**ASEAN Committee on Disaster Management (ACDM)** Working Group on Prevention and Mitigation

# Building Disaster and Climate Resilient Cities in ASEAN

**Final Report** 

October 2018

Japan International Cooperation Agency (JICA)

Nippon Koei Co., Ltd. Pacet Corp. Eight-Japan Engineering Consultants Inc.

GE
JR
18-104

**ASEAN Committee on Disaster Management (ACDM)** Working Group on Prevention and Mitigation

# Building Disaster and Climate Resilient Cities in ASEAN

**Final Report** 

October 2018

Japan International Cooperation Agency (JICA)

Nippon Koei Co., Ltd. Pacet Corp. Eight-Japan Engineering Consultants Inc.



# **EXECUTIVE SUMMARY**

# INTRODUCTION

# Background

- I.1 Due to their climatic environment and geological properties, disaster risk in the Association of Southeast Asian Nations (ASEAN) area is high and it brings a number of disasters to the ASEAN countries. Approximately 90% of the victims of natural disasters are from Asia according to the accumulated total of the record from 1984 to 2013.
- I.2 Today, more people from rural areas move and live in the cities. By 2050, it is expected that 68% of the world's population would live in urban areas. This unprecedented growth of cities, particularly countries in the ASEAN Region, causes problems in resource management and land use management, which posed a huge challenge to disaster risk management and sustainable development.
- I.3 The Great East-Japan Earthquake in Japan and Chao Phraya River Great Flood in Thailand, which 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 global economy.
- I.4 Hence, building urban resilience to disaster and climate risks has become an important issue in the ASEAN Region, and the ASEAN Committee on Disaster Management (ACDM) and ASEAN countries have been addressing disaster risk reduction at the regional level.
- I.5 ASEAN Agreement on Disaster Management and Emergency Response (AADMER) prepared by ACDM has a rolling plan, namely AADMER Programme. AADMER Programme Phase 2 (2013-2015) formulated 21 concept notes, and this project has been implemented since November 2015 based on Concept Note 18 (CN 18) among the 21 concept notes.
- I.6 In April 2016 during the project period, AADMER Work Programme 2016-2020 was newly launched. After that, this project has been consistent with "Build Safely", which is one of the priority programme of the new AADMER Work Programmee. "Build Safely" plans ASEAN Urban Planners Forum, to which ASEAN Urban Resilience Forum in CN18 will be integrated.

# Outline of the Project

- I.7 Based on Concept Note 18 (CN 18) "Building Disaster and Climate Resilient Cities in ASEAN" of AADMER Work Programme Phase 2 under the 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.8 Expected outputs of the project are as follows. The project area is the ASEAN countries (ten member-states).
  - <u>Output 1:</u> Establishment of a regional cross-sectoral collaboration mechanism and formation of partnerships to increase urban resilience in the ASEAN;
  - <u>Output 2:</u> Evaluation of candidate cities, commitment and partnership-building for the demonstration project on risk assessment of priority cities in ASEAN

Member States ; and capacity development for urban resilience through implementation of the demonstration project at two cities in ASEAN<sup>1</sup>

- <u>Output 3:</u> Development of tools on building resilient cities in ASEAN
- I.9 ACDM, each ASEAN Member States (AMS), ASEAN Secretariat (ASEC), AHA Centre, Japan International Cooperation Agency (JICA), and JICA Project Team are the key stakeholders of the project. Co-chairs of the ACDM Working Group on Prevention and Mitigation (Lao PDR and Thailand), ASEC, 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.10 After the JICA Project Team was formed in November 2015, ten project steering committee (PSC) meetings had been held in December 2015, April 2016, July 2016, December 2016, March 2017, July 2017, September 2017, November 2017, December 2017, and July 2018. PSC members had captured the progress and issues of the project and discussed the solutions and schedule in the PSC meetings. The 11<sup>th</sup> PSC meeting concluded the project.

# PHASE 1: DEVELOPMENT OF IMPLEMENTATION FRAMEWORK

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

ASEAN Urban Resilience Forum (AURF)

- 1.1 The JICA Project Team supported the establishment of ASEAN Urban Resilience Forum (AURF) for concerned stakeholders from ten ASEAN Member States (AMS). The ASEAN Secretariat, Lao PDR, and Thailand as co-chairs of ACDM Working Group (WG) on Prevention and Mitigation (P&M) are expected to lead and coordinate with other AMS.
- 1.2 The JICA Project Team supported to make a draft concept and plan of the AURF, collect ideas and opinions from each AMS, and prepare the necessary materials for discussions including the draft concept note of the forum and draft terms of reference for the forum secretariat.
- 1.3 The JICA Project Team supported to hold three AURF meetings. The first and second AURF meetings were held to collect ideas for future AURF of Output 1, and the guidebook and checklist of Output 3. The third AURF meeting was held to collect ideas for sharing experiences of the demonstration project on disaster risk assessment, which was implemented in Luang Prabang, Lao PDR, and Denpasar, Indonesia.

