earthquake)	Vulnerability related to hazard	60
Attachment 3 (Flood and others)		63
Attachment 4	Capacities for Disaster Response	34
Attachment 5	Land Use and Development Plan on Cities	15
Attachment 6	Infrastructure and building facilities for disaster prevention	12
Attachment 7	Institutional System for Disaster Prevention	26

Source: JICA Project Team

For the Capacity Assessment, the questionnaire items related to the Capacity are extracted from the questionnaire survey items and categorized into two categories, namely “Prevention & Mitigation” and “Preparedness”. Table 2.4.6 illustrates the part of questionnaire item categorized for the assessment. Total item number for the assessment is indicated in Table 2.4.7.

Table 2.4.6 Categorized Questionnaire Items (extract)

Questionnaire Item		Category
a) Organization/institution of local government	- organization chart of city government	Preparedness
	- roles of each department of city government	Preparedness
	- organization chart of disaster prevention related	Preparedness
	- roles of each section of the disaster prevention	Preparedness
	- organization chart of urban planning dept.	Preparedness
	- roles of each section of urban planning dept.	Preparedness
b) Community based organization (CBO)	- number of CBOs in the city	Preparedness
	- organization chart of one CBO	Preparedness
	- roles of each organization in the CBO	Preparedness
	- main activities of CBOs in relation to disaster risk	Preparedness
c) Education for Disaster Risk Reduction	- organization in charge of education on disaster risk	P & M
	- textbook or reference used in education	P & M
	- curriculum of education on disaster risk reduction	P & M
	- level of understanding of students	P & M
d) Evacuation drill	- organization in charge of evacuation drill	Preparedness
	- content of activities in evacuation drill	Preparedness
	- target groups of evacuation drill	Preparedness
	- annual schedule of evacuation drill	P & M
	- effect of evacuation drill	P & M
e) Forecasting and warning including emergency	- any systems of forecasting and warning	Preparedness
	- outline of the systems showing information flow	Preparedness
	- performance of the system	Preparedness
	- organization in charge of forecasting and warning	Preparedness
f) evacuation plan	- any evacuation plans in the city	P & M
	- organization in charge of formulating evacuation	P & M
	- organization in charge of implementing evacuation	P & M

Source: JICA Project Team

Table 2.4.7 Total Number of Questionnaire Item for the Capacity Assessment

Hazard	Prevention & Mitigation	Preparedness	Total
Earthquake	37	98	135
Flood	45	102	147
Tsunami	40	101	141
Cyclone	40	101	141

Source: JICA Project Team

## (2) Methodology of Capacity Assessment on the Middle List Cities

The “Capacity Point” and “Incapacity Point” are evaluated by the achievement ratio of the items. The each element score is summed by each box objective in an aggregated manner. In addition, Capacity Point is adjusted to a 100-point scale, 50 points for “Prevention & Mitigation” and 50 points for “Preparedness”.

Finally, “Lack of Capacity Point” is calculated by subtracting Capacity Point from 100 points. That is, the higher “Lack of Capacity Point” indicates the low capacity of the city against disaster.

Table 2.4.8 shows an example of calculating Capacity Point and Lack of Capacity Point

**Table 2.4.8 Example of Calculating Capacity Point and Lack of Capacity Point**

	The number of "YES"	Total number of items	Capacity Point		Lack of Capacity Point
Prevention & Mitigation	10	45	11 (=10 ÷ 45 × 50)	26	74
Preparedness	30	102	15 (=30 ÷ 102 × 50)		

Source: JICA Project Team

(3) Assessment result of capacity

The calculation result for each middle city is listed in the following Table 2.4.9.

**Table 2.4.9 Calculation Result of Capacity and Lack of Capacity Point**

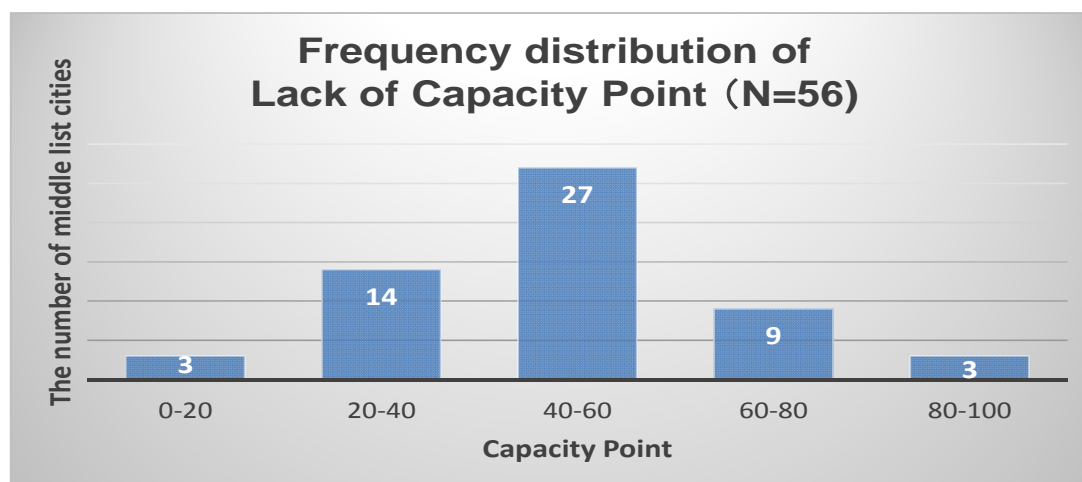
No.	Country	City Name	Population	Capacity Point			Lack of Capacity Point		
				Prevention& Mitigation	Prepared ness	Total	Prevention& Mitigation	Prepared ness	Total
1	KHM	Băttâmbâng	140,533	18	20	38	32	30	62
2	KHM	Kâmpóng Cham	47,300	18	22	40	32	28	60
3	KHM	Phnom Pénh	1,242,992	16	16	32	34	34	68
4	IDN	Banda Aceh	249,499	25	22	47	25	28	53
5	IDN	Bandar Lampung	1,167,101	34	38	72	16	12	28
6	IDN	Bitung	202,204	36	31	67	14	19	33
7	IDN	Denpasar	880,600	30	29	59	20	21	41
8	IDN	Gorontalo	197,970	22	27	49	28	23	51
9	IDN	Kota Ambon	395,423	34	34	68	16	16	32
10	IDN	Kota Bima	156,400	42	42	84	8	8	16
11	IDN	Kota Semarang	1,672,999	27	37	64	23	13	36
12	IDN	Samarinda	797,006	32	30	62	18	20	38
13	LAO	Luangprabang (luang)	90,300	1	5	6	49	45	94
14	LAO	Pakxane (bolikh)	45,000	1	10	11	49	40	89
15	LAO	Thalhek (kham)	90,800	1	5	6	49	45	94
16	MYS	Alor Setar	186,433	35	44	79	15	6	21
17	MYS	George Town (penang CC)	500,000	29	35	64	21	15	36

18	MYS	Kuala Terengganu	255,518	28	34	62	22	16	38
19	MYS	Langkawi kedha	94,777	29	44	73	21	6	27
20	MYS	Sibu	167,427	20	36	56	30	14	44
21	MYS	Sungai Petani	174,962	32	44	76	18	6	24
22	MMR	Amarapura	237,618	22	16	38	28	34	62
31	MMR	Hakha	48,352	23	23	46	27	27	54
32	MMR	Kale	348,573	19	22	41	31	28	59
33	MMR	Kyaukpyu	165,352	23	35	58	27	15	42
23	MMR	Kyimyindaing-WY	111,514	13	27	40	37	23	60
24	MMR	Manaung	56,966	19	32	51	31	18	49
25	MMR	Mrauk-U	189,630	15	33	48	35	17	52
26	MMR	Myingyan	276,096	19	15	34	31	35	66
27	MMR	Nyaung-U	239,947	17	27	44	33	23	56
28	MMR	Pwintbyu	163,692	23	28	51	27	22	49
29	MMR	Rathedaung	111,974	14	30	44	36	20	56
30	MMR	Toungup	158,341	9	36	45	41	14	55
34	PHL	Batangas city	305,607	36	42	78	14	8	22
35	PHL	Butuan city	309,709	32	37	69	18	13	31
36	PHL	Cavite city	101,120	18	25	43	32	25	57
37	PHL	Dagupan city	163,676	34	40	74	16	10	26
38	PHL	Iloilo city	424,619	30	19	49	20	31	51
39	PHL	Laoag city	104,904	23	25	48	27	25	52
40	PHL	Mandaue city	331,320	43	37	80	7	13	20
41	PHL	Meycauayan	199,154	17	28	45	33	22	55
42	PHL	Olongapo city	221,178	47	39	86	3	11	14
43	THA	Pak Phanang	85,487	13	29	42	37	21	58
45	THA	Pathum Thani	84,727	19	28	47	31	22	53
47	THA	Ranot	62,220	19	33	52	31	17	48
46	THA	Rayong	56,010	26	39	65	24	11	35
44	THA	Wiang Sa	67,861	17	29	46	33	21	54
48	VNM	Anh Khe	63,118	17	13	30	33	37	70
49	VNM	Bạc Liêu	109,529	21	27	48	29	23	52
50	VNM	Đồng Hới	76,058	20	21	41	30	29	59
51	VNM	Hạ Long	201,990	23	31	54	27	19	46
52	VNM	Hà Tĩnh	63,415	21	14	35	29	36	65
53	VNM	Hội An	69,222	16	19	35	34	31	65

54	VNM	Huế	302,983	21	16	37	29	34	63
55	VNM	Qui Nhon	255,463	21	24	45	29	26	55
56	VNM	Son La	56,848	15	18	33	35	32	67

Source: JICA Project Team

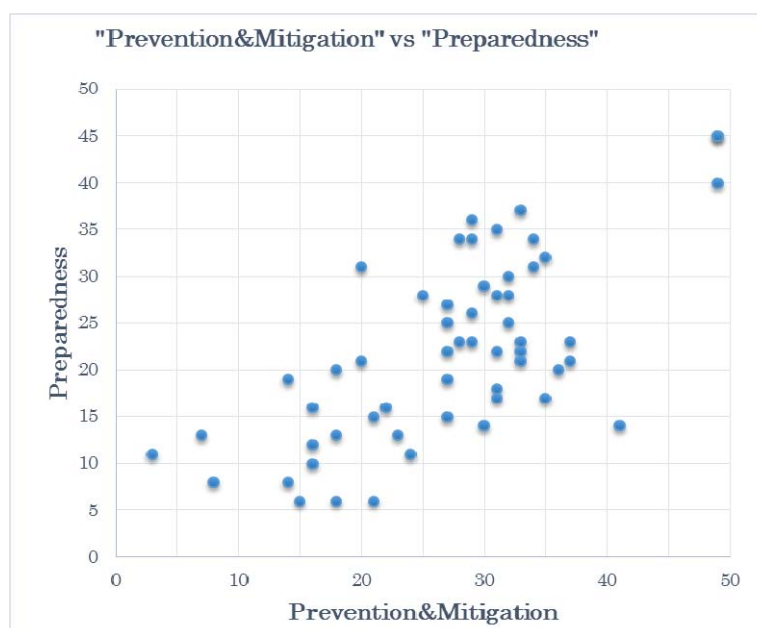
The frequency table of Incapacity Score is illustrated in the following Figure 2.4.4. This table shows a normal (Gauss) distribution.



Source: JICA Project Team

**Figure 2.4.4 Frequency Distribution of Capacity Point**

In addition, the relationship between the “Prevention & Mitigation” and “Preparedness” categories are indicated in the Figure 2.4.5. This figure shows the correlation between these two categories, but the average score of the “Prevention & Mitigation” (= 27.2) is higher than the other (= 22.1), which indicates the middle city is prepared more for the disaster than the mitigation and prevention.



Source: JICA Project Team

**Figure 2.4.5 Correlation between “Prevention & Mitigation” and “Preparedness”**

## 2.4.4 Shortlisted Cities and Candidate Cities (Preliminary Report)

As a result of the 2nd Preliminary Risk Assessment, the following cities were selected as the short list cities. The candidate cities were also selected through the discussion between NPC and JPT members. The following lists shows the short listed cities and candidate cities. Myanmar and Vietnam needs further discussion to finalize the candidate city. Detailed information such as selection process in each AMS will be delineated in the draft final report. Here only mentions the result as the preliminary report of city selection.

**Table 2.4.10 Short Listed Cities and Candidate Cities**

Country	Short Listed Cities		Candidate Cities	
	Name	Number of Cities	Name	Number of Cities
Cambodia	Battambang (F)	1	Battambang (F)	1
Indonesia	Bima (E), Semarang (F), Denpasar (T)	3	Denpasar (T)	1
Lao PDR	Luang Prabang (F)	1	Luang Prabang (F)	1
Malaysia	Kuala Terengganu (F) George Town (T)	2	Kuala Terengganu (F)	1
Myanmar	Amarapura (E), (F) Kyimyindaing (T) ,(C) to be internally discussed	2	Kyimyindaing (T) ,(C) to be internally discussed	1
Philippines	Butuan (F), Meycauayan (E)	2	Butuan (F)	1
Thailand	Pathumthani (F), Rayong (F)	2	Pathumthani (F)	1
Viet Nam	Qui Nhon(T), Hue(F), Ha Long (T) to be internally discussed	3	Qui Nhon(T), to be internally discussed	1
	Total	16	Total	8

\*: ( ) shows the main disaster type for the cities. (C): Cyclone, (E): Earthquake, (F): Flood, (T): Tsunami

Source: JICA Project Team

## 2.5 Development of Database

JICA Project Team (JPT) assembles collected and analyzed data in the project to GIS database. Following table shows points of GIS database work. Since the database is to be transferred to AHA centre after the completion of the Project, JPT will discuss the following ideas and image with AHA centre.

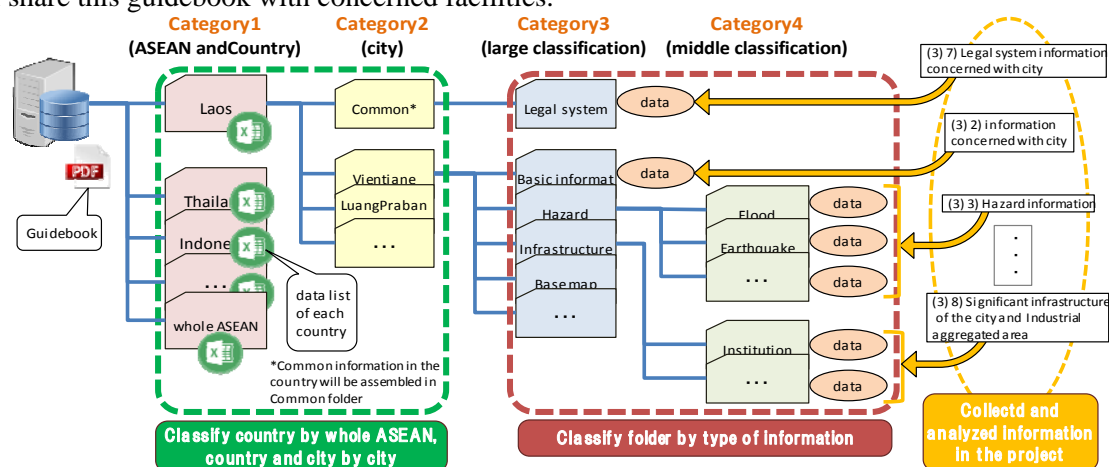
**Table 2.5.1 Points of GIS database work**

Items	Points of Work
Confirmation of existing database	- JPT will comprehend component and content of existing GIS database in AHA centre. - JPT will also comprehend existing GIS system, e.g. GIS software, of focal point facilities in ASEAN, too.
Proposal of draft database component	- JPT will propose draft database component that all concerned facilities can use easily and that have general versatility data type.
Utilization of existing documents and data	- In many cases, it is difficult to obtain data with digital spatial information, and data has a lot of differences in accuracy, range and density of information by country. - JPT positively utilizes existing reports of past JICA projects and available open databases of some international authorities, such as GAR and UNGRDP, to prevent above problems.
Collection and arrangement of information	- The local subcontract will collect detail information about middle-list cities.
Formulation of GIS database	- JPT assembles existing database, open database and subcontract outputs of collected and arranged data in the project to integrated GIS database.
Utilization for analysis	- JPT will positively utilize GIS database for mapping of disaster location, evaluation of disaster risk, and will store results of analysis and mapping to GIS database.

Source: JICA Project Team

Following figure shows image of GIS database component in the project. GIS database should have systematic and comprehensible component by category of whole ASEAN, country, city and type of information. GIS database also makes consideration to procurable information level of each country.

JPT will assemble collected and analyzed data basically by city. However, in case of type of information should be assembled by country, such as the legal system, or there are little information about city, JPT will assemble data in common folder of the country. JPT also develops a guidebook that will report data source of information, attributes of GIS data and component of GIS database. JPT will share this guidebook with concerned facilities.



Source: JICA Project Team

Figure 2.5.1 Image of GIS database component

## 2.6 Development of Draft TOR for Demonstration Project

### 2.6.1 Demonstration Project as the Framework for the Draft TOR Development

According to the purpose and the scope of works for the “Output 2” afore-mentioned in the beginning of Chapter 2, the draft TOR for the demonstration project will be developed and formulated based on certain policies and directions through discussions toward appropriate formulation of the demonstration project in order to build effectively “disaster and climate resilient cities” in ASEAN.

The followings are key matters to be discussed including some considerations or issues in conjunction with directions and implementation of the demonstration project and tentative proposal of the draft TOR as the framework of the project.

### 2.6.2 Key Considerations for the Draft TOR Development

There are considerable issues to be clarified in conjunction with the framework of the demonstration project, taking account of viability and sustainability of the project for expected favorable impacts to other cities, where candidate cities may be required by certain level of capacity to achieve a successful project. The followings are identified issues to be considered when the draft TOR is developed.

#### 1) Candidate cities with some conditions

Although the preliminary risk assessment with certain criteria will give the quantitative result for the selection of candidate cities, further discussions are required to direct the policy and strategy of the demonstration project implementation. An example can be given by the cases

whether the project should focus on a weak governance capacity of local government for disaster risk reduction or should give the weight to certain level of capacity enabling to handle with the demonstration project. The following conditions are necessary for the draft TOR to be clarified.

- Candidate city satisfying the criteria of the preliminary risk assessment (vulnerability, capacity) at least
- Candidate city fitting with suitability or adaptability enabling to respond and implement the project effectively and capable to maintain and promote the project.

## 2) Type of the Project

The demonstration project may allow several ranges of scope of works from technical assistance to physical intervention project, although the range depends on the budget and funding. Several options for type of the demonstration project can be listed as follows..

- Technical Assistance Project: This type may fit with characters of the project which aims at enhancing administrative capacity of local governments (city) for building disaster and climate resilient city in ASEAN. The project may focus on the capacity development programs for relevant organizations and staffs of the local government, in order to integrate sectors in planning and programming given the weight to Disaster Risk Reduction (DRR) through technical transfer programs.

This type also may include pilot projects which aim at verifying activities through some practices for the project and establishing a model of activities for building disaster and climate resilient city

- Loan Project for Physical Intervention in combination with Technical Assistance: This type aims at implementing an integrated urban resilience project package consisting of physical interventions to contribute to actual prevention and mitigation with technical assistance by capacity development for local governments and relevant stakeholders.

In this case, the physical intervention for prevention and mitigation may require different type of the scope rather than “technical assistance project” with engineering studies in association with larger budget for the project

Taking account of suitability and adaptability to the concept of CN18 and the purpose of the demonstration project, it is envisaged that type of the project would be fit with “technical assistance project” involving practical and applicable activities to other cities in AMS to be verified toward building urban resilience.



### 2.6.3 Tentative Proposed Framework for the Draft TOR

#### (1) Proposed Technical Assistance Project for the Demonstration Project

Although there are several uncertain factors as parts of the project framework for the draft TOR, the technical assistance project for the demonstration project is proposed tentatively as follows.

##### 1) Theme of the project

Capacity development technical assistance for candidate cities in AMS to build disaster risk and climate resilient cities in ASEAN, taking account of effective impacts on other cities governance and institutional arrangement for AMS

##### 2) Sector

Primary sector: Urban planning and disaster risk reduction

Secondary sector: Multi-sector as relevant stakeholders (e.g. infrastructure and transportation, economic development, education, health, environment, etc) for mainstreaming disaster risk reduction

##### 3) Impact and outcomes

The impact will be enhanced on resilience of disaster risks and climate change in cities of AMS, leading to improved governance of the cities especially for land use planning, urban development and disaster prevention and mitigation activities. And it will be positively influenced to national institutional arrangement in association with other cities governances. Expected outcomes can be listed in below.

- Outcome 1: Methodology of the natural disaster risk assessment will be understood and acquired
- Outcome 2: Issues on planning and implementation to be improved or developed based on the assessment result will be identified and clarified through consensus among relevant stakeholders
- Outcome 3: Action plan and guidelines for improvement or development of land use and development planning and development control with regulations will be formulated
- Outcome 4: Pilot activities to be implemented under the project will contribute to the verification of activities to be applied to other cities on building disaster and climate change resilient cities
- Outcome 5: Practices and lessons learnt from the project for building disaster and climate change resilient city will be reflected to national governance and shared to other cities of AMS mainly by the ASEAN Urban Resilience FORUM

#### 4) *Expected outputs of the project*

As the result of activities to achieve the outcomes (1~5), the following outputs will be prepared.

- Guidelines for formulation of land use and development planning, and development control and regulations
- An action plan for improvement of land use and development planning, and development control and regulations, taking consideration of institutional arrangement, human resource development, budgeting of local government
- Relevant outputs through pilot project activities (refer to 2.6.4)
- Activities' Report of the project

#### 5) *Beneficiaries from the project*

The followings are expected beneficiaries from the project including expected project counterpart (hereinafter C/P).

- Urban local government: urban planning agency (C/P), development control and regulation agency (C/P), disaster risk management agency (C/P), infrastructure including transportation sector agency, economic development agency, education sector agency, health sector agency
- Central government: urban planning agency (C/P), development control and regulation agency (C/P), disaster risk management agency (C/P)
- Relevant organizations, stakeholders of urban local government with their assets

### (2) *Implementation arrangement*

#### 1) *Terms of project*

This Technical Assistance project is expected to have three years at least, assuring fruitful capacity development program to be implemented effectively.