Development of Draft Action Plan for Future ASEAN Urban Resilience Forum

- 1.4 Based on Concept Note (CN 18), the JICA Project Team has developed the basic idea of action plan for AURF 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.
- 1.5 The JICA Project Team developed the draft concept note of AURF and draft TOR for setting secretariat for AURF and consulted with the Project Steering Committee (PSC) members at the meeting held in April 2016.
- 1.6 ACDM WG on Prevention and Mitigation expressed in the 9<sup>th</sup> ACDM WG on P&M, that AURF would be integrated with the ASEAN Urban Disaster Resilience Forum, which was agreed to

<sup>&</sup>lt;sup>1</sup> Inclusion of capacity development through implementation of the demonstration project in Output 2 was agreed in the 7<sup>th</sup> Project Steering Committee Meeting in July 2017.

rename ASEAN Urban Planners Forum specified in AADMER Work Programme (2016-2020).

1.7 The draft action plan, draft concept, draft terms, and draft TOR for the forum secretariat developed by the JICA Project Team will be further elaborated and finalized by ACDM WG on P&M after the project is completed.

#### Holding Workshops

1.8 The JICA Project Team held workshops, in total of four times. The JICA Project Team members became a moderator basically on introduction and discussion about project (intermediate) outputs. Participants from each AMS actively participated in the workshop by expressing their ideas and opinions. The outputs of the workshops were the inputs of draft TOR of demonstration project on Output 2 and guidebook including checklist on Output 3.

#### Facilitation for Enhancing Networking among Stakeholders

- 1.9 The 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. The JICA Project Team has compiled the list of 13 National Project Coordinators (NPC) with their contact addresses, based on the information from the ASEAN Secretariat.
- 1.10 In order to develop the mailing list for networking, the JICA Project Team drafted the mailing list of the AURF, based on the list of participants in the 1st AURF held in Bangkok, on July 28, 2016. Since the mailing lists include personal information should be protected, this report does not disclose the names and e-mail addresses of the attendants of the AURF.
- 1.11 The JICA Project Team developed the Project's website, which was handed over to AHA Centre. The website is one of the communication tools to disseminate the progress and useful information for urban resilience. The outline of prospected website was discussed in the 4<sup>th</sup> PSC on July 27, 2016 and PSC members came to the conclusion that AHA Centre shall be the main actor. Based on this result, the JICA Project Team discussed with AHA Centre how the website shall be developed. The URL of the developed website is http://aurf.ahacentre.org/.
- 1.12 The JICA Project Team also developed the Facebook page of the project and posted the project's progress timely. According to AHA Centre's opinion, the AURF is basically for closed members, so there is no need to promote it widely to the public. In addition, there will be some problems such as administrator/ moderator, duplication of the contents, and so on. Therefore, the 10<sup>th</sup> PSC noted that the Facebook will be kept informally for the time being.

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

# Process of Listing of Candidate Cities

- 2.1 In the evaluation process, the candidate cities to be selected for the demonstration project are considered as high-risk cities with typical natural hazards in the ten ASEAN Member States (AMS). The principles of the evaluation for the candidate cities of the demonstration project are: i) Representativeness of natural hazards in ASEAN, ii) Replicability to apply the 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 cites, and v) Others such as data availability of basic information.
- 2.2 In order to select candidate cities in the members' countries, the preliminary risk assessment (PRA) was adopted to the evaluation method to identify considerable cities for the demonstration project based on the three indicators, i.e., "intensity level of natural hazard dangers", "scale of exposure", and "level of capacity". Taking into account the gradual

evaluation process due to data availability in city level information.

- 2.3 A total of 2,431 local governments including rural and urban administration are observed in AMS according to desktop information (e.g., countries' website and documents). Based on the definition of "city" as an urban status administration of local governments, cities in these local governments, which are subject for evaluation of the demonstration project, are covered by 817 local governments.
- 2.4 According to the principle and method for PRA mentioned above, 817 cities were evaluated by following the three steps in principle in order to select candidate cities for the demonstration project.

Demonstration Project						
		STEP-1	STEP-2	STEP-3		
Assessment	Preparation	1st PRA for Middle List	2nd PRA for Short List	Evaluation for Candidate Cities	Selection	
Hazard Risk		•	•			
Exposure Vulnerability	Data Collection*	•	•			
Coping Capacity	**		•			
Project Principles Consistency				•		
Major Data Source		GRDP/UNEP**/ Data Collection***	GRDP/UNEP Data Collection***/ Survey Data****	All Available Data		
Involvement of Each I State	Member	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)	

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

Note: \*\*GRDP/UNEP: UNEP-GRID/Geneva, UNISDR, \*\*\*Data collection mainly through desk-top (e.g., website documents, satellite imageries), \*\*\* the data gathering survey through subcontract conducted by the JICA Project Team, \*The total 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

- 2.5 Natural hazards that typically happened in AMS are considerable risks to affected exposures. For the 1st PRA, the types of natural hazards are identified as "earthquake", "tsunami", "flood", and "wind by tropical cyclones wind and surge including monsoon and typhoon". This definition utilizes published natural hazard data with some risk assessment data from UNEP/UNISDR.
- 2.6 Cities in the long-listed cities were considered by appropriate scale of populations for the 1st PRA according to the principles of the demonstration project. The following criteria are used to narrow down the list by identification of cities consistent with the principles:
  - City at medium scale population in AMS: The capital cities and small cities with population of under 10,000 people are excluded in principle in order to fit with the principle of the demonstration project.
  - Number of cities within 90<sup>th</sup> percentile in each AMS: The top 5% of cities with the largest population and the bottom 5% of cities are excluded in order to identify

representative cities in AMS in terms of predominant population scale in the long list cities.

- 2.7 The results of cities assessed and selected preliminarily through quantitative scoring by utilizing the open-source data are reviewed by each member state of AMS through discussions with NPC. Taking into account the appropriateness of local information and conditions in each state of AMS, the list of cities assessed for the middle list cities were modified and finalized.
- 2.8 Regional seaports and airports as key infrastructure were assessed by their considerable magnitude in terms of proximity to the city and 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 the city and numbers of agglomerate industrial areas.
- 2.9 For the 1st PRA, hazards were evaluated by the data, which is based on Global Risk Data Platform (GRDP/UNEP) and previous study result.
- 2.10 Fifty-six cities (6.8% out of the total cities) in AMS countries are selected from the long list cities (817 cities). Selected cities mainly come from Myanmar, followed by Indonesia, Malaysia, the Philippines, and Vietnam in terms of numbers of cities affected by absolute numbers of cities in the long list cities. Number of cities experiencing "flood" (34 cities; 60% of the total selected cities) is predominant followed by cities with tsunami where earthquake is presumed as incidental event such as in Indonesia, Myanmar, Malaysia, and the Philippines.



Source: JICA Project Team Distribution of Middle Listed Cities by Natural Hazard Type in AMS

2.11 Some cities in AMS having multi-natural hazard potentials were not specified in relation to the principles of demonstration project and the expected conditions because of difficult counter mitigation measures against multi-hazards and their probability of occurrence. Therefore, cities

with potential multi-natural hazards are listed with a represented natural hazard. Since the disaster risk in Brunei Darussalam and Singapore is smaller than other AMS, the cities in these countries were not listed in the middle list.

2nd Preliminary Risk Assessment for Short Listed Cities and Selecting Candidate Cities

- 2.12 The 2<sup>nd</sup> preliminary risk assessment (2<sup>nd</sup> PRA) aimed 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 was assessed by baseline data of which information in conjunction with natural hazards, hazard management activities, organization, and other relevant data were collected by local consultants through field surveys in AMS.
- 2.13 The 2<sup>nd</sup> PRA assessed 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 the city level in AMS.
- 2.14 In this assessment, factors of hazard and exposure were considered as "Vulnerability", which can be defined by how assets exposed to risks are affected by natural hazards.
- 2.15 As a result of the 2<sup>nd</sup> 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 the JICA Project Team members. The following lists show the short listed cities and candidate cities.

Country	Short Listed Cities		Candidate Citi	es
	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)	2	Kyimyindaing (C)	1
Philippines	Butuan (F), Meycauayan (E)	2	Butuan (F)	1
Thailand	Pathumthani (F), Rayong (F)	2	Pathumthani (F)	1
Viet Nam	Qui Nhon (C)(T), Hue (F), Ha Long (T)	3	Qui Nhon(C)	1
	Total	16	Total	8

Short Listed Cities and Candidate Cities

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

#### Database Management

- 2.16 The JICA Project Team compiled collected and analyzed data in the project to the GIS database. The GIS database was combined with existing database of AHA Centre, and it was prepared in consideration of each ASEAN country, which can be utilized effectively. In addition, for enhancing the capacity of AHA Centre, the JICA Project Team proposed utilization and update of GIS database, and expanded GIS software at the AHA Centre.
- 2.17 The JICA Project Team divided the GIS database into two main contents as shown below.
  - Risk Assessment Data: Including city location, administrative boundary, infrastructure location, natural hazard (earthquake, tsunami, flood, cyclones/typhoon wind/surge), and exposure data, which were used for the preliminary and 2nd preliminary risk assessment, including results of risk assessment and capacity evaluation, the whole map, and hazard map of each middle list cities by hazard type.

• Existing and Additional Data: Including data from former JICA studies, data collected in this study such as population and digital elevation model (DEM) data, and data from the subcontract survey done in each country.