#### 2) *Executing agencies*

Two key agencies in combination with the urban planning sector and/or the disaster risk management sector at national (ministry) and local government level as essential counterparts in each candidate country and its selected city are expected to be implementation agency. They at national level would chair the project coordination, while technical working groups would be also formulated to discuss technical issues and orientation. The following Table 2.6.1 illustrates a tentative proposal for the executing agencies. In case of the project funded by donors, consultants would be procured and facilitate and support those agencies.

**Table 2.6.1 Tentative Proposal for Executing Agencies of the Project**

Name of Executing Agencies	Expected Member	Role and Function
1. PROJECT DIRECTOR for each candidate country	<ul style="list-style-type: none"> <li>• A responsible officer from a relevant agency for urban planning or disaster management sector <u>at national level</u> in each candidate country</li> </ul>	<ul style="list-style-type: none"> <li>• A relevant agency in each candidate country will be responsible for overall administration and implementation of the Project.</li> </ul>
2. PROJECT MANAGER in each candidate city	<ul style="list-style-type: none"> <li>• A responsible officer from an agency for urban planning or disaster management sector <u>at local government level</u></li> </ul>	<ul style="list-style-type: none"> <li>• A relevant agency will be responsible for the smooth implementation and coordination of the Project in each candidate city.</li> </ul>
3. PROJECT COORDINATION COMMITTEE (PCC)	<ul style="list-style-type: none"> <li>• Each National Project Director</li> <li>• Each Local Government Project Manager</li> <li>• ASEAN Secretariat</li> <li>• Funding Donor</li> </ul>	<ul style="list-style-type: none"> <li>• PCC will have a role in decision-making in relation to key issues and direction of the Project.</li> <li>• PCC will facilitate inter-organizational coordination in terms of the Project implementation.</li> </ul>
4. TECHNICAL WORKING GROUP (TWG)	<ul style="list-style-type: none"> <li>• National Project Director</li> <li>• Local Government Project Manager</li> <li>• Relevant organizations in the local government</li> <li>• Consultants procured by the Donor</li> </ul>	<ul style="list-style-type: none"> <li>• TWG will have a role in discussing technical issues and direction of the Project.</li> <li>• TWG will facilitate intra-organizational coordination in each local government in terms of the Project implementation.</li> </ul>

Source: JICA Project Team

#### 2.6.4 Reference: Tentative Candidate Pilot Activities

In conjunction with the project formulation, pilot activities are listed as tentative candidates to be incorporated into the demonstration project as follows.

##### (1) Objectives of Pilot Activities

- Pilot activities under the demonstration project aim to verify effectiveness of activities for building disaster risk and climate change resilient cities through implementing practical and small-scale activities as part of planning and controlling or implementation measures.
- These activities are expected to contribute to identification of issues and lessons learnt for further activities of mainstreaming Disaster Risk Reduction (DRR) and dissemination to other cities of AMS

##### (2) Tentative Candidates for the Pilot Activities

###### 1) Formulation of Hazard Map

A hazard map for local government plays an considerable role not only in identifying risks to be reduced in terms of land use planning and development controls, but also contributing effectively to disseminate inevitable information to all relevant stakeholders and local communities. Taking account of this effective multi-function product, the formulation or improvement of the hazard map through various rational analyses, evaluation and discussion would be valuable and effective activities to build urban resilient cities.

A hazard map is also expected to play another role in indicating and planning necessary measure to mitigate and prevent disasters such as evacuation routes, places of shelters and spatial information by development control and regulations.

### 2) *Formulation of Draft By-law for Development Control and Regulations*

Based on the natural hazard risk assessment, appropriate controls and regulations are applied to zoning under a land use plan. However, those regulations of local governments have not been coped with effectively the assessment or natural hazard potential areas in general. This pilot activity aims at strengthening control and regulations effectively through formulation of the draft by-law to enact these control and regulations to be a pilot model of control and regulations.

### 3) *Formulation of Detail Plan*

Taking account of difficult and unfit conditions of implementation of land use or urban development plan formulation to be reflected by disaster risk assessment within the demonstration project, a detail plan for considerable disaster risk areas could be introduced into further detailed level planning with practical implementation measures such as regulations or some infrastructure plans, if a land use plan or other spatial master plan is established in the local government.

### 4) *Formulation of Pre-Feasibility Studies*

In order to realize practical measures for building disaster resilient city, concrete physical development project can be introduced by the pre-feasibility study to apply to necessary documents to seek further budgeting or funding, if a local government or central government has a long or short list of the candidate project.

## 2.6.5 Further Discussions toward Draft TOR formulation

### (1) Depth of the Draft TOR for the Demonstration Project

Although the tentative framework of the draft TOR can be illustrated in the previous section, issues for the range of depth to be described in the draft TOR still remains. It is envisaged that this draft of TOR will be at level of the framework rather than ordinal TOR which is defined by a certain implementation body or bodies, funding donors and its magnitude of funding. This is a matter of discussions to be confirmed and clarified.

### (2) Cost Estimation

The magnitude of cost is one of the factors to be clarified for the framework of draft TOR for which the scale of the project would highly rely on possible funding. And the contents of project packages will require also further discussion on appropriate project framework. It is necessary to be confirmed whether information for the cost and financing are required or not.

### (3) Donor funding and the project operation

An ordinal TOR describes necessary conditions for project implementation by a certain implementation body or implementation bodies mainly by i) project formulation (beneficiaries,

counterparts, supporting stakeholders, budgeting, etc), ii) project implementation (implementation agencies, funding donor agencies, management agencies, etc). In this stage of this project, those frameworks of the demonstration project may not be able to fix and determine unless expected donors are committed within this project.

And the scale of project may reflect the scope of works for which possible budget is set by candidate donors. From this concern, the draft of TOR is considered as contents excluding those factors or potential candidates of donor, if the other frameworks of the demonstration project are agreed by potential candidates.

## 2.7 Issues and Way Forward on Output 2

### 2.7.1 Further Activities and Issues on Demonstration Project Formulation

#### (1) Activities for the Selection of Candidate Cities for the Demonstration Project

The selection of candidate cities for the demonstration project is currently underway in assessing cities at the stage of 2nd PRA. The candidate cities would be narrowed down to the short list (20 -30 cities from 56 cities of the middle listed) and final candidates (three-eight cities). The process for the selection requires not only numerical evaluation by the JPT but also sufficient discussions by stakeholders of AMS and relevant organization including potential donors toward implementation of the project.

Discussion agenda could be addressed by the following issues on how to select final candidate cities which would be also highly affected and defined by directions of the demonstration project. Therefore the draft TOR needs to be discussed in parallel, when final candidate cities will be discussed and selected. The followings are discussion agenda for the selection of cities for the demonstration project.

- Clear principles and definitions the demonstration project to be achieved
- Desirable directions of the project implementation in terms of implementation agencies, funding agencies, project term, magnitude of the scale of inputs (budget)
- Defined common contributions by the project to AMS in ASEAN in terms of regional cooperation and benchmark resilience city

However, the demonstration project could be set at the level of concept or framework for the project, unless those issues above mentioned are able to be fixed or determined within CN 18 project.

#### (2) Further discussions on the formulation of "Draft TOR" for the demonstration project

The demonstration project is defined naturally by the draft Terms of Reference (TOR), of which various scopes including range of the project based on its budget and funding, implementation agencies are determined if the TOR is required as a normal or standard document.

It is envisaged that these conditions for scope of works may be difficult to be fixed within the duration of the CN18 Project due not only to internal conditions of ASEAN but also to external conditions by potential donors. Therefore this draft of TOR is considered to focus on technical terms mainly as a basic framework of the demonstration project under desirable conditions, taking account of some ranges or alternatives of scope of works. The followings are key agenda when a proposed draft of TOR is discussed

- Clear objectives and scopes of the demonstration project to be implemented
- Desirable depth or range of risk assessment study as one of the focused themes of the project implementation, taking account of applicable methodology to other cities in AMS and basic data availability for risk assessment.
- Desirable scope of a physical planning under the project to play effective roles in assisting an land use plan, socio-economic plan and sector plans as the statutory plans under existing planning system of each AMS, although proposed idea focuses on the guideline formulation of planning
- Desirable components of studies whether they limit themes to planning measures only or to other activities under concept of preparedness (prevention/mitigation).
- Expected institutional capacity development and arrangement component to enhance and promote mainstreaming of resilience urban planning system at a local government and national level

### **2.7.2 Further Activities and Issues on Database Development**

#### **(1) Activities for the formulation of database**

Since the preliminary risk assessments on cities in AMS were examined, a part of the expected database mentioned in the section 2.5 Development of Database mainly by geographical information system (GIS) has been formulated and contributed to their analyses of cities with basic data for natural hazards, exposures in AMS. The formulation of database will be facilitated and preceded further for the other analyses of the preliminary risk assessment.

#### **(2) Further considerations on the database development in conjunction with AHA Center Activities**

According to the discussions with AHA Center by JPT in September 2016, spatial database development for the AHA Center still needs to see further internal discussions in terms of maintenance cost, limited software licenses, and training needs. They prefer to have simple structure of database enabling to transfer and add them on their system without complicated program taking account of constraints above mentioned.

## **CHAPTER 3 : [OUTPUT 3] DEVELOPMENT OF TOOLS ON BUILDING RESILIENT CITIES IN ASEAN**

### **3.1 Overview of Output 3**

#### **(1) Background**

The Concept Note 18 (hereinafter CN18) as the framework of the ASEAN Cooperation Project by Japan International Cooperation Agency (hereinafter the Project) describes the objectives and implementation strategies with key activities for three OUTPUTs to be achieved in order to increase the resilience of ASEAN cities to disasters in 10 Member States of ASEAN (hereinafter AMS). In conjunction with the Output 3, the following notes illustrated in CN18 are referred as backgrounds of the Output 3.

- Stocktaking of existing tools on integrating DRR and CCA in local development, land use and investment planning, and risk financing and insurance
- Development of regional guidelines on urban risk assessment, risk sensitive urban development planning, land use management and investment programming
- Development of guidance note on urban risk financing and insurance

#### **(2) Scope of Works for Output 3**

According to the Project Proposal by JICA as the project framework, activities of the Output 3 to be implemented are stipulated in the scope of works of Output 3 as follows.

- Conducting study on the result or progress of the Resilient Cities Campaign and other ASEAN related initiatives
- Conducting study on good practices and the lessons learned from past disasters and projects or programs related to enhancing resilience of urban cities including developed countries
- Conducting a study towards developing a guide to building resilient cities
- Documentation of tools (Guidebook) which will be composed of (i) lessons from past disasters that affected cities; (ii) good practices on countermeasures for disasters in cities, and (iii) a guide to build resilient cities.

### **3.2 Study on Related Activities in ASEAN countries (such as Resilient Cities Campaign by UNISDR)**

ASEAN countries are participating in international activities as the purpose of the development of disaster prevention planning and gathering information about natural disasters. Related activities are following.

- i) Resilient Cities Campaign (UNISDR)
- ii) 100 Resilient Cities (Rockefeller Foundation)
- iii) Resilient Cities Series (International Council for Local Environmental Initiatives : ICLEI)
- iv) City Resilience Profiling Programme (UN-Habitat)
- v) Associated Programme on Flood Management (WMO)
- vi) Asia Pacific Adaption Network (APAN)

Such activities are reviewed to examine the contents of the guide book to be created in this project.

### 3.2.1 Resilient Cities Campaign (UNISDR)

‘Resilient Cities Campaign (RCC)’ is supported by UNISDR. Throughout 2010-2020 and beyond, the UNISDR campaign together with its partners to support sustainable urban development by promoting resilience activities and increasing local level understanding of disaster risk. A ten-point checklist of essentials for making cities resilient serves as a guide for a city’s commitment toward improving their “Essential Eight: Increase Infrastructure Resilience” are following table and topics.

**Table 3.2.1 Fundamental Information of RCC**

Title	Resilient Cities Campaign	Organization	UNISDR
About the Campaign	<p>UNISDR campaigns together with its partners to support sustainable urban development by promoting resilience activities and increasing local level understanding of disaster risk. A ten-point checklist of essentials for making cities resilient serves as a guide for a city’s commitment toward improving their resilience and is the organizing principle for reporting and monitoring during the campaign.</p> <p>&lt; Checklist of Essentials &gt;</p> <ol style="list-style-type: none"> <li>1) Organise for Disaster Resilience</li> <li>2) Identify, Understand and Use Current and Future Risk Scenarios</li> <li>3) Strengthen Financial Capacity for Resilience</li> <li>4) Pursue Resilient Urban Development and Design</li> <li>5) Safeguard Natural Buffers to Enhance Ecosystems’ Protective Functions</li> <li>6) Strengthen Institutional Capacity for Resilience</li> <li>7) Understand and Strengthen Societal Capacity for Resilience</li> <li>8) Increase Infrastructure Resilience</li> <li>9) Ensure Effective Disaster Response</li> <li>10) Expedite Recovery and Build Back Better</li> </ol> <p>&lt; Flow (How to Entry RC)&gt;</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%; border: 1px solid black; padding: 5px; background-color: #e6f2ff;"> <p style="text-align: center;">(Local Governments)</p> <p style="text-align: center;">Access UNISDR HP</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Provide Details</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Upload Confirmation</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Action The Role Model</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">&lt; Results of Participation &gt;</p> <ol style="list-style-type: none"> <li>1) Understanding disaster risk</li> <li>2) Knowledge of disaster prevention</li> <li>3) Construction Resilience Cities connect</li> </ol> </div> <div style="width: 45%; border: 1px solid black; padding: 5px; background-color: #e6e6ff;"> <p style="text-align: center;">(UNISDR)</p> <p style="text-align: center;">Verification</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Create Online Profile</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">&lt; Toolkit for Local Governments &gt;</p> <ol style="list-style-type: none"> <li>1) Guidance Documents</li> <li>2) Assessment Tools</li> <li>3) Risk Mapping</li> <li>4) Planning for Resilience (Resilient Cities Connect)</li> <li>5) Latest City Reports</li> </ol> </div> </div> <p style="text-align: center;">Submit →      ← Nomination for Role Model</p>		



Participants	3,098Cities (20 <sup>th</sup> April 2016)	ASEAN	127	Japan	3
ASEAN Members	Numbers of Local Government	Name of Local Government			
Negara Brunei Darussalam	0	Kingdom of Cambodia	0		
Republik Indonesia	7	Lao People's Democratic Republic	1		
Malaysia	1	Republic of the Union of Myanmar	0		
Republic of the Philippines	105	Republic of Singapore	0		
Kingdom of Thailand	8	Socialist Republic of Viet Nam	5		

Source: JICA Project Team

### 3.2.2 100 Resilient Cities (Rockefeller Foundation)

100 Resilient Cities—Pioneered by the Rockefeller Foundation (100RC) is dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century. 100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks—earthquakes, fires, floods, etc.—but also the stresses that weaken the fabric of a city on a day to day or cyclical basis.

**Table 3.2.2 Fundamental Information of 100RC**

Table 3.2/2 Fundamentals Information of 100RC					
Title	100 Resilient Cities		organization	Rockefeller Foundation	
About 100RC	100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks—earthquakes, fires, floods, etc.—but also the stresses that weaken the fabric of a city on a day to day or cyclical basis. Cities in the 100RC network are provided with the resources necessary to develop a roadmap to resilience along four main pathways: 1. Financial and logistical guidance for establishing an innovative new position in city government, a Chief Resilience Officer, who will lead the city’s resilience efforts. 2. Expert support for development of a robust resilience strategy. 3. Access to solutions, service providers, and partners from the private, public and NGO sectors who can help them develop and implement their resilience strategies. 4. Membership of a global network of member cities who can learn from and help each other. Through these actions, 100RC aims not only to help individual cities become more resilient, but will facilitate the building of a global practice of resilience among governments, NGOs, the private sector, and individual citizens. (From Rockefeller Foundation HP)				
Participants	65Cities (20 <sup>th</sup> April 2016)		ASEAN	6	Japan1
ASEAN Members		Bangkok, Da Nang, Mandalay, Phnom Penh, Semarang, Singapore,			
Menu of Activity	Support (Winning city will receive three forms of support)	Support for making resilience plan	Support to create a resilience plan, along with the tools, technical support, and resources for implementation. The Rockefeller Foundation will deploy its expertise in innovative finance to help cities leverage billions of dollars of potential private sector financial support as well as public dollars to realize their plans.		
		Membership of new network	Membership in a new network The Rockefeller Foundation is creating, the 100 Resilient Cities Network, which will provide support to member cities and share new knowledge and resilience best practices		
		Support to hire a Chief Resilience Officer (CRO)	Support to hire a Chief Resilience Officer (CRO). The creation of this innovative new role is an innovation that will ensure resilience-building and coordination is the specific responsibility of one person in a city government. The CROs can also oversee the development of a resilience strategy for the city and be part of a learning network of other CROs as representatives to the 100 Resilient Cities Network		

Source: JICA Project Team

### 3.2.3 Resilient Cities Series (International Council for Local Environmental Initiatives : ICLEI)

ICLEI is a growing Association of cities, local and metropolitan governments leading the way in sustainable development with worldwide presence, which connects leaders in strategic alliances, which prepares cities for the future, whose voice is heard, and which is attractive to be a member of, work for and partner with.

**Table 3.2.3 Fundamental Information of RCS (ICLEI)**

Title	Resilient Cities Series	organization	ICLEI
About ICLEI	ICLEI's work is grouped around 10 agendas, designed to help cities and local governments to become sustainable, resilient, resource-efficient, biodiverse and low-carbon; to build a smart infrastructure; and to develop an inclusive, green urban economy with the ultimate aim of achieving healthy and happy communities. (From ICLEI HP)		
Menu of Activity	Resilience Resource Point	ICLEI's Adaptation Work	ICLEI's Adaptation is formed two tool groups (Global Resources (GR) and Regional Resources(RR)). Each tool group is formed several reports and books. (Example) GR: 'Subnational Climate Compatible Development' : Learning from CDKN's experience, 'Resilient Cities', etc.) RR: 'ACCCRN Process Workbook', 'Building Adaptive and Resilient Cities (BARC) Program and Tool', etc.
		Resilience Library	Overviews, Resilience planning, Urban adaptation, Human development, Costs & Finance, Risk reduction, Food systems, Methodologies & tools
		Glossary of Key Terms	This glossary has been compiled and adapted by ICLEI (2016) from several authoritative sources including the IPCC, UNISDR, UNFCCC, the World Bank, and Arup as well as from ICLEI publications, with input from the Durban Adaptation Charter Secretariat.
		Web Resources and Networks	Webinar Series continues the discussions initiated between experts and practitioners in urban adaptation and resilience at the Resilient Cities congress. And this resource has check sheet "Resilient Cities Webinar Series 2014 Feedback Form", and each city can check activities of year.
		Congress Presentation	ICLEI opens Congress Presentation per one year. For example, Program of 2015 are formed Opening Plenary, Finance Forum and Urban Food Forum. City that participate this series, City can present its acutibities for making resilience city.
Participants	536Cities (20 <sup>th</sup> April 2016)	ASEAN	47 Japan 17

Source: JICA Project Team

### 3.2.4 City Resilience Profiling Programme (UN-Habitat)

The City Resilience Profiling Programme (CRPP) focuses on providing national and local governments with tools for measuring and increasing resilience to multi-hazard impacts, including those associated with climate change. Working through partnerships with stakeholders including international agencies such as UNISDR, academic and research institutes, private sector actors, and NGOs, the CRPP will develop a comprehensive and integrated urban planning and management approach for profiling and monitoring the resilience of any city to all plausible hazards.

**Table 3.2.4 City Resilience Profiling Programme (UN-Habitat)**

Table 3.2.4 City Resilience Profiling Programme (CRPP)					
Title	City Resilience Profiling Programme(CRPP)	organization	UN-Habitat		
Contents	The tools and guidelines developed under the Programme will be tested and refined in: Balangoda (Sri Lanka), Barcelona (Spain), Beirut (Lebanon), Dagupan (Philippines), Dar es Salaam (Tanzania), Lokoja (Nigeria), Portmore (Jamaica), Concepcion/Talcahuano (Chile), Tehran (Iran), and Wellington (New Zealand). These cities were selected based on the proposals submitted to UN-Habitat in response its call for proposals in November 2012, and represent a balance of geographical and economic distribution, population size, hazard profiles, and commitment to the resilience agenda.				
Participants	9Cities (20 <sup>th</sup> April 2016)	ASEAN	1 (Dagupan)	Japan	0
Menu of Activity	System of Entry	Step-1 Cities interested in becoming an Associate City of the programme should send their expressions of interest (EoI) to be evaluated for the CRPP Secretariat. Step-2 Provide completely filled “City Index Card”. “Index Card” is formed seven sheets (Location, Population, Governance and Policies, Economy, Build Env and Infra, Partnership and other relevant Information. City must fill this card. Step-3 Submit a letter of commitment signed by the Mayor of the City or some authorized representative of the Municipality.			
	Brochures	In HP, ten brochures for “City Resilience Profiling Programme” are insert and cities interested this action can access easily.			
	Associated Cities Selection Criteria	This programme share four criteria for association. 1) Willingness to Participate 2) Availability of Data 3) Promotional impact (Indicators:Large-scale disaster events, database:major reconstruction programmes complete or underway, UN-Habitat World Urban Campaign associated cities etc. 4) Network linkages Cities already inter-linked through city-to-city dialogue or partnerships, and with a commitment to expanding their engagement with the City Resilience Profiling Programme will be preferred. (Indicators: City-to-city agreements in place; membership in one or more city networks (UCLG, Metropolis, etc.))			

Source:JICA Project Team

### 3.2.5 Associated Programme on Flood Management (WMO)

The concept of Integrated Water Resources Management (IWRM) has attracted particular attention following the international conferences on water and environmental issues in Dublin and Rio de Janeiro held during 1992, and it was emphasized that IWRM is a necessary criterion for sustainable development.

In August 2001, the Associated Programme on Flood Management was jointly founded by the World Meteorological Organization and the Global Water Partnership promoting the concept of Integrated Flood Management as a new approach to flood management.

**Table 3.2.5 Associated Programme on Flood Management (WMO)**

Table 2.2. Associated Programme on Flood Management (APFM)					
Title	Associated Programme on Flood Management		organization	WMO	
Contents	To support countries in the implementation of Integrated Flood Management (IFM) within the overall framework of Integrated Water Resources Management (IWRM) to maximize net benefits from the use of their floodplains and minimize loss of life and impacts.				
Participants	25Cities for Capacity Building 8 counties and region for projects (20 <sup>th</sup> April 2016)	ASEAN Jakarta, Vangvieng, Nakhon Pathom, Hanoi	4	Japan	1
Menu of Activity	APFM Tools Series	The Flood Management Tools Series is composed of short technical publications intended to give quick guidance on relevant material about specific aspects of flood management to flood management practitioners. This tools are formed 24 items (Public Perception of Flood Risk and Social			

		Impact Assessment, Technical Assistance for the Preparation of an Advocacy Strategy etc.)
	Training Manuals	Three documents are ready to use for training. (Urban Flood Management, IWRM as a tool for adaptation to climate change training manual and facilitator's guide and Integrated urban Flood management) It is easy to get this document download and use.
	Case Studies	A number of case studies on flood management were collected from various regions, based on the experiences of organizations active in flood management.
Community	Support Base Partners	1) Advice and advocacy for flood management policy and strategy formulation 2) Technical advice on the (inter-) national, regional and local level 3) Facilitation of workshops and trainings supporting the Integrated approach of Flood Management 4) Development and provision of flood management tools and capacity building material; and 5) Formulation of objectives and scoping for flood management proposals.
	Global Water Partnership	GWP advocates for the implementation of integrated water resources management (IWRM) the coordinated development and management of water, land, and related resources in order to maximise economic and social welfare without compromising the sustainability of vital environmental systems.

Source: JICA Project Team

### 3.2.6 Asia Pacific Adaption Network : APAN

The mission of APAN is to build climate change resilient and sustainable human systems, ecosystems and economies through the mobilisation of knowledge, enhanced institutional capacity and informed decision making - processes, and facilitated access to finance and technologies. The purpose is to equip key actors in Asia and the Pacific Region with adequate knowledge for designing and implementing climate change adaptation measures, building capacity to access technologies and finance in support of climate change adaptation, and integrating climate change adaptation into policies, strategies and plans.

**Table 3.2.6 Asia Pacific Adaption Network : APAN**

Title	Asia Pacific Adaption Network : apan	
Contents	Mobilising Knowledge and Building Capacities for Climate Resilience “apan” has 14 themes. “Disaster Risk Reduction” is our main target. In this study, we focus this theme.	
Partners (Participants)	16 Organizations (2016)	ADB, Ministry of the Environment Government of Japan, USAID, UNEP, SEI, IGES, AIT, carec, KEIO (Japan), SPREP, PROE, CANSA, ICLEI, GWP, ICIMOD, SEARCA
Menu of Activity (Reference System)	Publications	109 publications of “Disaster Risk Reduction” can be searched in this system.
	Technology Database	42 technologies of Disaster Prevention can be searched in this system. For example, “Flood Disaster Preparedness Indices (FDPI) is included in this database. This is a questionnaire for flood disaster. By answering an online questionnaire based on Flood Disaster Preparedness Indices (FDPI), users can do a self-diagnosis of the degree of preparedness for flood disaster based on the individual situation in each community. The questionnaire can also provide the opportunity to learn about measures that could be taken to improve the disaster preparedness of the community.
	Projects	38 projects of “Disaster Risk Reductions” can be searched in this system.
	Good Practices	29 good practices of “Disaster Risk Reductions” can be searched in this system.
	Links	12 organizations are linked for Climate change.

Source: JICA Project Team

### 3.2.7 Effects of Related Activities

Effects of related activities for making resilient city based on six case studies are following items. Effects will be organized in two viewpoints. One is participate city and another is International organization.

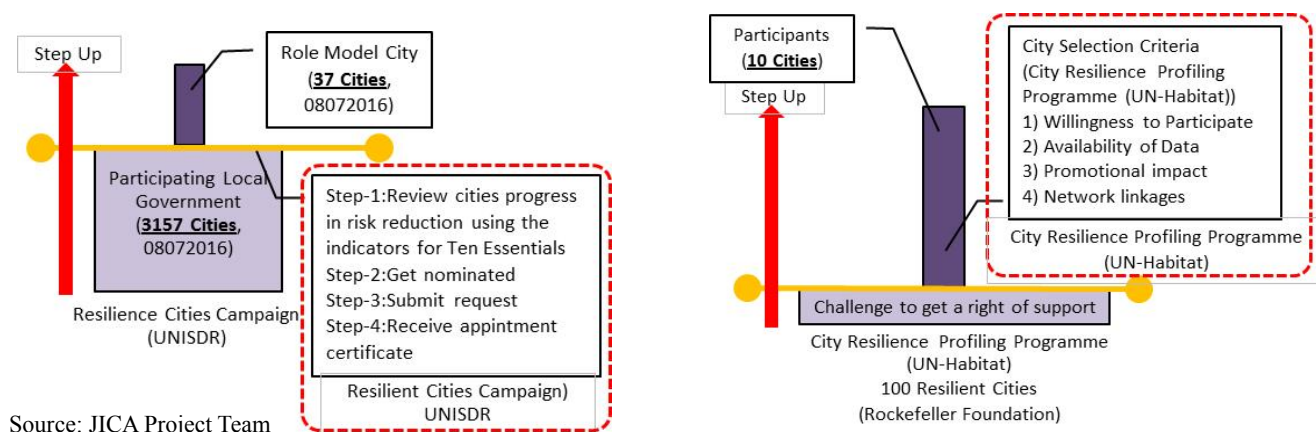
#### <Participate city>

- 1) It is easy to attend to the campaign of “Resilient City” or information of disaster prevention by international organization HP. About 3,000 cities are attended to Resilient City Campaign (UNISDR) from 2000 to 2016.
- 2) It is easy to access the information of city level statistics data, record of disaster and plan for disaster prevention of participating city. City that interested disaster prevention can get information of same class city’s activity of disaster prevention and mitigation. (same class means same population, location and record of disaster.)
- 3) Participating city understood it’s level of disaster prevention with entry of check sheet of activities.
- 4) According to Participate the activities of campaign, city gets a chance of support of international organization.

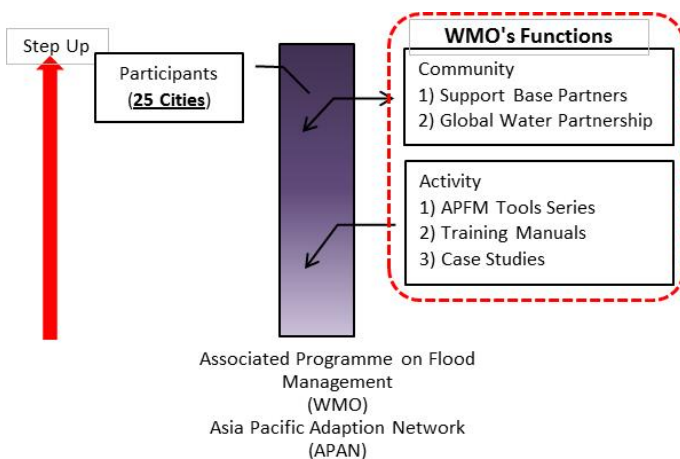
#### <International Organization>

- 1) It is very smooth to make a relationship of resilient city campaign with many cities or regions governments without nation level negotiation.
- 2) International organization can send Information about disaster prevention to participating cities (the case of UNISDR Resilient City Campaign, about 3,000 cities or regions can get new information of disaster prevention at once.)
- 3) Some organizations make a system of step up. If participating city tries to do several assignments, the city will step up. (for example, UNISDR Resilient city campaign Participating city step up to “Role Model City” and “Municipality of the month description”. ) International organization can select enthusiastic city about disaster prevention.

Related activities group three types. First type calls “Easy Entry and Step Up”, and second type calls “Select and Support with fund” and “Entry and Support with Technical Support”.



**Figure 3.2.1 Structure of Resilient Cities Campaign & City Resilience Profiling Programme**



Source: JICA Project Team

#### Upper right Figure

Image of “Challenge to get a right of support” structure is this figure. UN-Habitat selected carefully participants. Enterprising cities are selected.

#### Upper left Figure

Image of “Resilient Cities Campaign” structure is this figure. City that interest this campaign will be joined easy and after joined the campaign, enterprising city can step up with UNISDR’s request.

#### Lower left Figure

Image of “Associated Programme on Flood” structure is this figure. City want to get information of resilient city, access WMO’s HP and download tools and manuals. And if city need to support more, offer to WMO. WMO does not select city itself.

**Figure 3.2.2 Structure of Associated Programme on Flood**

### 3.2.8 Image of our output

In this mission, JPT make a tool (guidebook) formed i) Good Practices in Projects for Enhancing Resilience of Urban Cities, ii) Lessons Learned from Past Natural Disasters and iii) Study on Guide for Building Resilient Cities. On the other hand, we make check list for disaster response and measures and Data Collection (Harard Risk, Exposure Vulnerability etc). After this study, we hope that these tool and data will be used to city of ASEAN countries and city becomes resilience city. In six case studies, we select “Resilience Cities Campaign (RCC):UNISDR” type because of following reasons.

- 1) RCC type is simple and easy to entry the campaign. The most important objective is understanding risk hazard of participante city. It is effective that every city of ASEAN can access and understand it’s condition of risk hazard and disaster response.
- 2) Over 3,100 cities are participated to RCC. And new network (city to city) will be constructed with this campaign. For example, if Phuket (Thailand) and Langkawi (Malaysia) will use our tool and make a new network, they will share thier information about disaster prevention.
- 3) Our output will have only tool and data without incentive of participating. “100 Resilient cities” (Rockefeller Foundation) and “City Resilience Profiling Programme” (UN-Habitat) have incentive. Incentive will be installed next step of our tool.
- 4) First step of our tool is oneway system. Participate reads guidebook or accesses HP (undermined), do check list and read good practices or lessons learned from past natural disasters. WMO and APAN activities are two-way system. Support system will be next step of our tool.

### 3.3 Data Collection on Good Practices in Projects for Enhancing Resilience of Urban Cities, and Lessons Learned from Past Natural Disasters

Good practices for enhancing resilience of urban cities are able to grouped under several fields. Urban planning (zoning system, land use plan and Height control districts etc.), Building Code are the process for the enhancing resilience in the field of architecture. Earthquake-resistant of Public facility is important. Activities of existing organizations such as neighborhood councils for natural disaster reduction and disaster prevention are very important, too. Designation of emergency evacuation road and create a hazard map by community participation are effective for enhancing resilience of urban cities. In this section, good practices in projects for enhancing resilience of urban cities, and lessons learned from Past Natural Disasters are studied.

#### 3.3.1 Data Collection on Damages caused by Natural Disasters in Urban Cities

JPT has collected information of natural disasters mainly from websites such as Floodlist (<http://floodlist.com/>) and AHA Centre (<http://www.ahacentre.org/>). As of July 2016, JPT have collected the following data and information, and JPT will continue collecting data and information after this and analyze the feature of the damages by focusing on natural disasters causing fairly serious damages. All collected information at this stage is shown in Appendix 8.

**Table 3.3.1 Summary of Collected Information on Natural Disasters in AMS**

Name of Country	Disaster Type	Number of Collected Report	Collected Term	Main Features
Brunei Darussalam	JPT could not find any reports for Brunei Darussalam.			
Cambodia	Flood	13	Aug. 1999 to Oct. 2014	Damage by flood is large along the Mekong river and Tonle Sap lake. Damage to rice paddy field is found in 2013 floods. Especially, August 1999 the flash floods triggered by torrential rains during the first week of August, caused significant damage in the provinces of Sihanoukville, Koh Kong and Kam Pot. As of 10 August, four people were killed, some 8,000 people were left homeless, and 200 meters of railroads were washed away.
	Typhoon Flood	2	Sep. 2009 to Sep. 2013	At least nine people have died in Kampong Thom province in central Cambodia due to Typhoon Ketsana on 30 September 2009. Heavy monsoon rains exacerbated by Typhoon Usagi have pounded parts of Vietnam and Cambodia killing at least 36 people.
Indonesia	Flood	99	May. 2000 to Apr. 2016	About 19 cases out of 99 cases are related with the disaster in Jakarta or its surrounding area. Flood in Feb. 2015 affected an area in front of presidential palace.
	Storm Surge, Cyclone	2	June. 2008 to June. 2012	Cyclone Iggy killed fourteen people and another 60 were injured in Indonesia over a four-day period, and More than 11,000 Indonesians have fled their homes because of floods caused by torrential rain in Gorontalo city on Sulawesi Island, an official said on Monday, 27 October 2008.
	Earthquake/ tsunami	55	Nov. 1963 to Jun. 2016	Tsunami attack triggered by Indian Ocean Earthquake on Dec. 26, 2004 caused most seirous damage in the history. Earthquakes were observed mainly in Smatra, Papua, Central Java, Flores, according to the collected reports.
Lao PDR	Flood	6	Aug. 2008 to Sep. 2015	Flashflood and landslide occurred in the northern parts of Lao PDR in Sep. 2015.
	Tropical Storm	4	Sep. 2009 to Sep. 2015	In the first week of August, Tropical Storm Nock-Ten brought heavy rains, flash flooding and landslides to Lao



	Monsoon Rain			PDR's central and northern provinces. At least 165,247 people were affected, with some 21,800 hectares of rice fields damaged.
Myanmar	Flood	20	Oct. 2006 to Jul. 2016	The recent serious flood in Myanmar was occurred in July 2015. The flood affected 13 states and 1,615,335 people.
	Cyclone	6	May. 2004 to Aug. 2015	Cyclone Nargis has killed at least 22,500 people in Myanmar and 41,000 people are missing.
	Earthquake Tsunami	4	Dec. 2004 to Nov. 2012. 2011	24 <sup>th</sup> of March, big earthquake attacks to not only Myanmar but also northern part of Thailand, southern part of China. One bridge was reported collapsed in Myanmar, and Tsunami, At least 90 people were killed in Myanmar by a tsunami that wreaked death and destruction along the coasts of the Indian Ocean.
Malaysia	Flood	46	Nov. 2000 to Feb. 2016	Flood are observed both in Malay Peninsula and Borneo. Flood in Dec. 2013 in Johor is the most serious and affected displacement of 66,000 people among recent floods.
	Earthquake/ tsunami	2	Dec. 2004 to Jun. 2015	Magnitude 6.0 earthquake occurred in Sabah State, Malaysia in the morning on 4 June 2015. The earthquake triggered a series of landslides in Mount Kinabalu, killing at least 11 people, and At least 68 people were killed, 6 people are missing with hundreds injured in the aftermath of a tsunami triggered by the most powerful earthquake (9.0-magnitude) since 1964. Dead: 68 Missing: 6 Displaced: 8,000.
Philippines	Flood	54	Feb. 1999 to Jul. 2016	Floods caused by typhoon, tropical storm are remarkable in Philippine. Damages by Typhoon Yolanda in early Nov. 2013 and Storm FUNG WONG on Sep. 2014 are remarkable.
	Typhoon Tropical Cyclone Tidal Waves etc.	78	Sep. 1998 to Jul. 2016	Typhoon Haiyan (Yolanda), the strongest storm on earth this year, slammed into the Philippines' central islands on 8 November forcing millions of people to move to safer ground and storm shelters.
	Earthquake/ tsunami	12	Aug. 1976 to Oct. 2013	Recent earthquake was Bohol earthquake occurred in Oct. 2013. A total of 2.25 billion Philippines Peso worth of damage to public buildings, roads, bridges, was reported in Bohol and Cebu. For tsunami, Moro Gulf Tsunami on Aug. 1976 caused the death of 8,000 people.
Singapore	Flood	1	Sep. 2013	This flood caused blocked roads and difficulties for commuters.
Thailand	Flood	61	Jun. 2013 to Aug. 2015	Information on flood in 2011 to be collected. Flood disasters are observed in the whole part of Thailand.
	Tropical Storm Typhoon etc.	4	Apr. 2002 to Jul. 2014	Tropical Storm Nock Ten has caused continuous rainfalls in the north and the northeast of Thailand, causing floods in 15 provinces. Killed: 744 Missing: 3 Affected: 4,176,763 (current)
Viet Nam	Flood	63	Oct. 1998 to Sep. 2015	Among the recent floods, damages of floods in Sep. 2014 and July 2015 are more serious than other floods. Flood in Sep. 2014 damaged 74,000 ha of agriculture area.
	Typhoon	28	Nov. 1998 to Sep. 2015	The strongest typhoon (Lingling) to hit Vietnam in 15 years has killed at least two people, destroyed houses and uprooted trees on Monday after killing hundreds in the neighboring Philippines, local officials said. Dead: 20 persons Injured: 83 people Evacuated: 562 families Destroyed: 2,636 houses Damaged: 12,000 houses Close to 30,000 ha of rice paddy and other crops have been ruined. Some 145 boats have reportedly been washed away. Approximately 650 schools have been destroyed or damaged.

Source: JICA Project Team



### 3.3.2 Data Collection on Good Practices and Lessons Learned

#### (1) Category of Good Practices and lessons

##### 1) Definition of Good Practices and Lessons learned

Definition of good practices and lessons learned is methods and lessons for prevention the damage of natural disasters. JICA Project Team collected and organizes the materials in the famous proverb.

##### 2) Be prepared and have no regrets

Preparing natural disasters is important to minimize the damage. There is "Be prepared and have no regrets" the old Proverb. Good practices and lessons learned that related to this proverb are following items.

###### i) Risk Assessment

Risk management of disaster is the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and or impact of unfortunate events or to maximize the realization of opportunities of natural disasters.

###### ii) Government Plan

National, regional and city plan for disaster prevention, evacuation plan, urban plan and development plan, it is planned to prepare for natural disasters that might happen in the future.

###### iii) Regulation and Rule, Disaster Measures for Buildings and Development

Regulation and rule for building and development are important for inhibition and protection for natural disaster. If regulation or rule are established with risk assessment or record of disaster, it is effective for resilience city.

##### 3) A disaster strikes when people do not expect it

According to "Data Collection on Damages caused by Natural Disasters in Urban Cities", earthquake will happen about 50 to 100 year intervals at same point. If government or anyone did not record the damage of disaster, the experience of damage could not succeed present generation. Good practices and lessons learned that related to this proverb are following items.

###### i) Natural Disaster Memorial Park

In order to record the misery of natural disasters, it is effective to establish a memorial park.

###### ii) Regulation and Rule, Disaster Measures for Buildings and Development

Regulation, rule, disaster measures for buildings and development are duty for constructing building and infrastructure. These are universal systems and it is effective for resilient city.

##### 4) knowledge is power

With knowledge and or education of disaster prevention, government potential or ability of disaster to succeed in the pursuit of its objectives will certainly increase. Good practices and lessons learned that related to this proverb are following items.

###### i) Sustainable Development

In order to realize the sustainable development (disaster prevention measures), it is necessary to invent materials and methods adapted to the development characteristic of area.

###### ii) Early Warning System

It is effective for disaster mitigation to perceive quickly the disaster. It is also important to the invention a technique for constructing the early warning system.

##### 5) Practice makes perfect

"Practice makes perfect" means that do something many times, so that they will learn to do it very well. Good practices and lessons learned that related to this proverb are following items.

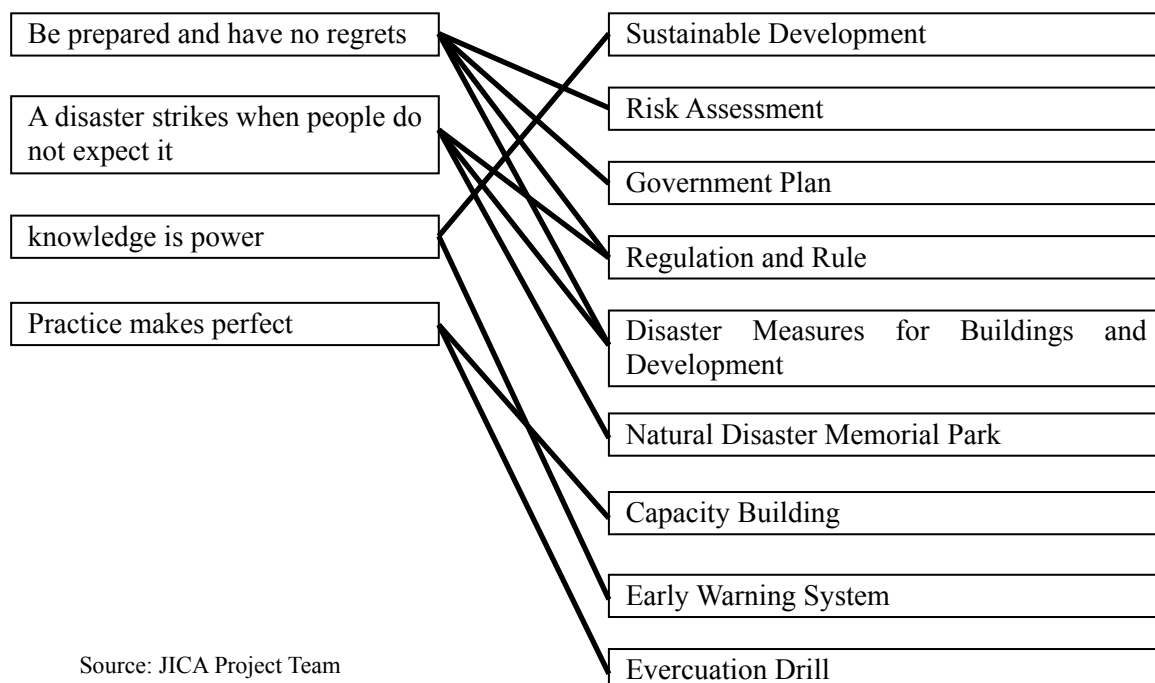
###### i) Capacity Building

To learn the technology of information on natural disasters and disaster prevention is important. In addition, exchange with practices and human resources of developed nations is

also effective.

ii) Emergency Drill

Planning simulation (especially assumed evacuation drills a disaster), practice based on the plan (evacuation drills, etc.), is also effective becomes the verification of the plan.



Source: JICA Project Team

**Figure 3.3.1 Structure of Good Practices and Lessons Learned**

JPT groups good practices and lessons into seven categories: 1) Sustainable Development, 2) Risk Assessment, 3) Government Plan, 4) Regulation and Rule, 5) Disaster Measures for Buildings and Development, 6) National Disaster Memorial Park, 7) Capacity Building, 8) Early Warning System and 9) Evercuation Drill.

1) Sustainable development

Sustainable development is defined as Development that meets the needs and aspirations of the present without compromising the ability of future generations to meet their needs. Sustainable development is the organizing principle for sustaining finite resources necessary to provide for the needs of future generations. For example, to build a bank protection of the steep slope by reinforced-concrete (RC) is effective in order to secure the slope, but requires a large amount of cost. To plant cultivated trees in the neighboring farm to and slopes, it will be effective to the prevention of landslides. This cost is cheaper than constructing a bank protection with RC. Good Practices and Lessons of Sustainable development are following.