#### Draft TOR of the Demonstration Project

- 2.18 The draft TOR for the demonstration project was developed and formulated based on certain policies and directions through discussions toward appropriate formulation of the demonstration project in order to effectively build "disaster and climate resilient cities" in ASEAN.
- 2.19 The demonstration project in line with CN 18 aims at promoting and enhancing the administrative capacity at small- to medium-scale population of the cities in ASEAN Member States (AMS), 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 disaster risk reduction (DRR) and climate change adaptation (CCA) measures.
- 2.20 The priority actions<sup>2</sup> and the fifth global target of the Sendai Framework for Disaster Risk Reduction (SFDRR), which is to "(e) substantially increase the number of countries with national and local disaster risk reduction strategies by 2020" in the seven targets, are the essential framework in order to formulate the demonstration project. Accordingly, through the following elements, the demonstration project is considered as the framework to achieve and contribute to the four priority actions of SFDRR:
  - To understand disaster risk by conducting disaster risk assessment;
  - To enhance disaster preparedness for an effective response by formulating a contingency plan;
  - To prepare for investing in disaster risk reduction by formulating an action plan for mainstreaming disaster risk reduction in urban planning;
  - To strengthen disaster risk governance to manage disaster risk by developing the capacity for disaster risk assessment, formulating of contingency plan, risk-sensitive urban planning, and strengthening cooperation among the concerned government organizations.
- 2.21 Although there are several uncertain factors as parts of the project framework for the draft Terms of Reference (TOR), the technical assistance project for the demonstration project was proposed as follows:

1) Theme of the project:

Technical assistance for the capacity development of the cities to be selected in AMS to build disaster risk and climate resilient cities in ASEAN, taking into account effective impacts on other cities' governance and institutional arrangement for AMS.

2) Sector

Primary sector: Urban planning and disaster risk reduction management

<sup>&</sup>lt;sup>2</sup> Priority Actions of SFDRR: "Priority 1: Understanding disaster risk., Priority 2: Strengthening disaster risk governance to manage disaster risk., Priority 3: Investing in disaster risk reduction for resilience, Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction.

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

#### 3) Impacts and outcomes

The impact will be enhanced on the resilience of AMS cities from disaster risks and climate change, leading to improved governance of the cities especially for land use planning, urban development, and disaster prevention and mitigation activities. It will also be positively influenced by national institutional arrangements in association with other cities' governance. Expected outcomes are listed below.

- Outcome 1: Methodology of the natural disaster risk assessment will be understood and acquired among relevant organizations in the city.
- Outcome 2: Issues in planning and implementation to be improved or developed based on the risk assessment result will be identified and clarified through a consensus among relevant stakeholders of the city.
- Outcome 3: Action plan for improvement or development in land use and development planning and development control with regulations and contingency plan, and relevant activities for the city and relevant national organizations will be formulated.
- Outcome 4: Practices and lessons learned from the project on building disaster and climate change resilient cities will be reflected to national governance and shared to other cities of AMS mainly by the ASEAN Urban Resilience Forum (temporal).

#### 4) Expected outputs of the project

As the result of activities to achieve the outcomes  $(1 \sim 5)$ , the following outputs will be prepared:

- <u>Disaster risk assessment report</u> utilizing existing available hazard assessment including open source data;
- <u>An action plan</u> for the improvement of an existing contingency plan, taking into account the coping capacity of target local government and DRR activities to be improved or enhanced, or for identifying basic concerns and directions to formulate a contingency plan in case there is no existing contingency plan;
- <u>An action plan</u> for the improvement of existing land use and development plans, and development control and regulations in consideration of institutional arrangement, human resource development, and budgeting of local government, or for identifying basic concerns and directions to formulate the land use and urban development plan in case there is no existing plan yet; and
- <u>Activity reports</u> for the results of the project.

# 5) Beneficiaries of the project

The following are expected beneficiaries of the project, including expected project counterparts (hereinafter C/P).

- <u>Local government:</u> urban planning agency (C/P), development control and regulation agency (C/P), disaster risk management agency (C/P), infrastructure including transportation sector agency, energy and telecommunication, and economic development agency, education sector agency, health sector agency, and cultural historical heritages;
- <u>National government:</u> urban planning agency (C/P), development control and regulation agency (C/P), and disaster risk management agency (C/P); and
- Relevant organizations and stakeholders with their assets in the project area.

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

# Review of Related Activities

- 3.1 The Association of Southeast Asian Nations (ASEAN) countries are participating in international activities towards the purpose of development of disaster prevention planning and information gathering on natural disasters. Related activities are the following:
  - i) Resilient cities campain (United Nations Office for Disaster Risk Reduction: 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)
- 3.2 The JICA Project Team analyzed the merits of 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. The JICA Project Team 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

- 3.3 The JICA Project Team groups good practices and lessons into four categories: 1) Understanding disaster risk, 2) Strengthening disaster risk governance to manage disaster risk, 3) Investing in disaster risk reduction for resilience, 4) Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction, to follow the four priorities for action of Sendai Framework for Disaster Risk Reduction.
- 3.4 In terms of understanding disaster risk, good practices of risk assessment and early warning system are addressed. For example, the Philippine government arranged 11 kinds of map for expression of disaster risk assessment and share the data and information of disaster risk in Twitter and Facebook.
- 3.5 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 destroyed by tsunami are preserved. The park has the effect to raise awareness of visitors and citizens that the city has high disaster risk.