**Table 3.3.2 Sustainable Development**

City Name	Title	Contents
Tajikistan (KUHISTON Foundation)	Creation of mini-nurseries in landslide-prone areas of Mountainous Badakhshan	The NGO Kuhiston developed a program to motivate and enable villagers to establish mini-nurseries in the Rushan district of Badakhshan. During the last 5 years, seedlings and clones from the nurseries were planted on many of the district's vulnerable slopes, where they help to stabilize the land and slow the soil erosion caused by wind and water. In future years, the trees will provide construction material, fuel, fodder and fruit (it takes 20 poplars to make a house.) Each participating household planted 120 trees, of which 20 fruit trees remain near domestic areas and 100 poplars are planted on the vulnerable slopes. The local office of the UN World Food Program provided food-for-work to the households. Besides this, to encourage people and to reduce the demand for fuel wood, the program provided warm clothing for many families, transparent plastic to cover broken windows in schools, and coal for two schools. Forty-two thousand trees were planted in the Bartang Valley by its communities.
Practices and lessons of this case  <b><u>It is effective that disaster prevention activities that take advantage of the region-specific materials.</u></b>		The issue of vulnerability of Badakhshan mountainous territory was desertification caused by two sets of hazards: natural and anthropogenic. Especially, the anthropogenic factors mostly cause or affect poverty including over-grazing, excessive wood cutting, inadequate water management, tilling and watering unstable slopes, neglecting proven mitigation investments. i) Additional strength for vulnerable slopes = Tree Planting (Common tree species, (poplar and fruit tree) ) ii) Grown trees = Housing material iii) Village people work to plant trees on slopes and construct a house.
Tajikistan (The World Bank & MoECD)	Reducing Poverty in High Mountain Environments around Lake Sarez in the Republic of Tajikistan	The several project components, including road rehabilitation and various small mitigation and income generation projects, were designed (a) to alleviate poverty by reducing the people's vulnerability to natural hazards, and (b) to foster sustainable development that will eventually help people to be prepared and to cope with inevitable natural catastrophes. To achieve this goal, each project included a capacity building component, providing people with new knowledge and skills that are in high demand in other areas of the country. Communities submitted 300 project proposals, among which 31 were selected for implementation. One of the mitigation projects included production of gabions used for the construction of retention walls and river bank strengthening. 18 gabion-production workshops with 60 workers were established in Rushan district of Gorno Badakhshan. Considering the high demand for gabions in similar mitigation activities, these workers can continue their production and sell their services to other communities.
Practices and lessons of this case  <b><u>It is important for sustainable development that materials and manpower for disaster prevention are supplied from local.</u></b>		i) To implement disaster prevention action with local residents manpower. ii) Rehabilitation of 120 km of the Rushan - Barchadiv road required all types of road and bridge construction skills. To construct road and bridge, local residents got technique of road repairing. iii) Gabion-production workshop was effective for this area's road repairing. Because material of gabion was supplied from same area. It is easy to get the material and this scheme is sustainable.

Source: JICA Project Team

## 2) Risk Assessment

Risk assessment is a process to determine the nature and extent of risk, by analyzing hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend. A comprehensive risk assessment not only evaluates the magnitude and likelihood of potential losses but also provides full understanding of the causes and impact of those losses. Risk assessment, therefore, is an integral part of decision and policy-making processes and requires

close collaboration among various parts of society. Good Practices and Lessons of Risk Assessment are following items.

**Table 3.3.3 Risk Assessment**

City Name	Title	Contents
<b>UNISDR</b>		
Whole World	Prevention Web	UNISDR informs several items and one of them is 'PreventionWeb'. Contents of this web is following. Find and share information and connect with the disaster risk reduction community on PreventionWeb - a project of UNISDR launched in 2007 to serve the information needs of the community. <a href="http://www.preventionweb.net/english/">http://www.preventionweb.net/english/</a>
<b>USGS (United States Geological Survey)</b>		
Whole World	Earthquake Hazards Program	The USGS Earthquake Hazards Program is part of the National Earthquake Hazards Reduction Program (NEHRP), established by Congress in 1977. We monitor and report earthquakes, assess earthquake impacts and hazards, and research the causes and effects of earthquakes. <a href="http://earthquake.usgs.gov/">http://earthquake.usgs.gov/</a>
<b>IFNet (International Flood Network)</b>		
Whole World	Flood Information	The International Flood Network (IFNet) was created on the Flood Days of the 3rd World Water Forum at Kyoto in March 2003. IFNet is a network aiming to promote activities that will contribute to reduce the negative impacts of floods all over the world. <a href="http://www.internationalfloodnetwork.org/index.html">http://www.internationalfloodnetwork.org/index.html</a>
<b>ADRC (Asian Disaster Reduction Center)</b>		
Whole World	GLIDE Number (Global unique disaster IDentifier)	ADRC proposed a globally common, unique identification scheme for disaster events, as a tool for facilitating the sharing of disaster information archived by organizations around the world. The idea was launched as the new initiative, "GLIDE", jointly with such organizations as the OCHA. <a href="http://www.glidenumber.net/glide/public/search/search.jsp">http://www.glidenumber.net/glide/public/search/search.jsp</a>
<b>CLIMATE CENTRAL</b>		
Whole World	CLIMATE SERVICES	An independent organization of leading scientists and journalists researching and reporting the facts about our changing climate and its impact on the public. Climate Central surveys and conducts scientific research on climate change and informs the public of key findings. Our scientists publish and our journalists report on climate science, energy, sea level rise, wildfires, drought, and related topics. Climate Central is not an advocacy organization. We do not lobby, and we do not support any specific legislation, policy or bill. <a href="http://ss2.climatecentral.org/#12/40.7298/-74.0070?show=satellite&amp;projections=0-RCP85-SLR&amp;level=5&amp;unit=feet&amp;pois=hide">http://ss2.climatecentral.org/#12/40.7298/-74.0070?show=satellite&amp;projections=0-RCP85-SLR&amp;level=5&amp;unit=feet&amp;pois=hide</a>
Practices and lessons of this case  <b><u>Easy to understand the risk of natural disaster is important.</u></b>		i) Easy to access the information of risk A participant or a person who is interested about risk assessment can access these information easily. And understand the situation of the area that they want to know. ii) Understanding of the broad-based risk A participant can understand the broad risk beyond city, state and country boundary. iii) Opportunity to understand the need for disaster-prevention measures Knowing the risk to the natural disasters of the city or region is the opportunity to develop a disaster prevention plan.

Source: JICA Project Team

3) Government plan (Disaster Prevention Plan, Evacuation Plan etc), practices and coordination  
Disaster Prevention Plan, Evacuation Plan etc. are planned by Government Disaster Prevention Section. Plan of evacuation route, arterial road network for transporting relief supplies at the time of disaster, plan of shelters for victims to evacuation and plan of warehouses for storage of supplies for evacuation etc. are made and discussed for resilient at the time of disaster. Regional government held emergency drill with regional community and central government will

cooperate with technical support, human resources and request to other ministries and government offices (for example. Home Affairs to National Police Agency, Defence Agency and Ministry of Construction etc.). Good Practices and Lessons of Government plan are following items.

Table 3.3.4 Government plan

City Name	Title	Contents
<b>UNDP DRR</b>		
ASEAN Eight Countries and ASEAN	Disaster Management Reference Handbook	<p>The Disaster Management Reference Handbook Series is intended to provide decision makers, planners, responders and disaster management practitioners with an overview of the disaster management structure, policies, laws, and plans for each country covered in the series. Overviews of natural and man-made threats most likely to affect the country are discussed.</p> <p>The handbooks also provide basic country background information, including cultural, demographic, geographic, infrastructure and other basic country data.</p> <p>Endemic conditions such as poverty, water and sanitation, food security and other humanitarian issues are included. A basic overview of the health situation in the country and disease surveillance is also covered.</p>
Practices and lessons of this case <b><u>It is important that country know the ability to respond to natural disasters each other.</u></b>		It is important that Nation deepen mutual understanding about disaster prevention each other. These handbooks form eight countries belonging ASEAN and ASEAN Report. Each country checks itself and next step, they understand how to cooperate each other at natural disaster.
<b>Philippines</b>		
All area	National Disaster Risk Reduction and Management Plan (NDRRMP) 2011-2028 NDRRMC	<p>The National Disaster Risk Reduction and Management Plan (NDRRMP) fulfills the requirement of RA No. 10121 of 2010, which provides the legal basis for policies, plans and programs to deal with disasters. The NDRRMP covers four thematic areas, namely, (1) Disaster Prevention and Mitigation; (2) Disaster Preparedness; (3) Disaster Response; and (4) Disaster Rehabilitation and Recovery, which correspond to the structure of the National Disaster Risk Reduction and Management Council (NDRRMC).</p> <p><a href="http://ndrrmc.gov.ph/">http://ndrrmc.gov.ph/</a></p>
All area	National Disaster Response Plan 2014 NDRRMC	<p>The preparation of this National Disaster Response Plan (NDRP) was made possible through the Disaster Risk Reduction and Management Capacity Enhancement Project (DRRM-CEP) of the Japan International Cooperation Agency (JICA) for the Office of Civil Defense (OCD), Government of the Republic of the Philippines. Component 2 of the Project aimed to assist the OCD develop the NDRP as the official document for all government agencies to use in times of disaster. The Department of Social Welfare and Development (DSWD), as the Sub-Agency for Response, as well as the other government agencies concerned, have given their support and cooperation in the preparation of the Plan.</p> <p><a href="http://ndrrmc.gov.ph/">http://ndrrmc.gov.ph/</a></p>
All area	OCD Education and Training Division	<p>Our Core Function</p> <p>Formulates, supervises and monitors the implementation of National DRRM and Civil Defense training policies, plans and programs.</p> <p>Our Specific Functions</p> <ol style="list-style-type: none"> <li>1. Formulate Civil Defense Career Development Training Program for OCD Organic Personnel and other DRRM professionals;</li> <li>2. Develop and establish a comprehensive monitoring system to ensure the effective implementation of DRRM and Civil Defense Training;</li> <li>3. Evaluate the training conducted to determine the effectiveness of the program;</li> <li>4. Conduct researches for the development of courses on Civil Defense and DRRM;</li> <li>5. Formulate the training needs assessment system on Civil Defense and DRRM to determine other training requirements of OCD personnel and the general public;</li> <li>6. Coordinate with the network of local and foreign DRRM, Civil</li> </ol>

		Defense and Climate Change institutions for training opportunities, partnerships and cooperation; and 7. Supervises the implementation of national DRRM training policies, plans and programs.
Practices and lessons of this case <b><u>PDCA Cycle is important for disaster prevention. Does not utilize disaster prevention plan is a waste</u></b>		NDRRMC made plans and system for Disaster Prevention and Mitigation, Disaster Preparedness, Disaster Response and Disaster Rehabilitation and Recovery. NDRRMC has been done capacity development, training and evacuation drill. The results (information) of activities are opened.

Source: JICA Project Team

## 4) Regulation and rule

Building Code (specially seismic code), Development Permission Criteria and Zoning System (Urban Planning) belong to this group.

Table 3.3.5 Regulation and rule

City Name	Title	Contents
<b>Building Code</b>		
Almaty City (Kazakhstan)	Building Control of Almaty City	This zoning code informs the location of active fault and soft ground area. If land owner constructs new building on soft ground area, he must attention the regulation of earthquake-resistant strength. Construction work is limited on active fault. the point of good practices is connection of zoning code and geologic map. (Refer to Appendix 9)
<b>Regulation for development</b>		
Kobe City (Japan)	Kobe City Development Guidelines	The purpose of this guidelines is following. i) The purpose of these Standards are to form a balanced and sound urban area through systematic developemt taking advantage of the characteristics of the City of Kobe, to thereby contribute to citizen' welfare. ii) To attain the purpose stated in the construction of public facilities-municipal frastructures.
Slope Engineering Branch, Public Works Department Malaysia	Guidelines for Slope Design	The main objectives for formulating these guidelines are following items. i) To stipulate guiding principles to JKR and other engineers involve in slope design ii) To minimise risks in slope failure disasters iii) To increase stability of slope iv) To create awareness of the risks involved in slope design v) To further enhance existing geotechnical requirements in slope design
<b>Zoning System</b>		
Indonesia	Spatial Planning	Spatial planning in Indonesia began in 1926 when the Nuisance Ordinance was introduced. The ordinance regulated certain industrial installation in certain areas through zoning and permit systems. The Spatial Planning Law (24/1992) stipulated the hierarchical spatial planning in Indonesia consisting of the national spatial plan (RTRW Nasional), the provincial spatial plans (RTRW Propinsi) and the district spatial plans (RTRW Kabupaten and RTRW Kotamadya). All levels of the government were required to make spatial plans for directing the development in their respective regions.
Practices and lessons of this case <b><u>In order to construct a resilience city for disaster, there is a need for building and infrastructure strong in disaster</u></b>		Building Control (Almaty City) based on geology analysis. Development Guidelines (Kobe City) and Guidelines for Slope Design (Malaysia) are revised with records and analysis of natural disaster. Spatial Planning (Indonesia) will be revised 10 year interval. The newest data and technology are introduced with revision of rules for disaster prevention.

Source: JICA Project Team

## 5) Disaster Measures for Buildings and Development

The most preferred method of earthquake resistance of building is earthquake resistance based on Building Code. However, Building Code and national seismic criteria are not being enforced, or or because of the low income, the family can not reinforce earthquake resistance for their house,

as a minimum condition, the evacuation to the outside of the building before the building collapses enable. For example, earthquake resistance with bamboo, scrap wood and scrap iron, and house with platform upper the surface of flood water line. Good Practices and Lessons of Disaster Measures for Building are following items.

**Table 3.3.6 Disaster Measures for Buildings**

City Name	Title	Contents
<b>World</b>		
Whole World	Regulations for Seismic Design - A World List (2012)	The International Association for Earthquake Engineering (IAEE) is a non-profit organization that includes representation from the world's national earthquake engineering societies, each national society having a Delegate to the IAEE. The IAEE is responsible for selecting the venue and local organizing society for each of the World Conferences on Earthquake Engineering. It compiles and updates Regulations for Seismic Design: A World List, as well as other issue publications as necessary. Its flagship periodical, the journal titled Earthquake Engineering and Structural Dynamics, has been a leading publication in the field since 1972. The IAEE's fundamental goal is to help improve worldwide seismic safety. <a href="http://www.iaee.or.jp/worldlist.html">http://www.iaee.or.jp/worldlist.html</a>
Practices and lessons of this case <b><u>knowledge is power. It is easy to access HP of disaster prevention.</u></b>		It is easy to access IAEE HP, and understand what country has a building code and what country does not have. Overlay GIS information of risk hazard on this information of IAEE, what city is weak for natural disaster is very clear. If government staff want to study foreign country's building code, check this HP and find a object of study with same situation (population, GDP or Linguistic area etc.)
<b>Republic of Peru and El Salvador</b>		
Adobe Building (Earthquake)	Disaster measures for building	<ul style="list-style-type: none"> <li>➤ Placement of cane reinforcement</li> <li>➤ Vertical and horizontal reinforcement</li> <li>➤ Barbed wire as horizontal reinforcement</li> <li>➤ House reinforced with cane pilasters</li> </ul>
<b>Nepal</b>		
NSET Guidelines and Report (Earthquake)	What are the tricks for Constructing Earthquake-resist ant Buildings Retrofitting of Common Frame Structural (Pillar System) Houses	In Nepal, generally bricks are main material of constructing buildings. But such structural building is weak for earthquake and many buildings are broken at big earthquake. Then these guidelines and reports are published for construction of resilience building and city. In these books, to use the building materials that can be easily procured. For example, cane (bamboo), wire and wooden for reinforcement.
<b>Philippines</b>		
UNDP, ISDR, gtz	Handbook on Good Building Design and Construction In the Philippines	This Handbook is made to provide simple information to house owners, to house designers and builders, and building monitors to teach principles of good design and good construction in natural hazard prone areas. Thoroughly studied, they will also guide on whether to repair or rebuild damaged houses. The descriptions are followed by a code of minimum standards for construction of houses to ensure quality and a sustainable building. <a href="http://www.unisdr.org/files/10329_GoodBuildingHandbookPhilippines.pdf#search='flood+building+construction+asia+handbook'">http://www.unisdr.org/files/10329_GoodBuildingHandbookPhilippines.pdf#search='flood+building+construction+asia+handbook'</a>
<b>Australia</b>		
Disaster Resilient Australia	Australian Emergency Management Knowledge Hub	The Knowledge Hub provides research, resources and news relevant to emergency management and includes statistics and information, photos, video and media about past disaster events. For those in the emergency management sector you can use the forum space to discuss ideas and issues affecting the sector by registering as a Knowledge Hub member. For information about the context and development of the Knowledge Hub visit the About page.






	<a href="https://www.emknowledge.gov.au/category/?id=2">https://www.emknowledge.gov.au/category/?id=2</a>
Practices and lessons of this case <b><u>knowledge is power and cheap and popular material and technology and idea are sustainable.</u></b>	Areas where major damage in a natural disaster occurs is a region where low income people live. High ratio of residence is shabby, and weak for natural disaster. These handbook or report guide shabby material with high technology and idea for Strong in disaster housing.

Source:JICA Project Team

## 6) National Disaster Memorial Park

Memorial park may be either a public park dedicated in memorial to an event or cemetery. The case of memorial park for natural disaster, destroyed building, the maximum water level of flood and ship bringing by tsunami are preserved. Good Practices and Lessons of national disaster memorial park are following items.

**Table 3.3.7 National Disaster Memorial Park**

City Name	Title	Contents
<b>Indonesia</b>		
Banda Aceh City	Tsunami Memorial Park	<p>The 2004 Indian Ocean earthquake occurred on 26 December with the epicentre off the west coast of Sumatra, Indonesia. According to the U.S. Geological Survey a total of 227,898 people died (see table below for details). Measured in lives lost, this is one of the ten worst earthquakes in recorded history, as well as the single worst tsunami in history. Indonesia was the worst affected area, with most death toll estimates at around 170,000. Lower left photo was taken at Apr. 2005. Right photo is existing condition. Around this ship became a memorial park for Tsunami.</p> <div style="display: flex; justify-content: space-around;">   </div> <p>Power Generation Plant Ship (Apr. 2005) Memorial Park of Tsunami (2016)</p>
<b>Japan</b>		
Miyako City Taro District	Tsunami Memorial Building	<p>The 2011 earthquake off the Pacific coast of Tōhoku was a magnitude 9.0 (Mw) undersea megathrust earthquake off the coast of Japan that occurred on Friday 11 March 2011. Japan's National Police Agency said on 3 April 2011, that 45,700 buildings were destroyed and 144,300 were damaged by the quake and tsunami. The damaged buildings included 29,500 structures in Miyagi Prefecture, 12,500 in Iwate Prefecture and 2,400 in Fukushima Prefecture. "Tourist Hotel TARO" was located on Taro District of Miyako City Iwate Pref. This hotel was destroyed by Tsunami. Government decided to preserve this hotel to remains.</p>  <p>Tourist Hotel TARO (Remains)</p>
Practices and lessons of this case <b><u>A disaster strikes when people do not expect it. To share and tell the experience of suffering is important.</u></b>		By the construction of the Memorial Park, citizens can not forget natural disaster. Moreover, large space such as a park will be effective for buffer zone, too.

Source:JICA Project Team



### 7) Capacity Building

Capacity building means planned development of knowledge, output rate, management, skills, and other capabilities of an organization through acquisition, incentives, technology, and training. Capacity building of disaster prevention means improvement of planning capacity of disaster prevention plan, Evacuation Plan etc and Ability of avoiding the risk of a disaster through the evacuation drill. Especially It is important the ability to formulate a disaster prevention plan on the assumption that to fully understand the risk assessment. Good Practices and Lessons of Capacity Building are following items.

**Table 3.3.8 Capacity Building**

City Name	Title	Contents
<b>UNISDR</b>		
Participating Local Governments	A Toolkit for Local Governments	UNISDR Participating local governments can use 'Toolkits' of Resilient City Champion. Toolkit is formed Guidance Documents, Assessment tools, Risk Mapping and Planning for Resilience.
Themes	Capacity Development	The process by which people, organizations and society systematically stimulate and develop their ability over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions - within a wider social and cultural enabling environment. <a href="http://www.preventionweb.net/english/themes/capacity-development/">http://www.preventionweb.net/english/themes/capacity-development/</a>
<b>ADRC</b>		
Human Resources Development	Disaster Risk Reduction begins with Capacity Building	(1) Organizing Conference, Workshops & Trainings on Disaster Risk Reduction ADRC organizes and conducts various conferences, workshops and trainings for enhancing the human resources capability of pursuing effective disaster risk management in member countries. (2) Program for Inviting Visiting Researchers from Member Countries Each year, ADRC invites four officials in charge of disaster management from Member Countries as visiting researchers for a term of about half a year. The researchers are provided with opportunities to discuss challenges for disaster management of each country, enhance understanding of the disaster management system, disaster reduction, and international cooperation in Japan.
<b>World Meteorological Organization</b>		
Development and Regional Activities	Education and Training Programme	The Education and Training (ETR) Office manages the Education and Training Programme (ETRP), which serves as an advisory body on all aspects of technical and scientific education and training for WMO Members. The ETR Office contains two divisions: the Education and Fellowships Division (FEL) and the Training Activities Division (TRA). <a href="https://www.wmo.int/pages/prog/dra/etrp.php">https://www.wmo.int/pages/prog/dra/etrp.php</a>
Practices and lessons of this case <b><u>Practice makes perfect.</u></b>		International organization installs education and training programme for capacity building. ASEAN countries have a programme for capacity building, and some countries open the record and information of capacity building training.

Source: JICA Project Team

### 8) Early Warning System

Early Warning System is an element of disaster risk reduction. It prevents loss of life and reduces the economic and material impact of disasters. To be effective, early warning systems need to actively involve the communities at risk, facilitate public education and awareness of risks, effectively disseminate alerts, and warnings and ensure there is constant state of preparedness. For example, 'Indonesia Tsunami Early Warning System' is working and early warning system of floods is studies in Malaysia. Good Practices and Lessons of Early Warning System are following items.

**Table 3.3.9 Early Warning System**

City Name	Title	Contents
<b>World</b>		
Whole World	Pacific Tsunami Warning Center (NOAA's National Weather Service)	The Pacific Tsunami Warning Center (PTWC) is one of two tsunami warning centers that are operated by NOAA in the United States. <a href="http://ptwc.weather.gov/">http://ptwc.weather.gov/</a>
Whole World	Northwest Pacific Tsunami Advisory (Japan Meteorological Agency)	Information bulletins provided by the Northwest Pacific Tsunami Advisory Center (NWPTAC) should not be construed as official warnings or evacuation notices for the areas concerned. The issuance of actual evacuation notices is the responsibility of individual local authorities. <a href="http://www.jma.go.jp/en/distant_tsunami/WEPA40/indexo.html">http://www.jma.go.jp/en/distant_tsunami/WEPA40/indexo.html</a>
<b>Indonesia</b>		
All area	Indonesia Tsunami Early Warning System	The Indian Ocean Tsunami Warning System is a tsunami warning system set up to provide warning to inhabitants of nations bordering the Indian Ocean of approaching tsunamis. <a href="https://inatews.bmkg.go.id/new/">https://inatews.bmkg.go.id/new/</a>
Jakarta	Flood Early Warning Early Action System (FEWEAS) Provinsi DKI Jakarta (BPBD)	Flood Early Warning Early Action System is now constructing. Twitter Survice (flood information sharing ) is supply information of flood of Jakarta. Twitter user name ( <a href="https://twitter.com/BPBDJakarta?ref_src=twsrc%5Etfw">https://twitter.com/BPBDJakarta?ref_src=twsrc%5Etfw</a> ) BPBD DKI Jakarta <a href="http://bpbd.jakarta.go.id/">http://bpbd.jakarta.go.id/</a>
<b>Thailand</b>		
Chao Phraya River	Hydrometeorological conditions in Chao Phraya river basin	JICA launched a flood-control project following the massive flooding. We joined the project through the integrated Study on Hydro-Meteorological Prediction and Adaptation to Climate Change in Thailand Project. The aim of this study was to determine the water-balance characteristics in the upper Chao Phraya River basin using a hydrological model. <a href="http://impact-www.eng.ku.ac.th/chaophraya-auto/">http://impact-www.eng.ku.ac.th/chaophraya-auto/</a>
<b>Malaysia</b>		
Kelantan Perak Kuala Terengganu Melake	Research and Development for Reducing Geo-Hazard Damage in Malaysia caused by Landslide and Flood (SATREPS)	In Malaysia, the concern for economic damage caused by landslides and floods is increasing in accordance with climate change, recent population increase and urbanisation as a result of rapid economic growth. A trial advanced disaster risk management system with an integrated data system of landslide and flood is proposed to the relevant Government agencies in Malaysia for them to consider the implementation of a disaster management programme. <a href="http://jmgeohazard.cs.usm.my/">http://jmgeohazard.cs.usm.my/</a>
Practices and lessons of this case  <b><u>Knowledge is power. It is effective to minimize the disaster that people know the advent of natural disasters early.</u></b>		Most of countries of ASEAN are often flood damage every year. To understand the mechanism of the flood, it is important to inform the lower reaches early. It is possible to make the early warning system without using high technology.

Source: JICA Project Team

## 9) Evacuation Drill

Evacuation Drill is an element of disaster risk reduction. Evacuation drill is a method of practicing how a building would be evacuated in the event of a fire or other emergency with evacuation plan. For example, "KIZUNA Project (Republic of Chile)", JICA supported evacuation drill and early warning system were formed. When Chile Earthquake (Sep. 2015) has happened, damage of people and stock were restrained. Good Practices and Lessons of Evacuation Drill are following items.

**Table 3.3.10 Evacuation Drill**

City Name	Title	Contents
<b>Papua New Guinea</b>		
Aitape (ADRC)	PNG Tsunami Awareness Raising Literature Project	In 1998, a Tsunami (Tidal Wave) struck the west coast in Sandaun Province of the Papua New Guinea causing the death of 2,022 people and destroying entire villages and leaving thousands homeless. In 1999, The Disaster Management Office in consultation with other key agencies and ADRC had programmed to undertake number of major community awareness and education in year 2000. One of these projects, provided enough knowledge for school students and resident of coastal/ Non coastal community in PNG on Tsunami Disaster Prevention and provided enough knowledge for experts and leaders in PNG in order to promote future tsunami disaster prevention.
<b>Philippines / Indonesia</b>		
Evercuation Drill	NDRRMC / NDMA	Philippines and Indonesia have a high level evercuation drill system. National government (NDRRMC, NDMA) linkages local government and local community, school, hospital, private company etc, cooperate to carry out the evercuation drill. After drill, local government and community must make a record of action and insert to HP of NDRRMC, NDMA. Person who intersted such action can access this information easily.
Practices and lessons of this case <b><u>New Ireland earthquakes and knowledge is power</u></b>		In 2000 New Ireland Earthquakes, Tsunami came to Aitape beach. Aitape villagers took refuge from tsunami on a hilltop. There is no victim for this tsunami. This is effect of ADRC's activities.

Source:JICA Project Team

### 3.4 Study on Guide for Building Resilient Cities

#### 3.4.1 Development Concept of Guidebook

##### (1) Goals and objectives of Guidebook

This Guidebook is intended for practitioners: National and local government staff working at urban planning, development permission, infrastructure construction, disaster prevention and financial. It is also aimed both at staff working on long term development programmes and those involved in emergency managemernt. This Guidebook aims to help the staff of urban planning, development permission, infrastructure construction, disaster prevention and financial to :

- 1) understand the vulnerability to natural disasters of interest city
- 2) understand how to address these issues and weak points for disaster prevention.
- 3) appreciate the necessity for risk management in urban planning and development of infrastructure, and disaster prevention
- 4) construct cooperation with the city or country that has same problem

##### (2) Tentative contents of Guidebook

Guidebook will be formed seven chapters (1.Introduction, 2. Challenges and Intiatives, 3.Why we need mainstreaming of DRR into Urban Planning?, 4. Approaches to Risk-sensitive Urban and Land Use Planning, 5.Disaster Risk Assessment, 6.Appricable Tools for Resilient Cities, 7. Good Practices for Resilient Cities).

##### (3) Image of output

Guidebook forms two parts. Part-1 is outline and part-2 is an appendix. The image of output is following Figure3.4.1.

## Part-1 Outline (Edited in 10 languages)

## Chapter 4 City Planning (Earthquake and Tsunami)

## 4-1 Master Plan

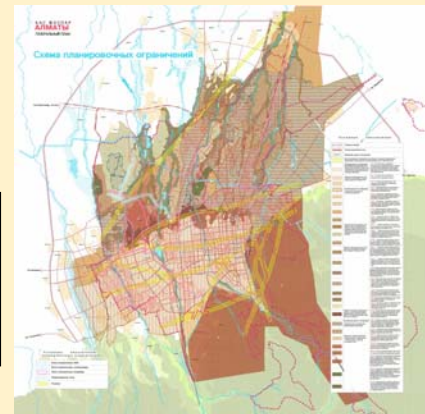
In ASEAN Countries, seven countries have a system for making a master plan of urban planning based on Urban Planning Law. In Master Plan, some tools are ready to make safety and resilience city. Tools for making resilience city are following items.

- (1) New expanded area for residence (Case of Indonesia)
- (2) Evacuation area (Park) for disaster (Case of Kobe City)
- (3) Tsunami Park (Case of ISHINOMAKI City)
- (4) .....



## 4-2 Zoning Code

- (1) Building Code for earthquake (Case of Almaty City)
- (2) District Plan (Case of Wellington City Council)
- (3) Enforcement Ordinance of Construction Standard Law (Case of FUKUOKA City)
- (4) .....

**Step-1**

Title of plan and city name are introduced and outline or key map are edited.

## Part-2 Appendix (English)

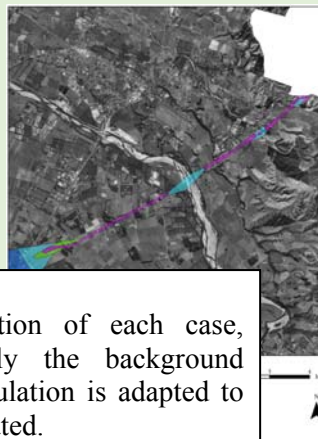
## Chapter 4 City Planning (Earthquake and Tsunami)

## 4-2 Zone Code

## (2) Wellington City Council District Plan

**The earthquake hazard in the Wellington Region**

The Wellington Region lies within the deforming boundary zone between the Pacific and Australian plates, within one of the most seismically active areas of the country.

**Step-2**

Explanation of each case, especially the background that regulation is adapted to be operated.

**Wellington City Home Page****Step-3**

Finally, it describes how to access the home page and documentation.

Figure 3.4.1 Image of Guidebook Structure

#### (4) Study on Resilience of Existing Infrastructure and Buildings, and Legislative System in ASEAN

In order to clarify the issue and remedy for infrastructure resilience in ASEAN, JPT is conducting the two kinds of survey related to infrastructure as follows:

##### A. Literature review for infrastructure damage in the past disaster

Information about infrastructure damage in ASEAN as well as Japan in the past disaster is collected through literature review. Based on this information, JPT will summarize the issue and remedy for the infrastructure resilience to put them in the guidebook.

##### B. Questionnaire survey for design code for infrastructure and situation of its application to actual design (Table 3.4.1)

In order to collect information about design code for infrastructure and situation of its application to actual design in ASEAN region, questionnaire survey is conducted to local consultant in each AMS. In addition, actual design code book is collected if possible.

By comparing assumed seismic force in the risk assessment with design earthquake loadings in the each code, gap and issue on the design code for infrastructure will be clarified in the forthcoming activities, which will be put in the guidebook.

**Table3.4.1 Questionnaire Sheet for design code**

Questionnaire on the design specifications for infrastructures in ASEAN countries								
						Country/province/city name ( )		
						Name of respondent ( )		
						Email address ( )		
	Existence of design specification	If the specification exists,					If not,	
		Name of specifications	Link on website (if opened to public)	Availability of hardcopy	Issue year	Latest revised year and major revised points	Comment on the application to design	How to design without specification
Example	<input checked="" type="radio"/> YES <input type="radio"/> NO	Bridge Design Specification	<a href="http://...">http://...</a>	Available at the bookstore	1990	2010 • seismic loads • calculation method	• Not applied to actual design • Not enough items to design structures	• Based on my/engineers' experiences • Use AASHTO/BS etc
Bridge	YES / NO							
Road structure	YES / NO							
Port facilities	YES / NO							

Source: JICA Project Team

#### (5) Further Considerations

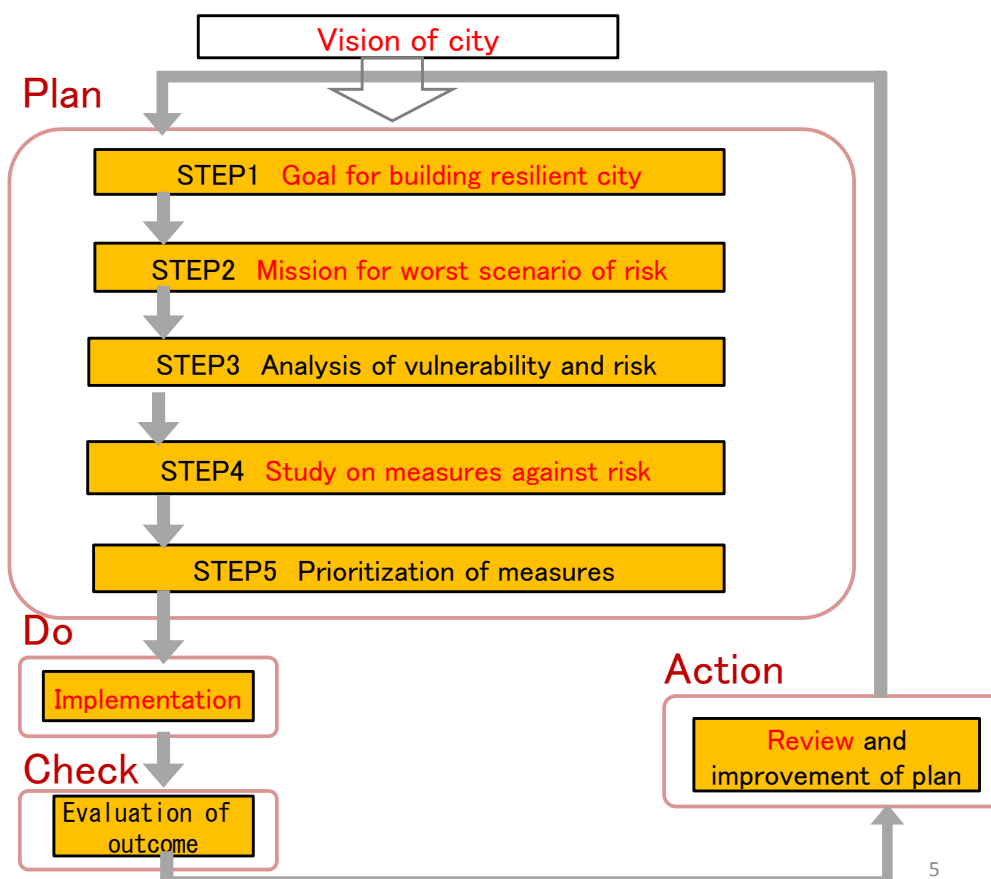
There are a lot of matters necessary for the creation of the guide book. Following topics will be discussed next step to complete.

- Part-1's contents and relationship between Checklist, risk assessment and Guidebook.
- Material of Part-2 (Appendix). In our plan, JICA Project Team uses existing research results and report to solve the problem of disaster damage. If we edit such reports to Guidebook, it is necessary to obtain a permission to publisher and Author.
- This study's target city scale is middle class. Part-1 will be edited in 10 languages, but part-2 will be edited in only English. JICA Project Team considers to make easy-to-understand part-2 for staff of local government.

### 3.4.2 Risk Assessment for Building Resilient Cities

#### (1) Overview of Risk Assessment

For building resilient cities, appropriate structural and non-structural measures have to be identified by risk assessment. In Figure 3.4.2, planning flow of building resilient cities in Japan is shown.

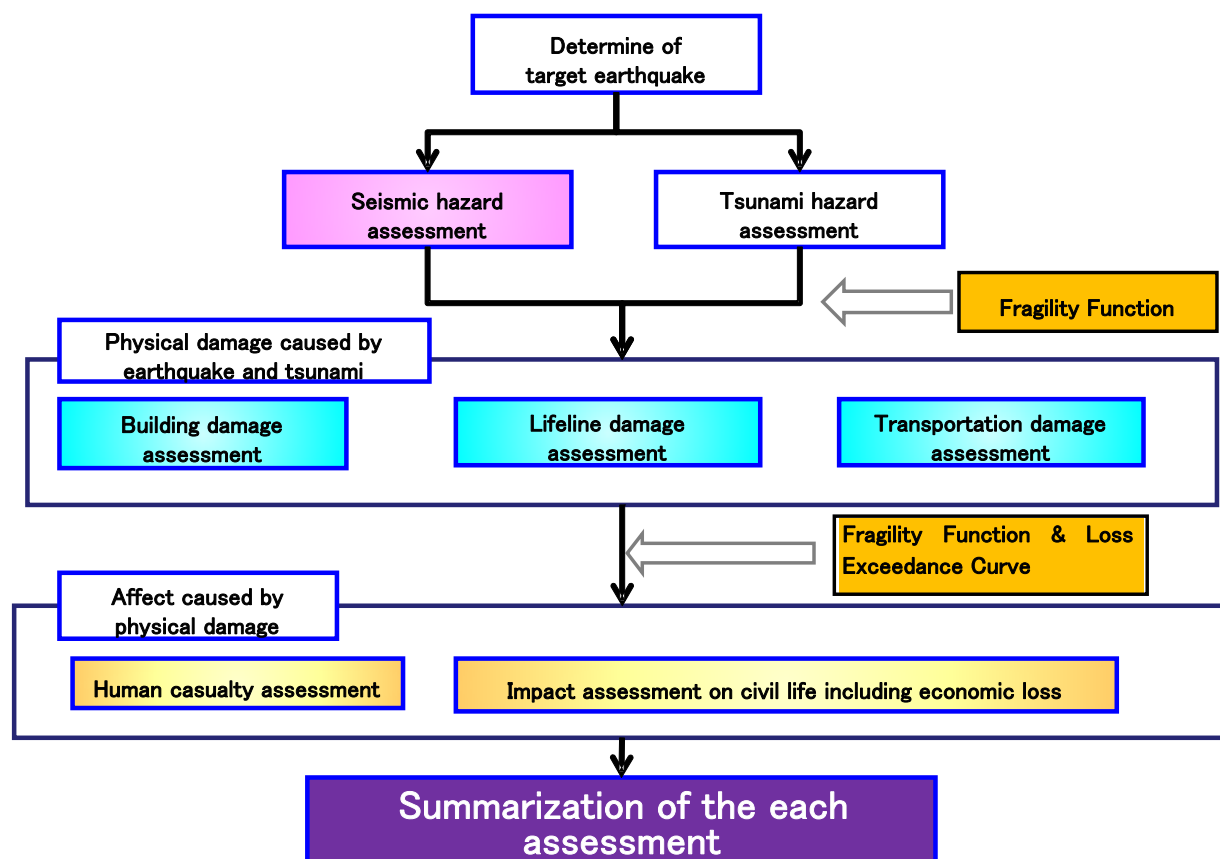


Source: Cabinet Secretariat of Japan (translated by JICA Project Team)

**Figure 3.4.2 Planning Flow of Building Resilient Cities in Japan**

In the steps 2 to 4 in the above figure, more accurate and precise risk assessment can identify the vulnerability of target area and lead to more effective measures. Figure 3.4.3 shows the flow of risk assessment of earthquake and tsunami.



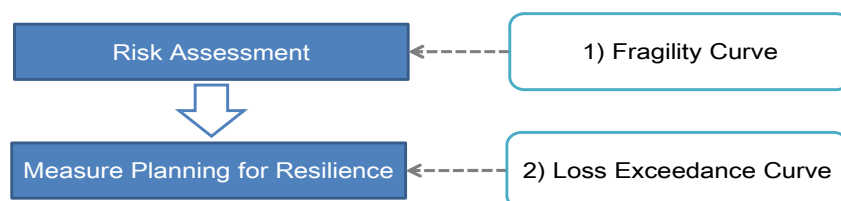


Source: JICA Project Team

**Figure 3.4.3 Flow of Risk Assessment of Earthquake and Tsunami**

## (2) Fragility Function

In the risk assessment, 1) fragility function/ curve and 2) loss exceedance curve are important. The former shows relationships between external force and damage scale/rate on house, bridge, human life, etc., which is mainly used for risk assessment. On the other hand, the latter shows relationships between external force and probabilistic loss, which is mainly used for evaluation of effectiveness of measures. Figure 3.4.4 shows procedure for measure planning for resilience by fragility curve and loss exceedance curve. Table 3.4.2 shows role of fragility curve and loss exceedance curve. Figure 3.4.5 shows example of these two curves.



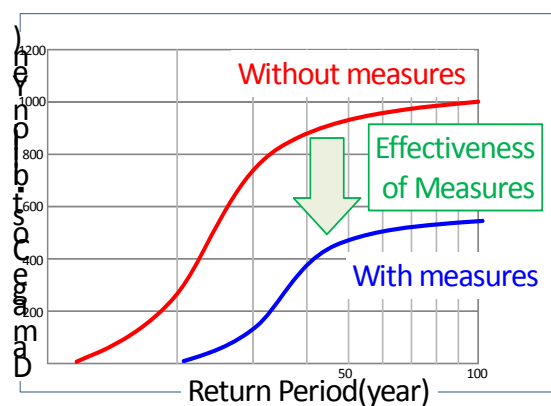
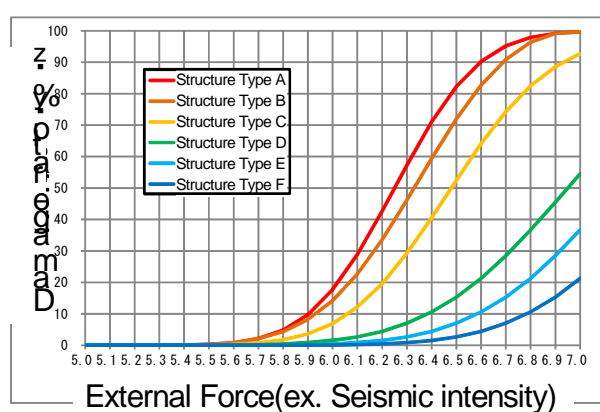
Source : JICA Project Team

**Figure 3.4.4 Procedure for Measure Planning for Resilience by Fragility Curve & Loss Exceedance Curve**

Table 3.4.2 Role of Fragility Curve and Loss Exceedance Curve

Curve	Definition	Purpose	Methodology	Study in this Project
Fragility Curve	Relationships between External Force and Damage Scale/Rate on House, Bridge, Human Life, etc.	Risk Assessment, etc.	1) Empirical 2) Analytical (Simulation) 3) Hybrid 4) Expert Opinion-based	1) Literature Review 2) Identification on Key Issues and Explanation of Opinion on Output and Results of Survey in Workshop
Loss Exceedance Curve	Relationships between External Force and Probabilistic Loss	Evaluation of Effectiveness of Measures, Insurance, etc	1) Empirical 2) Analytical (Simulation)	3) Preparation of Draft TOR

Source : JICA Project Team

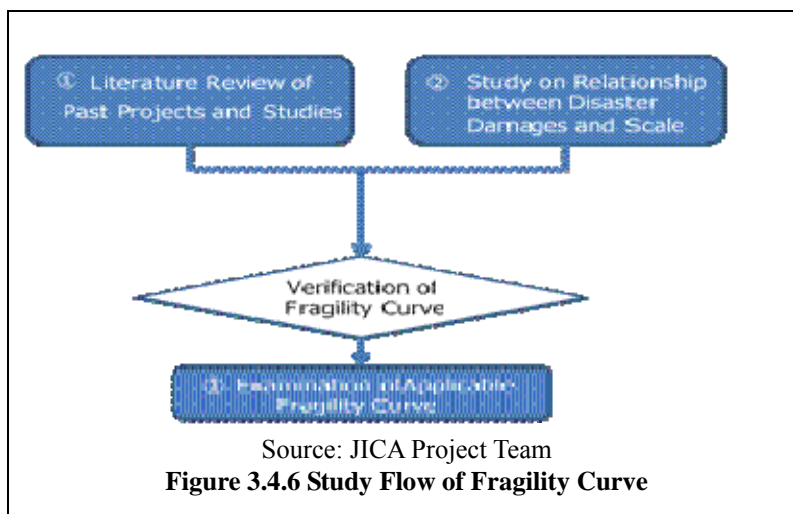


Source : JICA Project Team

Figure 3.4.5 Example of Fragility Curve (Left) and Loss Exceedance Curve (Right)



In this project, fragility function of a) Earthquake, and b) Water Hazard (Tsunami, Storm Surge, Strong Wind and Flood) were studied by 1) literature review of fragility function and 2) Study on relationship between disaster scale and damage.