#### <u>Guidebook</u>

3.6 The JICA Project Team developed a guidebook as a tool specified in Output 3 of CN 18. This guidebook is intended for practitioners: National and local government staffs working at urban

planning and disaster risk reduction. The aim of the guidebook is as follows:

- To understand disaster risk of a city;
- To understand how to address issues and weak points for disaster risk reduction;
- To mainstream disaster risk reduction in urban planning and development plan; and
- To learn good practices and lessons learned from other cities.
- 3.7 The guidebook has two parts, i.e., main text and appendix. Main text has seven chapters (1.
- Introduction, 2. Definition, 3. Why we need mainstreaming DRR into Urban Planning?, 4. Who will do what?, 5. Process to Risk-sensitive Land Use and Urban Development Planning, 6. Disaster Risk Assessment, 7.Applicable Tools for Resilient Cities). Appendix contained the checklist.
- 3.8 The JICA Project Team developed the contents of the guidebook by keeping the consistency with the four priority actions of Sendai Framework for Disaster Risk Reduction (SFDRR) and the checklist as well. This guidebook aims to contribute the basic principle and framework of Priorities 1, 2, 3 and the "Enhancing Disaster Preparedness for Effective Response" part of Priority 4 of SFDRR. This can make things easier for DRR officials and urban planners to evaluate their efforts of building resilient cities in line with the indicators to monitor the global targets of SFDRR.
- 3.9 The guidebook was translated to seven languages: Khmer, Indonesia, Lao, Malay, Burmese, Thai, and Vietnamese for disseminating it to each AMS. The electric file of the guidebook will be uploaded to the developed website in Output 1.



Source: JICA Project Team Guidebook for Urban Resilience

# Checklist

- 3.10 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 the ASEAN. This checklist is also positioned as one of the practical tools to materialize the four priority actions of SFDRR.
- 3.11 The checklist in general is utilized by two types of function mainly "administrative performance measure" or "process guide mark of required activities". Current products of the checklist by international organizations such as "Disaster Resilience Scorecard for Cities Version 2.2" and "Local Government Self-Assessment" by UNISDR, have been made as a common performance measurement tool for the assessment of activities for disaster risk reduction applicable to all local governments all over the world.
- 3.12 Taking into account the considerable DRR activities in local governments against current increase of disaster risks in ASEAN, the checklist could play an effective role in assisting their activities to be improved, and this is also one of the administrative performance measurement tools coupled with awareness function that can cope with the weak capacity of local governments requiring the necessary support and assistance by the national government.

The objectives for local and national governments are set as follows:

#### For local governments

- To understand the current status of DRR of a local government and identify its weaknesses in DRR and urban resilience through the checklist; and
- To utilize the checklist as a benchmark and monitoring tool for DRR activities.

# For national government

- To understand and assess the situation of local governments for DRR and urban resilience in the country, taking into account the identification and examination of weak areas and further policies for the improvement of local governments; and
- To utilize the checklist as a tool to stimulate DRR and urban resilience activities in a comparative manner among local governments in the country through the dissemination of assessments of all local governments.
- 3.13 According to the principles of structure design in the previous section, the contents of the checklist are proposed for the two types of Checklists A for "disaster risk management" and Checklist B for "resilient urban development". The contents are composed of questions to relevant respondents of local government as indicators or criteria to measure activities for disaster risk reduction.
- 3.14 The Checklist A aims at assessing the capacities of local governments in disaster risk management in the prevention, mitigation, and preparedness stages and how their activities and measures are or have been achieved by DRR activities in line with the priority actions of SFDRR. These activities are covered by a broad range of activities to prepare the actions for planning, human resource development, and institutional arrangements to physical interventions.
- 3.15 The Checklist B aims at assessing capacities of local governments in land use planning, urban development planning, and relevant infrastructure planning and how these planning activities and measures are or have been considered in light of DRR. The planning process in each stage could become one of the important factors when DRR is adapted to the planning stage in each process such as data collection, analysis to planning, and programming.
- 3.16 Taking into account the efficient and effective use of both Checklist A and Checklist B, the sequential process by the automated sheets of excel for checking is adopted, producing an output-oriented compilation of the checklist in terms of the process of "checking work visualization of the result issues list based on the results action lists".

# **PHASE 2: IMPLEMENTATION OF DEMONSTRATION PROJECT**

# 4. OVERVIEW OF DEMONSTRATION PROJECT

- 4.1 The implementation of the demonstration project, which was included in the Phase 2 of the project, was agreed in the 7th PSC meeting in order to test the outputs of Phase 1 through the demonstration project and set the outputs in place in ASEAN. The PSC members noted that capacity development through the demonstration project as well as sharing knowledge and experiences through the ASEAN Urban Resilience Forum would meet the above objectives of AADMER Work Programme (2016-2020) Priority Programme 2 Build Safely.
- 4.2 The demonstration project aims at materializing the priority actions of the Sendai Framework for Disaster Risk Reduction and developing capacity for counterpart officials of the target cities on building urban resilience. Through implementing the demonstration project, dissemination to other ASEAN cities and ensuring sustainability of CN 18 products are also to be expected.
- 4.3 The outline of the demonstration project is as follows:

1) Expected Outputs

<u>Output 1:</u> The concerned organizations at the local level of the target cities understand the significance of disaster risk reduction and disaster risks through preliminary disaster risk assessment.

<u>Output 2:</u> The counterparts identify the issues to develop contingency plan and land use plan based on the results of the disaster risk assessment and implementing the checklists.

<u>Output 3:</u> The counterparts share the experiences and lessons learned from the demonstration project with other ASEAN cities.

2) Project Area

Two cities, Luang Prabang (Lao PDR) and Denpasar (Indonesia), out of the candidate cities in ASEAN identified in the CN 18 project.

3) Project Period

The demonstration projects were conducted from November 2017 to July 2018.

Luang Prabang, Lao PDR: November 10, 2017 to July 18, 2018

Denpasar, Indonesia: November 27, 2017 to July 18, 2018

4) Coordinating/Implementing Agency

<u>Regional Level</u>: Co-chairs of ACDM Working Group on Prevention and Mitigation (Lao PDR, Thailand), ASEAN Secretariat, AHA Centre

National Level and Local Level: National Disaster Management Organization of target AMSs and local government of target cities

5) Main Tasks

Task 1: Establishment of Implementation System for the Demonstration Project

Task 2: Data Collection and Review of Current Conditions

Task 3: Preliminary Disaster Risk Assessment

Task 4: Formulation of Action Plans

Task 5: National Workshop

Task 6: 3rd ASEAN Urban Resilience Forum

4.4 Through implementation of the demonstration project, the above three expected outputs were achieved. The following are the achievement by output:

# Achievement in Output 1:

- For both cities of Luang Prabang and Denpasar, the counterpart members understand the significance of disaster risk reduction (DRR) and disaster risks. They assessed the status of their capacity on building resilient cities by using the checklist for the ASEAN Urban Resilience. They understand not only the importance of DRR but also the involvements of other concerned stakeholders in DRR. Actually, they invited members from the other concerned organizations in the process of using the checklist.
- They also learned the process of the preliminary disaster risk assessment and how to see the results of the assessment. The analytic work of the assessment was a challenge for the members since GIS mapping skills and some analytic knowledge on hydrology and seismology were required to fully understand the procedure of the analysis.

# Achievement in Output 2:

• Through the checklists, the counterparts understand their strengths and weaknesses of the required works for building urban resilience. Weaknesses were identified as the issues. The issues were reflected to the action plans for developing contingency plan and land use plan.

# Achievement in Output 3:

- The counterparts shared the experience and lessons learned from the demonstration project with other cities in the National Workshop and the 3rd ASEAN Urban Resilience Forum. The participants of the workshops in both Lao PDR and Indonesia pointed out the importance of collaboration among the concerned agencies especially between the disaster management organization and planning organization and commitment by top level officials of the local government such as mayor or governor. Participants from other cities in Lao PDR and Indonesia would like to have chances to implement this kind of demonstration project for mainstreaming DRR into the land use plan.
- 4.5 Besides the achievements corresponding to the expected outputs, the JICA Project Team found the following additional points as the achievements of the demonstration projects.
  - Practice in line with Sendai Framework for Disaster Risk Reduction
  - Practices in line with AADMER Work Programme (2016-2020)
  - Willingness to Sustain Outputs
  - Impact to Other Cities

- Effectiveness of Tools
- Utilization of Local Resources
- Extracting Lessons for Other ASEAN Cities