#### 1) Literature review of fragility function

Literature review of fragility function for earthquake was made as follow:

##### a) Cabinet office, Government of Japan

The risk assessment implemented by the Cabinet office is one of the standard in Japan, and many local governments carry out the assessment referring to the method and fragility curve of the Cabinet Office.

##### b) General Insurance Rating Organization of Japan

This organization collects many practical cases of the earthquake risk assessment in Japan and summarizes the risk assessment method and fragility curve.

##### c) 12<sup>th</sup> World Conference on Earthquake Engineering

The World Conference on Earthquake Engineering is one of the most authoritative conferences in the world which is held once every four years. Many articles related to fragility curve are submitted.

Literature review of fragility function for flood as typical was made as follow:

##### a) Time Series Variation of Flood Exposure induced by Flood Prevention Projects

Fragility curves in every 5 years from 1975 to 2005 were developed and compared to evaluate flood risk structures chronologically. Flood damages were changed due to change in land use in the basin.

##### b) Flood Risk Assessment in Tokyo Metropolitan

Flood risk in Tokyo Metropolitan was assessed by fragility curve based on the flood damage data from 1976 to 2008, which were estimated by the equation  $(L = (F \times N) \times (D \times E))$ , where L: Annual Flood Damage, F: Affliction Rate, N: Number of Houses, D: Damage Rate, E: General Asset Value per House)

### c) Evaluation of Riverrine Flood Risk Reduction by Scenario-Base Analysis for Response of Flood Prevention System to Wide-Scaled Floods

This evaluation method was proposed to examine flood risk characteristics and effect on damage reduction measures using risk analysis framework and flood risk curve. 20 rivers in Japan were evaluated with potential damage scenarios, worst damage scenarios, and range of potential flood damages.

The titles of collected literatures are listed in the Appendix 10.

### 2) Study on Relationships between disaster scale and damage

The relationships between disaster scale and damage caused in the past were studied with the data in the following table.

**Table 3.4.3 Data on Disaster Scale and Damage**

Type of Disaster	Disaster Scale 【Horizontal Axis】	Damage 【Vertical Axis】
Tsunami or Storm Surge	<ul style="list-style-type: none"> <li>Wave Height</li> <li>Inundation Depth, Duration and Flow Velocity</li> </ul>	<ul style="list-style-type: none"> <li>Human Damage (Nos. of Death, Affected People, etc.)</li> <li>Building and structure damage (damaged houses, financial damage, inundated farm land, and so on)</li> </ul>
Flood	<ul style="list-style-type: none"> <li>Runoff and Rainfall</li> <li>Inundation depth, duration, and overflow velocity</li> </ul>	<ul style="list-style-type: none"> <li>Interruption period of public service(Electricity, gas, water service, and so on)</li> <li>Restoration Period (road, railway, and so on)</li> </ul>
Earthquake	<ul style="list-style-type: none"> <li>Magnitude/Seismic Intensity</li> </ul>	

Source: JICA Project Team

### 3) Resilience of Existing Infrastructure and Buildings, and Legislative System in ASEAN

Data on resilience of existing infrastructure and buildings, and legislative system in ASEAN were collected.

### 4) Draft Fragility Function in ASEAN and Recommendation for Further Improvement

Draft fragility function with the proposed variables is presented in the following table.

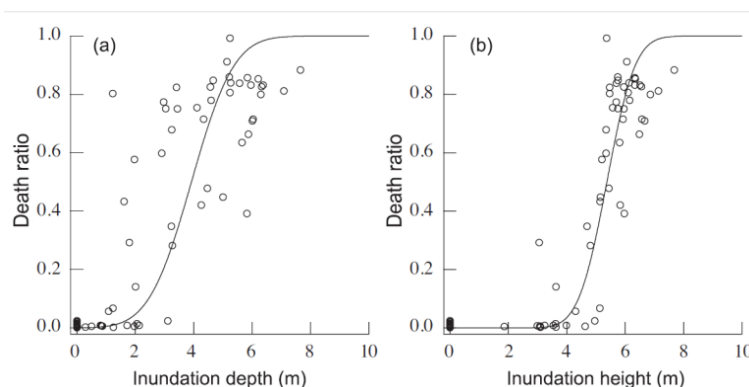
**Table 3.4.4 Draft Fragility Function in ASEAN**

Type	Hazard	Fragility Function	Prospected Variables
Building	Earthquake	Damage Ratio by Seismic Motion	<ul style="list-style-type: none"> <li>Seismic Intensity</li> <li>Structure Type</li> <li>Seismic Code</li> </ul>
		Damage Ratio by Liquefaction	<ul style="list-style-type: none"> <li>Liquefaction Possibility</li> <li>Structure Type</li> </ul>
	Flood, Tsunami and Storm Surge	Damage Ratio by Tsunami and Storm Surge	<ul style="list-style-type: none"> <li>Inundation Depth</li> <li>Structure Type</li> </ul>
		Damage Ratio by Flood	<ul style="list-style-type: none"> <li>Inundation Depth</li> <li>Ground Gradient</li> </ul>
Casualty	Earthquake	Casualty Rate by Building Collapse	<ul style="list-style-type: none"> <li>Structure Type</li> <li>Time Period</li> </ul>
	Flood, Tsunami and Storm Surge	Casualty Rate by Inundation	<ul style="list-style-type: none"> <li>Inundation Depth</li> <li>Evacuation Activity</li> </ul>
Infrastructure	Earthquake	Damage of Bridge	<ul style="list-style-type: none"> <li>Seismic Intensity</li> </ul>

			<ul style="list-style-type: none"> <li>• Bridge Span</li> <li>• Seismic Code</li> <li>• Retrofit / Reinforcement</li> </ul>
	Flood, Tsunami and Storm Surge	Damage of Infrastructure	<ul style="list-style-type: none"> <li>• Inundation Depth</li> <li>• Inundation Duration</li> </ul>

Source: JICA Project Team

Example of fragility curve is shown in the following figure:



Source: Koshimura et al., Journal of Japan Society for Civil Engineering, B Vol.65 No.4, 2009

Fragility Curve of Tsunami : (a) Inundation Depth and Death Ratio (b) Inundation Depth and Death Ratio (Banda Aceh)

**Figure 3.4.7 Examples of Fragility Curve**

Due to insufficient availability of statistics on disaster data, kind of fragility curve and applicable area for function, etc. are limited. Therefore, further study for improvement is recommended.

#### 5) Development and Propose of Disaster Risk Assessment Method by Fragility Function in Building Resilient Cities

Example of measures related to fragility curve is presented in the following table:

**Table 3.4.5 Example of Measures related to Fragility Curve**

Type of fragility curve	Related measures on building resilience
Building Damage (by Type of Structure)	<ul style="list-style-type: none"> <li>• Earthquake Resistance</li> <li>• Reinforcement of Building Standard</li> <li>• Insurance</li> </ul>
Flood Damage (Inundation Depth)	<ul style="list-style-type: none"> <li>• Land Use Regulation</li> <li>• Improvement of Flood and Drainage Facilities</li> </ul>
Ratio of Death People (Evacuation people)	<ul style="list-style-type: none"> <li>• Flood Fighting Drill</li> <li>• Education, Formulation of Early Warning and Evacuation Plan</li> <li>• Flood Forecasting and Warning System, etc.</li> </ul>

Source: JICA Project Team

The measures towards building resilient cities shall be widely proposed by fragility curve, since situation in each ASEAN country/city is different.

#### 6) Explanation of Opinion on Output and Results of Survey in Workshop

In the Workshop scheduled in December 2016, opinion on output and results of the Survey shall be explained.

### 3.4.3 Checklist for Building Disaster Risk Resilient Cities

As mentioned in the section 3.1, the checklist is one of the expected tools in the Output 3. This section describes the rationale, approaches of the checklist formulation and the draft proposal of the checklist for building disaster and climate resilient cities.

#### (1) Rationale of formulation of checklist

The scope of works of this project stipulates “checklists formulation” contributing to enhancement of capacity of disaster risk reduction for local governments in association with central government involvement through effective and practical utilization of the checklist in ASEAN. This checklist is also positioned as one of practical tools to materialize the four priority actions.

Checklist in general is utilized by two types of function as “administrative performance measure” or “process guide mark of required activities”. Current products of checklist by international organizations and national agencies in the world such as “Disaster Resilience Scorecard for Cities ver 2.2” and “Local Government Self-Assessment” by UNISDR, seem to function as a performance measure tool for assessment of activities on local government disaster risk reduction.

In line with this purpose of checklist, this tailor-made checklist is attempted to formulate a practical, sustainable and systematic tool involving both levels of governments at local and national level in each AMS.

#### (2) Approaches on Checklist Formulation

The formulation of checklists is under process at present in participatory manner through trial implementation of draft checklists on selected cities in AMS. JICA Project Team will conduct workshops for the draft checklist trial implementation to gather opinions and comments for improvement of them. The following steps will be implemented to formulate “Checklist for building Disaster Risk Resilient Cities”.

- STEP-1: Formulating draft checklists
- STEP-2: Conducting workshops for trial implementation of checklist in selected local governments to get feedbacks from users (relevant officers)
- STEP-3: Reviewing and reflecting to draft checklists for improvement
- STEP-4: Formulating utilization mechanism for both of local and central level of governments in association with checklist guidance production
- STEP-5: Finalizing proposed checklists through plenary workshops of relevant AMS members
- STEP-6: Incorporating checklists into “Guidebook” as integrated tools for building disaster and climate resilient cities

#### (3) Draft Proposal for Checklist and its Formulation

Although the draft checklists will be formulated and finalized through the steps above mentioned, tentative proposal for checklists are set especially for the step 2 (workshops for trial implementation). The followings brief the draft checklist including objectives, composition and method mainly for the trial implementation at the workshops.

### 1) *Goals and objectives of Checklist*

Taking account of considerable activities in administrative roles against disaster risk on local governments in recent years due to frequent disaster events in ASEAN, the checklist may need to consider a little bit wider function of administrative performance measure tool adding awareness function on it because of weak capacity of local governments. The goals and objectives are set as follows.

#### Goals

- To encourage understandings and capabilities of local urban authorities in AMS to manage Disaster Risk Reduction (hereinafter DRR) for urban resilience
- To enhance the preparedness for DRR in risk-sensitive planning (land use, development, sector plans)
- To contribute to enhancement of the capacity and performance of local urban authorities for prevention and mitigation activities on DRR

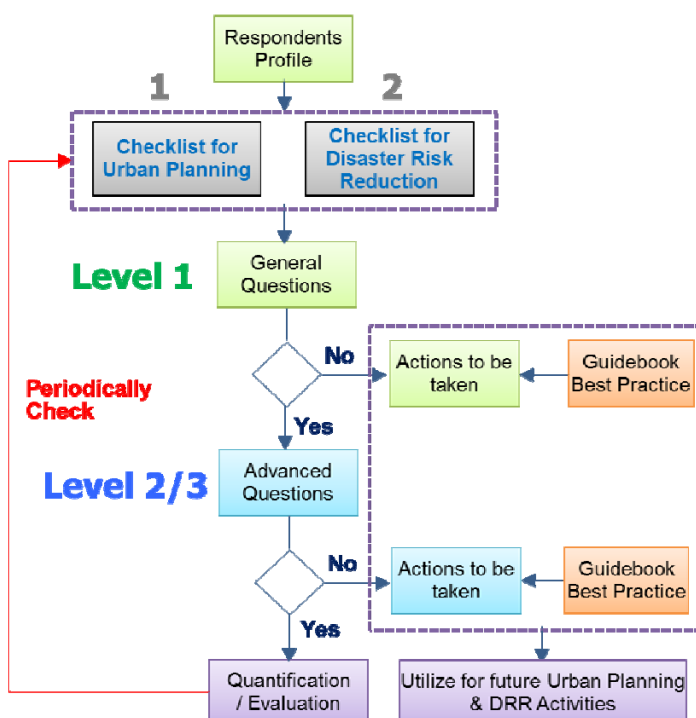
#### Objectives

- To assess the capacity and performance of local urban government for activities on DRR by checklist
- To utilize checklist as bench-mark for further activities on DRR as a part of Plan-Do-Check-Act (PDCA) cycle at local and national level

### 2) *Structure Design for Checking Capacity and Performance*

The checklist is attempted not only to assess administrative performances on DRR, but also to stimulate and enhance local government capacity for DRR. Therefore questions or items for checking cover inquiries to identify their performances by “Yes” and “No” and further questions linking to detailed inquiries in step-wise structure of checking. The followings are considerations for formulation of the checklist structure.

- To prepare two types of checklist by “land use and urban development planning” and “disaster risk reduction” for cross-check purpose among relevant agencies in which experts and officers in each agency answer both checklists.
- To consider the level of local government capacity for DRR in AMS by step-wise questions by levels in order to enable them to answer simple questions especially for weak capacity local government and to answer complicated questions for advanced activities of DRR
- To take account of effective utilization of the checklist as a part of PDCA cycle in order to improve DRR activities continuously such as actions to be taken based on the result of checklist for which the Guidebook shows references as good practices.
- To assess the results of checklist quantitatively as performance measures by quantitative and qualitative indications for DRR activities where aggregated results will be evaluated by local and central government for further actions to be taken



Source: JICA Project Team

**Figure 3.4.8 Checking Process of Items in conjunction with DRR for Cities**

### 3) Draft Contents of Checklist

According to the principles of structure design in the previous section, the draft contents for checklists are developed for two types of checklists of “land use and urban development planning” and “disaster risk reduction”. The contents are composed of questions to relevant respondents of local government as indicators or criteria to measure activities for disaster risk reduction.

There are two aspects of questions by qualitative criteria to let respondents answer simply by “Yes & No” and quantitative indicators to be answered by countable responses such as activities performance achievement by percentage. The two aspects of questions are considered also by the level of local government’s capacity where well-organized local governments may respond to countable response with certain data, and local governments in opposite side may not be ready to respond to it. The main topics as the contents of two checklists are described in below.

#### Topic areas the checklist for land use and development planning

This checklist aims at assessing capacities of local governments in land use and urban development planning how their planning activities and measures are or have been considered by DRR. The planning process in each stage could become one of the important factors when DRR is adapted to the planning in each process such as from data collection, analysis to planning and programing.

Especially, natural disaster risk assessment becomes one of the essential measures to give not only spatial solution but also priority for programing in the planning when DRR is

mainstreamed. The questions are also considered how a plan is materialized by concrete measures such as development control, building regulations and physical interventions assured by certain budget programs as actions of prevention and mitigation of disaster risks.

Table 3.4.6 shows main topics of the draft checklist for land use and urban development planning and the checklist as its-self is compiled.

**Table 3.4.6 Main Topic Areas of Checklist for Land Use and Urban Development Planning**

Main Topic Areas	Purpose of Questions	Questions	
		Qualitative	Quantitative
1. Ensuring historical track of natural hazards	<ul style="list-style-type: none"> <li>To assess local government capacity to collect and gather historical hazard data in relation to capability to understand risks and organize risk assessments</li> </ul>	✓	--
2. Introducing “Disaster Risk Assessment” to planning	<ul style="list-style-type: none"> <li>To assess local government capacity to understand the disaster risk assessment</li> <li>To assess local government capability to handle with the risk assessment based on the certain facts and their data and to apply the result to planning</li> </ul>	✓	--
3. Assessing vulnerable exposure in the planning area	<ul style="list-style-type: none"> <li>To assess local government capability to identify potential exposures from the aspect of available data</li> <li>To assess local government capability to identify exposures in terms of magnitude of damages for prioritization in planning and programing.</li> </ul>	✓	--
4. Mainstreaming DRR in urban development planning	<ul style="list-style-type: none"> <li>To assess local government capability to make a land use plan or other spatial development plans incorporating DRR into spatial measures of the planning</li> <li>To assess local government capability to formulate implementation plan incorporating DRR into appropriate investment distribution</li> </ul>	✓	✓
5. Mainstreaming DRR in development controls	<ul style="list-style-type: none"> <li>To assess local government capability to have control effective measures for developments and constructions in places with high disaster risks</li> </ul>	✓	✓
6. Mainstreaming DRR in urban development programs & projects	<ul style="list-style-type: none"> <li>To assess local government capability to formulate and organize urban development programs or projects incorporating DRR into high disaster risks areas to be improved</li> </ul>	✓	--
7. Mainstreaming DRR in infrastructure and public facilities development programs & projects	<ul style="list-style-type: none"> <li>To assess local government capability to formulate and implement infrastructure and public facilities development programs or projects which contribute to prevention and mitigation</li> </ul>	✓	--

Source: JICA Project Team

#### Topic areas the checklist for disaster risk reduction

This checklist aims at assessing capacities of local governments in disaster risk reduction at preparedness stage how their activities and measures are or have been achieved by preventive and mitigative activities. These activities are covered by broad range of activities to prepare actions from planning, human resource development, institutional arrangements to physical interventions.

The questions are considered by comprehensive activities to encourage activities for DRR in local government, although there are some duplicated questions between the checklist for “land use and urban development planning” and this checklist. Table 3.4.7 shows main topics of the draft checklist for disaster risk reduction and the checklist as its-self is compiled.

**Table 3.4.7 Main Topic Areas of Checklist for Disaster Risk Reduction**

Main Topic Areas	Purpose of Questions	Questions	
		Qualitative	Quantitative
1. Ensuring Safe Urban Development	<ul style="list-style-type: none"> <li>To assess local government activities to be covered by necessary urban development and control measures for DRR</li> </ul>	✓	--
2. Enhancing Local Community Capability	<ul style="list-style-type: none"> <li>To assess local government activities to enhance local community capacities for DRR in terms of information, organization, emergency response, facilities provision, etc</li> <li>To assess local government capacity to cope with anti-disaster facilities or buildings by appropriate standards, codes, plans, construction and maintenances</li> </ul>	✓	--
3. Enhancing Disaster Response Capability	<ul style="list-style-type: none"> <li>To assess local government capacity to have enough organizations and staffs in order to respond to emergency disaster, recovery system, supporting system, etc</li> <li>To assess local government capacity to provide certain facilities and equipment for DRR activities</li> </ul>	✓	--
4. Securing infrastructure/utilities	<ul style="list-style-type: none"> <li>To assess local government capacity to prepare and provide anti-disaster resistant infrastructure / utilities in terms of planning, design standards, guidelines, budgeting, operation and maintenance</li> </ul>	✓	--
5. Strengthening logistic system	<ul style="list-style-type: none"> <li>To assess local government capacity to prepare and provide resilient transportation and logistics against potential hazards in terms of strongholds or hub, network, emergency response, communication system, etc</li> </ul>	✓	--
6. Strengthening medical & aid system	<ul style="list-style-type: none"> <li>To assess local government capacity to prepare and provide resilient medical and aid systems against potential hazards in terms of strongholds or hub, rescue network, and other emergency response, communication system, etc</li> </ul>	✓	--
7. Coping with refugee and shelter	<ul style="list-style-type: none"> <li>To assess local government capacity to prepare and provide resilient shelter and refugee system against potential hazards in terms of strongholds or hub, network, communication system, emergency response</li> </ul>	✓	--
8. Preparing for future recovery and reconstruction	<ul style="list-style-type: none"> <li>To assess local government capability to cope with post-disaster recovery system to achieve effective and efficient recoveries by provision of action plan, debris and solid waste management, etc</li> </ul>	✓	--

Source: JICA Project Team

### (3) Considerations for Checklist Operation

There are several considerations to be clarified in further discussions how the checklist can be utilized effectively in terms of checklist operation and management, of which operational principles may affect the contents of checklist in the framework. The following considerations are identified.

#### 1) Who is/are respondent/s to the checklist

Taking account of one of the purposes of checklist as a tool for improvement of local government capacity in DRR, checklist may be necessary to be responded by all relevant officers who would know required activities and be encouraged through checklist activities. There are options of the respondent as follows.

- Case 1: A representative officer, this case aims at collecting whole responses in relevant organization by a representative officer who gathers and edits answers especially in cases of quantitative questions among organizations, and questions including



specific themes to which some expert can respond only. And two checklists of “land use and urban development planning” and “disaster risk reduction” are expected also to be responded equally by all relevant organization without separation.

- Case 2: A representative officer of each Checklist, this case aims at letting a represented officer in each checklist be responsible to respond separately each checklist of “land use and urban development planning” and “disaster risk reduction”.

## 2) *How often to do the checklist (frequency)*

There may be two roles in checking performance of local government by the checklist. One of them is to assess their capacity when some activities’ results are achieved by timing with some years’ interval. Another role is to utilize checklists as a monitoring tool for activities of DRR without assessment results. The frequency of the checklist utilization with different roles is shown as follows.

- Case 1: Three Year Interval may be adequate years to re-assess performances of local government with expected progress. This aims not only at assessing them-selves internally but also evaluating local governments at national level as a whole in each AMS in order to consider supports and assistances by the central government based on the result of evaluations.
- Case 2: One Year Interval, this case aims at monitoring their activities rather than assessment of performances, taking account of necessary time factor for distinct results of activities..

## 3) *Evaluation System and Feedback*

The checklist is expected to be utilized primarily by local government as a self-assessment tool for DRR, for encouragement of capacity through certain measurable indicators. Based on the assessment, an action plan to improve their capacity for DRR could be formulated as a part of feedback system of PDCA afore-mentioned.

And after this utilization, it is necessary to clarify how to utilize the checklist at national level or even at ASEAN level. When the checklists are utilized at national or ASEAN level, contents of checklist is required to consider applicability to all cities as standard checklist or tailor-made checklist formulation to fit with each AMS condition.

## 3.5 Issues and Way Forward on Output 3

JPT has collected data and information which will provide topics of guidebook to be developed in this project, but the data and information should be analyzed and organized for the readers to understand. Plus, JPT will grasp the tasks of both urban planning and disaster risk reduction in real world to make the guidebook match their needs. The following issues are to be tackled to prepare a guidebook which is practical and useful for the government officials in charge of both urban planning and disaster risk reduction.