# 5. DEMONSTRATION PROJECT IN LUANG PRABANG, LAO PDR

# **Activities**

- 5.1 <u>Establishment of Implementation System for the Demonstration Project:</u> Project Coordination Unit (PCU) was established at the national level to supervise, coordinate, and monitor the demonstration project. PCU consists of officials of the Ministry of Labor and Social Welfare and Ministry of Public Works and Transport. The Project Implementation Unit (PIU) was also established at the local level. PIU consists of officials from the Provincial Department of Labor and Social Welfare and Provincial Department of Public Works and Transportation.
- 5.2 <u>Data Collection and Review of Current Conditions:</u> PIU members with the JICA Project Team collected statistical data, hazard and climate-related data, spatial data and GIS data, and plans, programs, and relevant information. To grasp the status of capacity for building resilient cities, ASEAN Urban Resilience Checklist was used.
- 5.3 <u>Preliminary Disaster Risk Assessment:</u> Although PIU or relevant stakeholders in the province was programmed to conduct the preliminary disaster risk assessment and difficulties to implement the assessment on their own were encountered due to lack of basic skills of software manipulation. As a result, the JICA Project Team conducted the assessment and focused workshops in order to let them understand the flow of assessment and how to utilize the result of the assessment.
- 5.4 <u>Formulation of Action Plans:</u> PIU formulated two action plans, namely: 1) action plan for formulating disaster management plan, and 2) action plan for formulating urban land use and development plan. The action plans were formulated based on the result of using checklists, preliminary disaster risk assessment, and discussions among the concerned stakeholders through workshops.
- 5.5 <u>National Workshop:</u> The National Workshop was held on April 4, 2018 with 47 participants in total including 42 national and provincial government officers related to urban resilience in Lao PDR. The importance of coordination and cooperation between disaster risk management sector and urban planning sector in local government was recognized in the workshop as one of the important further issues in the formulated action plans.

# **Encountered Issues**

- 5.6 In the process of the demonstration project, PIC members and other concerned members encountered the following issues:
  - Difficulty in Determining Respondents to Checklist Items
  - Limitation of Self-assessment System in Checklist Assessment
  - Necessary Improvement of Technical Terms of Checklists
  - Appropriate Utilization and Operation of Checklists
  - Absence of Flood Specialized Staff in Province
  - Insufficient Technical Capacity for Disaster Risk Assessment

- Insufficient Capacity of Local Government for Planning
- Necessary Effective Coordination Mechanism with Relevant Sectors for Planning and Implementation
- Assurance of Effectiveness of Action Plan Implementation

# **Good Practices**

- 5.7 Good practices of the demonstration project are found in the following items:
  - Involvement of all relevant institutions from the early stage
  - Information sharing of examples in an advanced country
  - Effective utilization of checklist for enhancement of coping capacity of local governments
  - Rational approach in the planning process with checklist and preliminary disaster risk assessment

#### Lessons Learned for Other ASEAN Cities

- 5.8 <u>Key Considerations in Prioritizing Issues:</u> In prioritizing issues that are recognized by the checklist, there are regionally specific ways of prioritization, while there must be universal and general ways of prioritization also from the technical point of view. It would be an efficient way to organize such prioritization conditions to some extent at the national level and then to provide information to local governments for reference.
- 5.9 <u>Supportive Actions to be Executed by the National Government:</u> A local/provincial disaster management plan is to be prepared by the local government based on the Action Plan. On the other hand, the national government is expected to execute the following supportive actions:
  - Technical support such as preparation of standards, guidelines, manuals, and so forth not only for supporting local governments to formulate plans but also for ensuring a certain level of technical quality in planning among the provinces.
  - Financial support by preferentially allocating budgets to provinces that are willing to formulate local/provincial disaster management plan.
- 5.10 <u>Appropriate Localization of Checklist for Member of States of ASEAN:</u> The checklists formulated by the CN 18 project as common or standard version for ASEAN Member of States were revealed by necessary improvement of their contents through the implementation of checklists in the demonstration project. In this context, appropriate localization of checklists including arrangements of contents and wording of questions would be necessary when it is introduced, taking account of each country condition.
- 5.11 <u>Effective Enhancement of Coping Capacity through Checklists:</u> The checklists were recognized through the demonstration project as one of the effective tools to stimulate activities for building urban resilience under the priority actions of SFDRR such as the promotion of coordination and cooperative works, identification of weakness of coping capacity, and necessary actions. Taking account the promotion and enhancement of priority actions of SFDRR in ASEAN countries, utilization of checklist is expected to support the activities of SFDRR effectively.
- 5.12 <u>Dissemination of Method for Disaster Risk Assessment for Urban Resilience:</u> In the demonstration project, preliminary flood risk assessment utilizing partially open source data was implemented for the target area with the conditions of 50 and 100 years exceedance probability

of the Mekong River. However, relevant data for the flood probability analysis and exposure analysis were insufficient due to lack of historical data, number of points of river flow records, detailed topographic data and others, by which the level of analyses did not reach the flood management planning level. Taking account of this condition of Luang Prabang Province, many other small-medium cities or local governments in ASEAN are presumed to be in similar conditions. Therefore, issues to promote hazard risk assessment in those local governments could be described below.

- The effectiveness of preliminary disaster risk assessment in long-term urban structure analysis
- Establishment of a promotive mechanism for implementing risk assessment
- Importance of baseline data provision or development in flood management planning and land use planning
- 5.13 <u>Dissemination of Method for Disaster Risk Assessment for Urban Resilience:</u> Continuous supports and promotion of urban resilience activities for AMS should be undertaken by ASEAN through monitoring projects related to urban resilience, dissemination of the outputs of CN 18 products (e.g., guidebook, checklists) through websites and ASEAN Urban Planners Forum.