- To analyze good practices and lessons learned and organize them for reflecting to the guidebook

JPT has collected data and information which will be beneficial for preparing the guidebook, but the collected data and information should be analyzed and organized. Especially, JPT needs to clarify what are good practices and lessons learnt and why they are.

- To understand the practices by officials in charge of urban planning and disaster risk reduction

The main target group of the guidebook will be the city government officials in charge of urban planning and disaster risk reduction. JPT needs to know what the officials are doing in daily work and what issues they are facing in daily practice. JPT will collect those information during the 1<sup>st</sup> workshop to be held in September.

- To identify key issues for utilizing Fragility Curve and Loss Exceedance Curve

The ideas and concepts of fragility curve and loss exceedance curve will be introduced in the guidebook. Through literature survey, JPT will extract issues for utilizing the curves in ASEAN cities.

- To develop check lists based on collected ideas and opinions raised in Workshop.

Check lists should be practically used by city government officials mainly in charge of urban planning and disaster risk reduction. They are also used for monitoring purpose by national level officials. JPT will have a workshop to collect ideas and opinions on the check lists in order to develop practical checklists.

## CHAPTER 4 : WAY FORWARD

### 4.1 Way Forward of JICA Project (Phase 1)

#### 4.1.1 Outline of Activities from November 2015 to December 2016

Since the beginning of the Project in November 2015, activities have focused on establishing a platform for project implementation, collecting and analyzing basic city information and disaster risk information of the cities in ASEAN, and reviewing the existing activities by some concerned international partners including UNISDR and identifying good practices and lessons learned from the various activities.

Co-chairs of ACDM (ASEAN Committee on Disaster Management) on Prevention and Mitigation, ASEC, JICA, and JICA Project Team organized the 2<sup>nd</sup> Project Steering Committee on 3 December 2015, the 3<sup>rd</sup> Project Steering Committee on 7 April 2016, and the 4<sup>th</sup> Project Steering Committee on 27 July 2016. These members have discussed the methodology, progress, schedule, necessary actions, etc. for the project implementation in the project steering committee meetings. Each AMS has nominated one or two National Project Coordinator for the project. After the nomination, JICA Project Team visited each AMS and met the coordinators to explain the outline of the project and discuss the middle list cities for demonstration project and ASEAN Urban Resilience Forum in the first round of the visit.

JPT supported to hold the 1st ASEAN Urban Resilience Forum on July 28 in Bangkok, Thailand. The issues for both operation of the future forum and building resilient cities were discussed. JPT also opened the facebook account as a temporary tool for networking among the concerned stakeholders by opening website. Discussion for future ASEAN Urban Resilience Forum and website development were also made among JPT, AHA Centre, and ASEC.

JICA Project Team has conducted the 1<sup>st</sup> preliminary risk assessment and proposed the middle listed cities for each AMS besides Brunei and Singapore, through analysis of city information and disaster risk information and discussion results with the national project coordinators of each AMS. After that, the 2<sup>nd</sup> preliminary risk assessment was conducted for providing the reference to select the short listed cities and candidate cities. JPT visited the eight AMS besides Brunei and Singapore for explaining the results of the 2<sup>nd</sup> preliminary risk assessment and discussing shortlisted cities and candidate city for the demonstration project.

JPT also has conducted literature surveys of related activities by other international partners and extracted good practice and lessons learned to cater for the development of tools on building resilient cities. Plus, JPT prepared the first draft of check-list and conducted workshops trial implementation in Indonesia, Lao PDR, and Thailand, and collected feedback for improving the check-list. JPT also conducted research for fragility curve and loss exceedance curve and proposed how to utilize the curves in the process of disaster risk assessment.

### 4.1.2 Expected Forthcoming Activity

The project shifts from a phase, which focuses on strengthening networks among the stakeholders through publicity, selecting candidate cities and preparing draft TOR for demonstration project on disaster risk assessment, and organizing the collected data information for development of tools on building resilient cities, to the next phase. The next phase focuses on producing outputs such as action plan of ASEAN Urban Resilience Forum, website, database, draft TOR of demonstration project, guidebook including checklists.

Activities and events to be conducted until the next report up to the end of the JICA project are summarized below.

#### (1) Activities to be Conducted

Activities that are expected until the preparation of Progress Report includes the followings for each Output.

Output 1: Development of action plan for future ASEAN Urban Resilience Forum; development of website and information dissemination through the website and mailing list and Facebook; holding the 3<sup>rd</sup> – 4<sup>th</sup> Workshops and 2<sup>nd</sup> ASEAN Urban Resilience Forum.

Output 2: Completion of selecting candidate cities through communication with NPC, developing data base, and preparing the draft TOR for the demonstration project.

Output 3: Organizing the collected and reviewed information on the related activities for building resilient cities, studying on fragility function and curves, preparing the 2<sup>nd</sup> draft of checklists to be used by urban planning officials and DRR officials, and development guidebooks for building resilient cities.

#### (2) Events to be Conducted

Events that are expected until the preparation of Draft Final Report includes the followings for each Output.

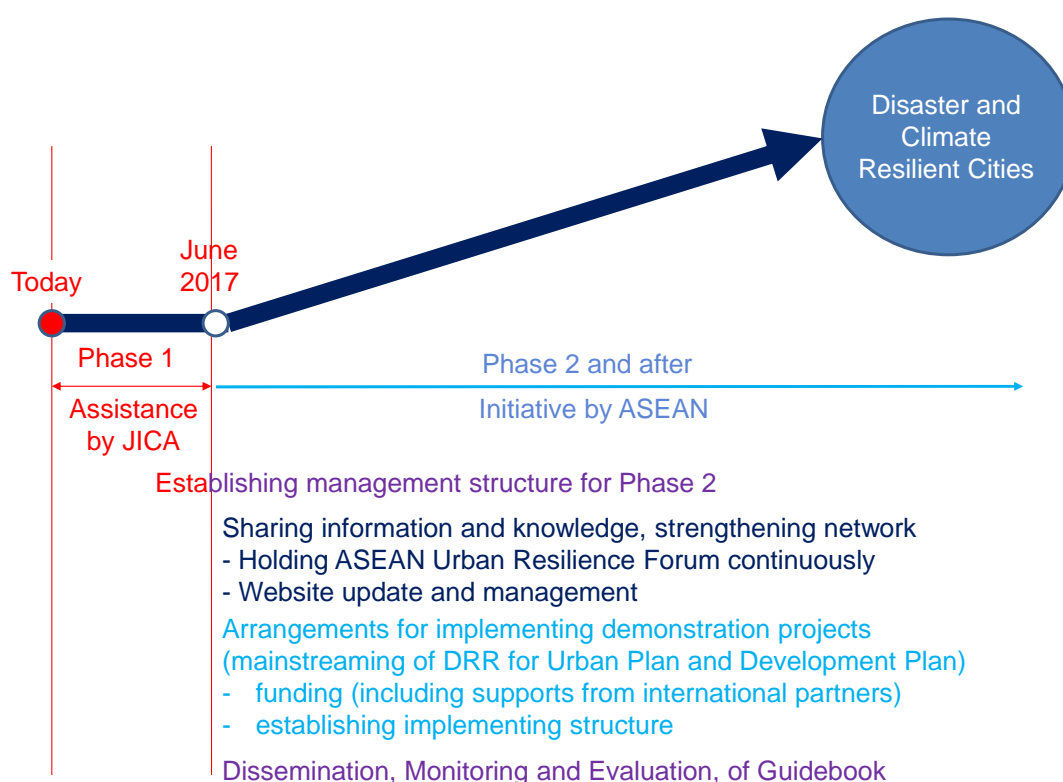
ASEAN Urban Resilience Forum: holding the 2<sup>nd</sup> forum will be held in May 2017 in Indonesia. The detail on the forum is shown in Chapter 1. At this stage, introducing outputs of the phase 1 project of CN 18 and discussing how to utilize and disseminate those outputs in ASEAN cities will be covered in the forum.

Workshops: The 3<sup>rd</sup> and 4<sup>th</sup> workshop for checklists will be held in March 2017. How to disseminate the checklists to city governments of all ASM and provide incentives to the officials are to be discussed in addition to the contents, expression, volume, etc. of the checklists. The results of the workshop is to be reflected to the finalization of the checklists and guidance of the checklists.

Project Steering Committee (PSC): Holding the 6<sup>th</sup> PSC in March 2017 is proposed. This PSC was not originally planned, but adding this meeting has benefits for the PSC members to capture the progress and discuss the preparation of the 2<sup>nd</sup> Urban Resilience Forum and validation process of the project of phase 1 supported by JICA and JPT. The final PSC will be held in May 2017 as the 7<sup>th</sup> PSC and validation meeting for overall outputs of the phase 1 project. The proposed 6<sup>th</sup> PSC meeting will be held back to back with the 3<sup>rd</sup> and 4<sup>th</sup> WS, and the 7<sup>th</sup> PSC meeting will be held back to back with the 2<sup>nd</sup> ASEAN Urban Resilience Forum.

## 4.2 Way Forward of CN 18 (Phase 2 and beyond)

ASEAN should take over the project of CN 18 supported by JICA and JPT after completing Phase 1 next year. To keep the momentum of the project of CN18 and implement the project smoothly, ASEAN Secretariat, Co-chairs, AHA Centre, should take the following activities with the cooperation by other AMS. This way forward should be elaborated more after this through the discussion with the PSC members after this. Image of developing future concept note is shown in Figure 4.2.1.



Source: JICA Project Team

**Figure 4.2.1 Image of Future Project Activities to be Initiated by ASEAN (draft)**

### (1) Establishing management structure for Phase 2

To keep the momentum of the project of CN18 which ASEAN, JICA, and JPT have worked together, ASEAN Secretariat, Co-chairs, AHA Centre should fully take over the project. For implementation of Phase 2 and beyond, ASEAN Secretariat, Co-chairs, AHA Centre should establish the management structure for the project. As proposed in Output 1, Co-chairs and ASEC should be the main actors and lead the project.

## (2) Sharing information and knowledge, strengthening network

As one of the important component of the project of Phase 2 and beyond, sharing information and knowledge among the AMS should be promoted. It is because most of the AMS are expecting to have the information and knowledge of building resilient cities. Through promoting information and knowledge sharing, further strengthening network among AMS is expected. To sustain the momentum of the Output 1, continuing the following activities is important.

- Holding ASEAN Urban Resilience Forum continuously
- Website update and management

## (3) Arrangements for implementing demonstration projects

Implementation of the demonstration projects are very important towards the realization of climate and resilient cities. The demonstration projects aim at mainstreaming of DRR for development planning and urban planning. For the implementation of the project, the following arrangements are necessary. Funding of the demonstration project and implementation structure should be clarified for the implementation.

- funding (including supports from international partners)
- establishing implementing structure (executing government agency in each AMS, collaboration with Co-chairs and ASEC)

## (4) Dissemination, Monitoring and Evaluation, of Guidebook

Co-chairs and ASEC are expected to play a role to disseminate, monitor, and evaluate the guidebook to be prepared in Phase 1. CN 18 plans that the guidebook including checklist for urban planning officials and disaster risk reduction officials is used and referred in all cities in ASEAN. The dissemination cannot be completed in a couple of years and it will be long-term effort. Co-chairs and ASEC should ask cooperation by other AMS to disseminate the guidebook. To achieve the full dissemination, the discussion with other AMS is necessary for the methods of the dissemination. ASEAN Urban Resilience Forum and web forum will be opportunities for the discussion. Co-chairs and ASEC also should take lead for monitoring and evaluation of the dissemination and utilization of the guidebook.

## EXECUTIVE SUMMARY

### I. INTRODUCTION

#### Background

- I.1 Due to their climatic environment and geological property, disaster risk in ASEAN area is high and it bring number of disasters to ASEAN countries. Approximately 90% of victims of natural disasters are from Asia according in accumulated total of the record from 1984 to 2013.
- I.2 Today, more people move and live in cities from rural areas. By 2050, it is expected that 68 percent of the world's population would live in urban areas. This unprecedented growth of cities, particularly in countries in the ASEAN region cause problems of resource management and land use management and poses a huge challenge to disaster risk management and sustainable development.
- I.4 Great East-Japan Earthquake in Japan and Chao Phraya river great flood in Thailand both occurred in 2011 have brought not only human and economic damages but furthermore, the disasters have impacted the regional and world economy by affecting the supply chain. Under the globalization trends in modern society, once a city is hit by a disaster, it causes not only human casualties but also impacts the national, regional and, to some extent, the global economy.
- I.5 Hence, building urban resilience to disaster and climate risks has become an important issue in ASEAN region, and ASEAN Committee on Disaster Management (ACDM) and ASEAN counties have been addressing disaster risk reduction in regional level

#### Outline of the Project

- I.6 Based on Concept Note 18 (CN 18) “Building Disaster and Climate Changes in ASEAN Cities” of AADMER Work Programme Phase 2 under ACDM Working Group on Prevention and Mitigation, this project will develop the implementation framework for CN 18. Overall, this project aims to increase the resilience of ASEAN cities to disasters.
- I.7 Expected Outputs of the project are as the followings. Project Area is ASEAN countries (10 member states).
  - Output 1: Establishment of a regional cross-sectoral collaboration mechanism and formation of partnerships to increase urban resilience in ASEAN;
  - Output 2: Evaluation of candidate cities, indicator development for city resilient and commitment and partnership building for the demonstration project on risk assessment of priority cities in ASEAN Member States ; and
  - Output 3: Development of tools on building resilient cities in ASEAN
- I.8 ACDM, each AMS, ASEAN Secretariat, AHA Centre, and the Project Team (JICA consultant Team) are the stakeholders of the project. Co-chairs of the ACDM Working Group on Prevention and Mitigation (Lao PDR and Thailand), ASEAN Secretariat, AHA Centre, and JICA are the members of Project Steering Committee (PSC). The PSC members oversee and provide guidance to the implementation and management of the proposed project on behalf of the ACDM Working Group.
- I.9 After JICA Project Team (consultant team) was formed in November 2015, three project steering committee meetings (PSCs) had been held in December 2015, April 2016, and July 2016. PSC members had captured the progress and issues of the project and discussed the

solutions and schedule in the PSC meetings.

- I.10 This report delineates the current status of each Output. As of December 2016, 12 months out of 18 months (about 67% of the project period) has passed. About 70% of the works were completed. The remaining works will be the ones for producing concrete outputs.

## **1. [OUTPUT 1] ESTABLISHMENT OF A REGIONAL CROSS SECTOR COLLABORATION MECHANISM AND FORMATION OF PARTNERHIPS**

### Background of Output 1

- 1.1 The following notes (strategies and activities) illustrated in CN18 are referred as backgrounds of the Output 1.
- Organization of the ASEAN Urban Resilience Forum: This forum will serve as a regional venue for policy formulation, networking, knowledge exchange, and technology transfer among government, private sector, non-government organizations, academe, and other stakeholders.
  - Establishment of regional multi-sectoral collaborative mechanism in ASEAN to pursue common goals and further collaborate on urban resilience: A mechanism that will help sustain the momentum and further pursue a collaborative programme in urban resilience will be formed at the regional level among key stakeholders, particularly with the private sector.
- 1.2 One of the objectives to achieve increasing resilience of ASEAN cities to disasters, the objective of Output 1 is “Establishment of a collaborative mechanism at the regional level to facilitate partnerships among stakeholders in urban development planning and disaster and climate risk management.
- 1.3 According to the Project Proposal by JICA as the project framework, activities of the Output 1 to be implemented are stipulated in the scope of works of Output 1 as follows.
- Conduct of regional seminar and workshops
  - Communication through the network of the forum for promoting resilient cities

### ASEAN Urban Resilience Forum

- 1.4 JICA Project Team (JPT) supports establishment of ASEAN Urban Resilience Forum for concerned stakeholders from 10 ASEAN Member States (AMS). ASEAN secretariat, Lao PDR and Thailand as co-chairs of ASEAN Committee on Disaster Management (ACDM) on Prevention and Mitigation (P&M) Working Group (WG), are expected to lead and coordinate with other AMS.
- 1.5 JPT has supported to make a draft concept and plan of ASEAN Urban Resilience Forum, collect ideas and opinions from each AMS, and prepare the necessary materials for discussions including draft concept note of the forum and draft Terms of Reference for the forum secretariat.
- 1.6 The first ASEAN Urban Resilience Forum was held on July 28 2016 in Bangkok, Thailand. The number of participants are 33 from Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippine, Singapore, Thailand, and Vietnam. Some NGOs and CSOs in Thailand also attended the forum. Resource persons from JICA and UNISDR gave presentations on urban resilience



and Sendai framework. The participants actively participated in group discussion of the issues of building urban resilience.

#### Development of Action Plan for ASEAN Urban Resilience Forum

- 1.7 Based on Concept Note (CN 18), JPT has developed the basic idea of action plan for ASEAN Urban Resident forum including 1) road map, 2) outline of the forum, 3) proposed annual action plan, 4) possible management/secretariat bodies, 5) image of cooperation and demarcation with UNISDR, and 6) draft terms of forum membership. The concept of the action plan has been accepted by National Project Coordinator (NPC) in each AMS in February 2016.
- 1.8 In order to prepare the documents for discussion towards establishment of ASEAN Urban Resilience Forum, JPT has developed the draft Concept Note of ASEAN Urban Resilience Forum and draft TOR for setting secretariat for ASEAN Urban Resilience Forum and consulted with Project Steering Committee (PSC) members at the meeting held in April 2016.
- 1.9 In the 4th PSC held on 27th July 2016, it was proposed by ASEC to utilize AADMER fund. AADMER fund is the only one fund source which ASEAN has for implementing AADMER working program. After that, JPT had a meeting with ASEC and confirmed the outline of AADMER Fund. As AADMER fund is a replenishment fund depending on voluntary contribution currently only from ASEAN Member States, and other AADMER program will also request for the AADMER FUND, it has uncertainty in terms of amount of allocated budget and sustainability if activities continue. Therefore, possibility of seeking support from other partner to support the activities should be considered as an alternative option for ensuring the budget for future CN.18 activities.
- 1.10 Both long term action plan and short term action plan need to be given more concrete shape, with opinions of JICA and ACDM P&M WG. JPT will consult with PSC members on further action and coordination as next step for detailed development of the action plan after the discussion of options for budgeting.

#### Holding Workshops

- 1.11 JPT will plan and hold workshops, in total four times. JPT will be a moderator basically on introduction and discussion about project (intermediate) outputs. Participants from each AMS are requested to actively participating in the workshop by expressing their ideas and opinions. The outputs of the workshops are the inputs of draft TOR of demonstration project on Output 2 and guidebook including checklist on Output 3.

#### Facilitation for Enhancing Networking among Stakeholders

- 1.12 Mailing list is being developed to be one of the communication tools for the forum and the project activities for building disaster and climate resilient cities in ASEAN. JPT has compiled the list of 13 National Project Coordinators (NPC) with their contact address, based on the information from ASEAN Secretariat.
- 1.13 In order to develop mailing list for networking, JPT drafted the mailing list of ASEAN Urban Resilience Forum (AURF), based on the participants' list of the 1st AURF held in Bangkok, on July 28, 2016. Since the mailing lists include personal information and the information should be protected, this report does not disclose the name and email address of NPC and attendants of AURF.
- 1.14 JPT will develop the Project's website, which will be hand over to the ASEAN Urban Resilience Forum (AURF) after the Project, as one of the communication tools to disseminate the progress and useful information for urban resilience. The outline of prospected website was discussed in

- 4<sup>th</sup> PSC on July 27, 2016, and PSC members came to the conclusion that AHA Centre should be a main actor. Based on this result, JPT discussed with AHA Centre how the website should be.
- 1.15 In addition, JPT will develop the facebook page of the Project, in order to distribute the project progress. According to AHA Centre's opinion, AURF is basically for closed members, so there is no need to promote widely in public. In addition, there will be some problem such as administrator/ moderator, duplication of the contents and so on. Therefore, they recommended using the facebook just for an alternative site until establishment of CN.18's website. The operation of the facebook page is also open to discussion with ASEAN Secretariat.
  - 1.16 JPT has issued newsletters four times so far. The 1st newsletter reported the launching of the Project in December 2015, and the 2nd reported the progress of the Project including the formulation of long list and middle list in April 2016. The third one informed the middle listed cities and report of 3rd PSC and the fourth one reported the 1st ASEAN Urban Resilience Forum. The newsletters were distributed to PSC members, NPCs, ACDM WG members on P&M, and other concerned officials in each AMS during PSC meetings, ACDM WG meeting on P&M, and visiting NPCs in AMS.

## **2. [OUTPUT2] EVALUATION OF CANDIDATE CITIES AND PARTNERSHIP AND COMMITMENT BUILDING FOR DEMONSTRATION PROJECT**

### Background of Output 2

- 2.1 As the concept note 18 (CN18) describes the demonstration project as one of key activities for "Output 2", it aims at promoting and enhancing local urban administrations or cities in terms of planning for urban resilience particularly in the area of risk-sensitive urban development, land use management plans and investment programs through building the most cost effective risk reduction and adaptation measures.
- 2.2 According to the Project Proposal by JICA as the project framework, activities of the Output 2 to be implemented are stipulated in the scope of works of Output 2 as follows.
  - Listing the candidate cities in ASEAN for the demonstration project through the risk assessment
  - Formulation of Terms of Reference (TOR) for the demonstration projects

### Process of Listing of Candidate Cities

- 2.3 In the process for evaluation, the candidate cities to be selected for the demonstration project are considered as high-risk cities with typical natural hazards in the 10 Member States of ASEAN (AMS). Principles for evaluation for the candidate cities of the demonstration project are i) Representativeness of natural hazards in ASEAN, ii) Replicability to apply demonstration project to similar cities in AMS, iii) Sustainability and preparedness for effective demonstration of the project, iv) Significance of economic exposure such as agglomerated industrial areas in cities, and v) Others such as data availability of basic information.
- 2.4 In order to select candidate cities in the members' countries, the preliminary risk assessment is adopted to the evaluation method to identify considerable cities for the demonstration project by three indicators of "intensity level of natural hazard dangers", "scale of exposure" and "level of capacity", taking account of gradual evaluation process due to data availability in city level information.

- 2.5 2,431 local governments including rural and urban administration are observed in the AMS according to desk-top information (e.g. countries' web-site and documents). Based on the definition of "city" as an urban status administration of local governments, cities in those local governments to be under consideration for the evaluation of demonstration project are covered by 817 local governments.
- 2.6 According to the principle and method for the preliminary risk assessment (PRA) mentioned above, 817 cities are evaluated by the following three steps in principle in order to select candidate cities for the demonstration project.

### Three Steps and Assessment and Evaluation Process for the Selection of Candidates for the Demonstration Project

Assessment	Preparation	STEP-1	STEP-2	STEP-3	Selection
		1st PRA for Middle List	2nd PRA for Short List	Evaluation for Candidate Cities	
Hazard Risk	Data Collection**	●	●	--	--
Exposure		●	●	--	--
Vulnerability		--	●	--	--
Coping Capacity		--	●	--	--
Project Principles Consistency		--	--	●	--
Major data source	--	GRDP/UNEP**/ Data Collection***	GRDP/UNEP Data Collection***/ Survey Data****	All available data	--
Each Member's State involvement		Recommendation	Recommendation	Discussion and Recommendation	--
Cities to be assessed		Long List Cities	Middle List Cities	Short List Cities	Candidates
Numbers of LGU	2,431*	817	56	(20~30)	(3~8)

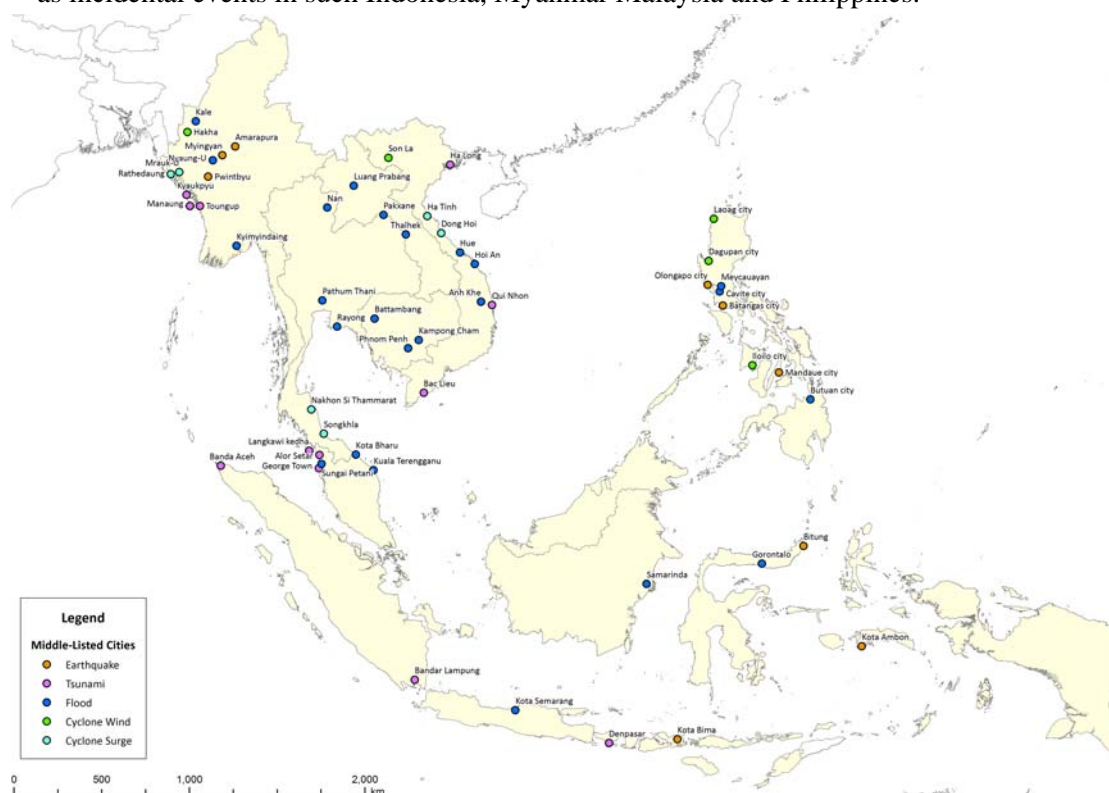
Note: \*\*GRDP/UNEP: UNEP-GRID/Geneva, UNISDR, \*\*\*Data collection mainly through desk-top (web-site documents, satellite imageries), \*\*\*\* the data gathering survey through sub-contract conducted by JICA Project Team, \*The number of 2,431 includes all local governments (rural and urban) and 817 cities among local governments are covered for the preliminary risk assessment.

Source: JICA Project Team

#### 1st Preliminary Risk Assessment for Middle List Cities

- 2.7 Natural hazards typically happened in AMS are considered as considerable risks to affect exposures. Types of natural hazards are identified as "earthquake", "tsunami", "flood" and "wind by tropical cyclones wind and surge including monsoon and typhoon" for the 1st PRA, utilizing published natural hazard data with some risk assessment data by UNEP/UNISDR.
- 2.8 It should be noted that draught and other natural hazards for the assessment are excluded. Draught is one of the complex phenomena of natural hazard events where they often happen at a long term and wide range damages on local areas. Therefore their scientific research are not established internationally yet for assessment. In this condition, cities cannot be assessed by these events of which spatial data for exposure vulnerability are not available.
- 2.9 Cities in the long listed cities are considered by appropriate scale of populations for 1st PRA according to the principles for the demonstration project. The followings are criteria to narrow down through identification of cities consistent with the principles.

- City at medium scale population in AMS: The capital cities and small cities under 10,000 populations are excluded in principle in order to fit with the principle for demonstration project.
  - Number of cities within 90% percentile in each AMS: top 5% numbers of cities with largest population and bottom 5% cities are excluded in order to identify representative cities in AMS in terms of predominant population scale in the long list cities.
- 2.10 The results of cities assessed and selected preliminarily by quantitative scoring are reviewed by each member state of AMS through discussions with NPC. Taking account of appropriateness by local information and conditions in each state of AMS, list of cities assessed for the middle list cities are modified and finalized.
- 2.11 Regional seaports and airports as key exposures were assessed by their considerable magnitude in terms of proximity to city as vulnerability against natural hazards. In a similar way of the key infrastructure, agglomerate industrial areas were assessed by their vulnerability in consideration with distance from city and numbers of agglomerate industrial areas.
- 2.12 For 1st PRA, hazard are evaluated by the data which is based on Global Risk Data Platform (GRDP/UNEP) and previous study result.
- 2.13 56 cities (6.8 % out of total cities) among AMS countries are selected from the long list cities (817 cities). Selected cities are distributed mainly in Myanmar, and followed by Indonesia, Malaysia, Philippines and Vietnam in terms of numbers of cities affected by absolute numbers of cities in the long list cities. Number of cities with “Flood” (34 cities; 60 % of the total selected cities) is predominant followed by cities with Tsunami where earthquake is presumed as incidental events in such Indonesia, Myanmar Malaysia and Philippines.



Source: JICA Project Team

#### Distribution of Middle Listed Cities by Natural Hazard Type in AMS

- 2.14 Some cities in AMS having multi-natural hazard potentials are not specified in consideration with the principles of demonstration project and expected conditions by difficult counter mitigation measures against multi-hazard and their probability. Therefore cities with potential multi-natural hazards are listed by a represented natural hazard. Since the disaster risk in Brunei Darussalam and Singapore is smaller than other AMS, the cities in these countries are not listed in the middle list.

### 2nd Preliminary Risk Assessment for Short Listed Cities

- 2.15 The 2<sup>nd</sup> preliminary risk assessment (2nd PRA) aims to narrow the middle list cities down to the short list cities followed by the step of final selection of candidate cities for the demonstration project in AMS. This is assessed by the baseline data of which information in conjunction with natural hazards, hazard management activities, organization and other relevant data were collected by the field surveys in AMS by local consultants.
- 2.16 The 2<sup>nd</sup> PRA aims at assessing middle listed cities by three factors of hazard, exposure and capacity on each city through utilization of data in combination with the data gathering survey outputs by the sub-contractors in each AMS, and open-data sources (GRDP/UNEP and GAR) in principle, taking account of data homogeneity and availability at city level in AMS.
- 2.17 In this assessment, factors of hazard and exposure are considered as “Vulnerability” which can be defined by how assets exposed to risks are affected by natural hazards. The following Figure illustrates applied formula for the 2nd PRA. And it should be noted that this assessment is examined by comparative evaluation scoring within each state of AMS rather than absolute scoring of whole countries of AMS taking account of variety of socio-economic conditions such as population range and scale of cities in AMS.
- 2.18 As a result of the 2nd Preliminary Risk Assessment, the following cities were selected as the short list cities. The candidate cities were also selected through the discussion between NPC and JPT members. The following lists shows the short listed cities and candidate cities. Myanmar and Vietnam needs further discussion to finalize the candidate city.

**Short Listed Cities and Candidate Cities**

Country	Short Listed Cities		Candidate Cities	
	Name	Number of Cities	Name	Number of Cities
Cambodia	Battambang (F)	1	Battambang (F)	1
Indonesia	Bima (E), Semarang (F), Denpasar (T)	3	Denpasar (T)	1
Lao PDR	Luang Prabang (F)	1	Luang Prabang (F)	1
Malaysia	Kuala Terengganu (F) George Town (T)	2	Kuala Terengganu (F)	1
Myanmar	Amarapura (E), (F) Kyimyindaing (T) ,(C) to be internally discussed	2	Kyimyindaing (T) ,(C) to be internally discussed	1
Philippines	Butuan (F), Meycauayan (E)	2	Butuan (F)	1
Thailand	Pathumthani (F), Rayong (F)	2	Pathumthani (F)	1
Viet Nam	Qui Nhon(T), Hue(F), Ha Long (T) to be internally discussed	3	Qui Nhon(T), to be internally discussed	1
	Total	16	Total	8

\*: ( ) shows the main disaster type for the cities. (C): Cyclone, (E): Earthquake, (F): Flood, (T): Tsunami

Source: JICA Project Team

### Database Management

- 2.19 JPT assembles collected and analyzed data in the project to GIS database. GIS database should have systematic and comprehensible component by category of whole ASEAN, country, city

and type of information. GIS database also makes consideration to procurable information level of each country. Since the 4th PSC agreed that AHA Centre is a main actor of managing GIS database, the specification of the database is to be elaborated through the discussion between AHA Centre and JPT.

#### Draft TOR of the Demonstration Project

- 2.20 The draft TOR for the demonstration project will be developed and formulated based on certain policies and directions through discussions toward appropriate formulation of the demonstration project in order to build effectively “disaster and climate resilient cities” in ASEAN.
- 2.21 Although the preliminary risk assessment with certain criteria will give the quantitative result for the selection of candidate cities, further discussions are required to direct the policy and strategy of the demonstration project implementation. An example can be given by the cases whether the project should focus on a weak governance capacity of local government for disaster risk reduction or should give the weight to certain level of capacity enabling to handle with the demonstration project. Type of the Project
- 2.22 Framework of technical assistance project for the demonstration project is proposed tentatively as follows.
- Theme of the project: Capacity development technical assistance for candidate cities in AMS to build disaster risk and climate resilient cities in ASEAN
  - Primary Sector: Urban Planning and Disaster Risk Reduction
  - Impact: Impact will be enhanced on resilience of disaster risks and climate change in cities of AMS, leading to improved governance of the cities especially for land use planning, urban development and disaster prevention and mitigation activities. And it will be positively influenced to national institutional arrangement in association with other cities governances.
  - Outcomes:
    - Outcome 1: Methodology of the natural disaster risk assessment will be understood and acquired
    - Outcome 2: Issues on planning and implementation to be improved or developed based on the assessment result will be identified and clarified through consensus among relevant stakeholders
    - Outcome 3: Action plan and guidelines for improvement or development of land use and development planning and development control with regulations will be formulated
    - Outcome 4: Pilot activities to be implemented under the project will contribute to the verification of activities to be applied to other cities on building disaster and climate change resilient cities
    - Outcome 5: Practices and lessons learnt from the project for building disaster and climate change resilient city will be reflected to national governance and shared to other cities of AMS mainly by the ASEAN Urban Resilience Forum

### 3. [OUTPUT 3] DEVELOPMENT OF TOOLS ON BUILDING RESILIENT CITIES IN ASEAN

#### Background of Output 1

- 3.1 In conjunction with the Output 3, the following notes illustrated in CN18 are referred as backgrounds of the Output 3.
- Stocktaking of existing tools on integrating DRR and CCA in local development, land use and investment planning, and risk financing and insurance
  - Development of regional guidelines on urban risk assessment, risk sensitive urban development planning, land use management and investment programming
  - Development of guidance note on urban risk financing and insurance
- 3.2 According to the Project Proposal by JICA as the project framework, activities of the Output 3 to be implemented are stipulated in the scope of works of Output 3 as follows.
- Conducting study on the result or progress of the Resilient Cities Campaign and other ASEAN related initiatives
  - Conducting study on good practices and the lessons learned from past disasters and projects or programs related to enhancing resilience of urban cities including developed countries
  - Conducting a study towards developing a guide to building resilient cities
  - Documentation of tools (Guidebook) which will be composed of (i) lessons from past disasters that affected cities; (ii) good practices on countermeasures for disasters in cities, and (iii) a guide to build resilient cities.

#### Review of Related Activities

- 3.3 ASEAN countries are participating in international activities as the purpose of the development of disaster prevention planning and gathering information about natural disasters. Related activities are following.
- i) Resilient Cities Campaign (UNISDR)
  - ii) 100 Resilient Cities (Rockefeller Foundation)
  - iii) Resilient Cities Series (International Council for Local Environmental Initiatives : ICLEI)
  - iv) City Resilience Profiling Programme (UN-Habitat)
  - v) Associated Programme on Flood Management (WMO)
  - vi) Asia Pacific Adaption Network (APAN)
- 3.4 JPT analyzed the merits of the related activities. The merits are largely divided into two points: i) easy entry and step up, and ii) select and support with fund and entry and support with technical support. JPT can learn the style and experience of “Resilience Cities Campaign (RCC):UNISDR”, because RCC has simple and easy entry system to enhance the networking for building resilient cities.

#### Good Practices

- 3.5 JPT groups good practices and lessons into seven categories: 1) Sustainable Development, 2)

Risk Assessment, 3) Government Plan, 4) Regulation and Rule, 5) Disaster Measures for Buildings and Development, 6) National Disaster Memorial Park, 7) Capacity Building, 8) Early Warning System and 9) Evacuation Drill. The following 3.6 to 3.8 shows a part of these practices.

- 3.6 In terms of Sustainable Development, to build a bank protection of the steep slope by reinforced-concrete (RC) is effective in order to secure the slope, but requires a large amount of cost. To plant cultivated trees in the neighboring farm to and slopes, it will be effective to the prevention of landslides. This cost is cheaper than constructing a bank protection with RC.
- 3.7 The most preferred method of earthquake resistance of building is earthquake resistance based on Building Code. However, Building Code and national seismic criteria are not being enforced, or because of the low income, the family can not reinforce earthquake resistance for their house, as a minimum condition, the evacuation to the outside of the building before the building collapses enable. For example, earthquake resistance with bamboo, scrap wood and scrap iron, and house with platform upper the surface of flood water line. Good Practices and Lessons of Disaster Measures for Building are following items.
- 3.8 Memorial park may be either a public park dedicated in memorial to an event or cemetery. The case of memorial park for natural disaster, destroyed building, the maximum water level of flood and ship bringing by tsunami are preserved. The park has the effect to raise awareness of the visitors and citizens that the city has high disaster risk.

#### Guidebook

- 3.9 JPT will develop guidebook as a tool specified in Output 3 of CN18. This Guidebook is intended for practitioners: National and local government staff working at urban planning and disaster risk reduction. The aim of the guide book is as follows
  - to understand the vulnerability to natural disasters of interest city
  - to understand how to address these issues and weak points for disaster prevention.
  - to appreciate the necessity for risk management in urban planning and development of infrastructure, and disaster prevention
  - to construct cooperation with the city or country that has same problem
- 3.10 Guidebook will be formed seven chapters (1. Introduction, 2. Challenges and Initiatives, 3. Why we need mainstreaming of DRR into Urban Planning?, 4. Approaches to Risk-sensitive Urban and Land Use Planning, 5. Disaster Risk Assessment, 6. Applicable Tools for Resilient Cities, 7. Good Practices for Resilient Cities).
- 3.11 JPT will develop the contents of the guidebook by keeping consistency with four priority actions of Sendai Framework and checklist which is also to be developed by JPT.

#### Risk Assessment for Building Resilient Cities

- 3.12 For building resilient cities, appropriate structural and non-structural measures have to be identified by risk assessment. The following five steps are taken for the planning of the building resilient cities. In the steps 2 to 4 out of the five steps, more accurate and precise risk assessment can identify the vulnerability of target area and lead to more effective measures.
  - Step 1: Goal setting for building resilient city
  - Step 2: Setting mission for worst scenario of risk



- Step 3: Analysis of vulnerability and risk
  - Step 4: Study on measure against risk
  - Step 5: Prioritization of measures
- 3.13 In the risk assessment, 1) fragility function/ curve and 2) loss exceedance curve are important. The former shows relationships between external force and damage scale/rate on house, bridge, human life, etc., which is mainly used for risk assessment. On the other hand, the latter shows relationships between external force and probabilistic loss, which is mainly used for evaluation of effectiveness of measures.
- 3.14 In this project, fragility function of a) Earthquake, and b) Water Hazard (Tsunami, Storm Surge, Strong Wind and Flood) were studied by 1) literature review of fragility function and 2) Study on relationship between disaster scale and damage. Through this, applicable fragility curve will be examined and proposed.
- 3.15 Example of measures related to fragility curve is presented in the following table. The measures towards building resilient cities shall be widely proposed by fragility curve, since situation in each ASEAN country/city is different.

**Example of Measures related to Fragility Curve**

Type of fragility curve	Related measures on building resilience
Building Damage (by Type of Structure)	<ul style="list-style-type: none"> <li>• Earthquake Resistance</li> <li>• Reinforcement of Building Standard</li> <li>• Insurance</li> </ul>
Flood Damage (Inundation Depth)	<ul style="list-style-type: none"> <li>• Land Use Regulation</li> <li>• Improvement of Flood and Drainage Facilities</li> </ul>
Ratio of Death People (Evacuation people)	<ul style="list-style-type: none"> <li>• Flood Fighting Drill</li> <li>• Education, Formulation of Early Warning and Evacuation Plan</li> <li>• Flood Forecasting and Warning System, etc.</li> </ul>

Source: JICA Project Team

- 3.16 In the 1st Workshop scheduled in December 2016, opinion on output and results of the Survey shall be collected. JPT will develop and propose disaster risk assessment by fragility function in building resilient cities in ASEAN.

Checklist

- 3.17 The scope of works of this project stipulates “checklists formulation” contributing to enhancement of capacity of disaster risk reduction for local governments in association with central government involvement through effective and practical utilization of the checklist in ASEAN. This checklist is also positioned as one of practical tools to materialize the four priority actions.
- 3.18 Checklist in general is utilized by two types of function as “administrative performance measure” or “process guide mark of required activities”. Current products of checklist by international organizations and national agencies in the world such as “Disaster Resilience Scorecard for Cities ver 2.2” and “Local Government Self-Assessment” by UNISDR, seem to function as a performance measure tool for assessment of activities on local government disaster risk reduction.

3.18 The formulation of checklists is under process at present in participatory manner through trial implementation of draft checklists on selected cities in AMS. JICA Project Team will conduct workshops for the draft checklist trial implementation to gather opinions and comments for improvement of them. The following steps will be implemented to formulate “Checklist for building Disaster Risk Resilient Cities”.

- STEP-1: Formulating draft checklists
- STEP-2: Conducting workshops for trial implementation of checklist in selected local governments to get feedbacks from users (relevant officers)
- STEP-3: Reviewing and reflecting to draft checklists for improvement
- STEP-4: Formulating utilization mechanism for both of local and central level of governments in association with checklist guidance production
- STEP-5: Finalizing proposed checklists through plenary workshops of relevant AMS members
- STEP-6: Incorporating checklists into “Guidebook” as integrated tools for building disaster and climate resilient cities

3.19 There are several considerations to be clarified in further discussions how the checklist can be utilized effectively in terms of checklist operation and management, of which operational principles may affect the contents of checklist in the framework. The following considerations are identified. The considerations will be discussed in the 3<sup>rd</sup> and 4<sup>th</sup> Workshops.

- Who is/are respondent/s to the checklist
- How often to do the checklist (frequency)
- Evaluation System and Feedback

## 4. WAY FORWARD

### During JICA Project (Phase 1)

- 4.1 Since the beginning of the Project in November 2015, activities have focused on establishing a platform for project implementation, collecting and analyzing basic city information and disaster risk information of the cities in ASEAN, and reviewing the existing activities by some concerned international partners including UNISDR and identifying good practices and lessons learned from the various activities.
- 4.2 The project shifts from a phase, which focuses on strengthening networks among the stakeholders through publicity, selecting candidate cities and preparing draft TOR for demonstration project on disaster risk assessment, and organizing the collected data information for development of tools on building resilient cities, to the next phase. The next phase focuses on producing outputs such as action plan of ASEAN Urban Resilience Forum, website, database, draft TOR of demonstration project, guidebook including checklists.
- 4.3 Activities that are expected until the preparation of Progress Report includes the followings for each Output.

- Output 1: Development of action plan for future ASEAN Urban Resilience Forum; development of website and information dissemination through the website and mailing list and Facebook; holding the 3rd – 4th Workshops and 2nd ASEAN Urban Resilience Forum.
- Output 2: Completion of selecting candidate cities through communication with NPC, developing data base, and preparing the draft TOR for the demonstration project.
- Output 3: Organizing the collected and reviewed information on the related activities for building resilient cities, studying on fragility function and curves, preparing the 2nd draft of checklists to be used by urban planning officials and DRR officials, and development guidebooks for building resilient cities.

After JICA Project (Phase 2 and beyond)

- 4.4 ASEAN should take over the project of CN 18 supported by JICA and JPT after completing Phase 1 next year. To keep the momentum of the project of CN18 and implement the project smoothly, ASEAN Secretariat, Co-chairs, AHA Centre, should take the following activities with the cooperation by other AMS. This way forward should be elaborated more after this through the discussion with the PSC members after this.
- 4.5 ASEAN side is required to execute the activities such as establishing management structure for Phase 2; sharing information and knowledge, strengthening network; arrangements for implementing demonstration projects; dissemination, monitoring and evaluation, of guidebook