# 6. DEMONSTRATION PROJECT IN DENPASAR, INDONESIA

# **Activities**

- 6.1 Establishment of Implementation System for the Demonstration Project: Project Coordination Unit (PCU) was established at the national level to supervise, coordinate, and monitor the demonstration project. PCU consists of officials from the National Disaster Management Authority (BNPB), Ministry of Agrarian Affairs and Spatial Planning (ATR), and Center for Volcanology & Geological Hazard Mitigation (PVMBG). The Project Implementation Unit (PIU) was also established at the local level. PIU consists of officials from the Regional Disaster Management Agency (BPBD) of Denpasar City and Bali Province, and Development Planning Agency at the Sub-National Level (BAPPEDA) of Denpasar City, and Public Works and Human Settlements Department of Denpasar City and Bali Province.
- 6.2 <u>Data Collection and Review of Current Conditions:</u> PIU members with the JICA Project Team collected statistical data, hazard information, spatial data and GIS data, and plans, programs, and relevant information. To grasp the status of capacity for building resilient cities, ASEAN Urban Resilience Checklist was used.
- 6.3 <u>Preliminary Disaster Risk Assessment:</u> PIU with the JICA Project Team conducted preliminary disaster risk assessment composed of tsunami exposure analysis and tsunami evacuation analysis. The analysis found that Benoa Port sustaining logistics of Bali is located in tsunami prone area. Other findings such as distribution of schools, hospitals, and utility facilities were also confirmed in the assessment.
- 6.4 <u>Formulation of Action Plans:</u> PIU formulated the action plan to improve the existing action plan for building resilience. The action plan was formulated based on the result of using checklists, preliminary disaster risk assessment, and discussions among the concerned stakeholders through workshops.
- 6.5 <u>National Workshop:</u> The National Workshop was held on May 9, 2018 with 47 participants in total including national and provincial government officers related to urban resilience in Indonesia. BNPB stated that this National Workshop could be a trigger for the future formation of the Working Group forum of tsunami for communication of local governments prone to

tsunami in conveying their aspirations to the central government. Denpasar City government also confirmed that close cooperation between BPBD and BAPPEDA on disaster risk reduction and action plan formulation was achieved.

#### **Encountered Issues**

- 6.6 In the process of the demonstration project, PIC members and other concerned members encountered the following issues:
  - Discrepancies among different versions of tsunami risk maps issued by different organizations;
  - Absence of Tsunami Specialized Staff and insufficient technical capacity in Denpasar City and Bali Province;
  - Difficulty in determining respondents to checklist items;
  - Limitations of self-assessment system in the checklist assessment;
  - Building height limit;
  - Needed assurance of effectiveness in the implementation of the action plan; and
  - Complexity of role demarcation, reporting system, and little collaboration among related agencies.

# **Good Practices**

- 6.7 ATR has integrated the Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) into the national level policy and coordination, including spatial planning. This is reflected in some initiatives, such as the integration of tsunami hazard map into the land use map of Pacitan City in the south of Java, and the retrofitting of some public buildings to function as tsunami evacuation shelters in Padang City in West Sumatra.
- 6.8 BNPB's Resilient City (Kota Tangguh) initiative developed a 71-indicator measurement tool ("71 Indikator") that measures urban resilience of the city and district governments. The new tool has been being adopted under the urban resilience guideline (Pedoman Kota Tangguh) applied at the city and district levels by BNPB as the agency's new capacity index "scorecard system".
- 6.9 Besides the policy-making initiatives, there are other practical implementations such as mangrove planting by the Ministry of Environment in the southern part of Denpasar. Although the original purpose of this mangrove planting initiative was not for tsunami protection, it does indeed provide a "bio-shield" against tsunami for the southern part of Denpasar.
- 6.10 Denpasar City has established an online geo-portal which provides various data in various forms including geographic information system (GIS) (refer to http://geoportal.denpasarkota.go.id/), which is publicly accessible. The city also actively crowd source its citizens for public feedbacks and reporting of categorized urban issues through phone apps such as "Pro Denpasar" app (also available online at: https://pengaduan.denpasarkota.go.id/). Besides, an advanced one-stop data center named Damayana Center, which provides real-time data and monitoring as well as GIS data.
- 6.11 In addition, the city (BPBD Province agency) has taken the initiative to sign a memorandum of understanding (MOU) with a number of tall hotels near the coastal lines, for which they would agree to renovate their buildings and facilities by themselves to meet the city's 52 indicator requirements and receive a tsunami-safe certificate.

6.12 Local universities such as Udayana University and Universitas Hindu Indonesia offer GIS training courses for their students, thereby contributing to enrich local human resources for GIS-related matters. Especially, BNPB has collaborated with Udayana University for staff capacity building in GIS applications.

# Lessons Learned for Other ASEAN Cities

- 6.13 <u>Project implementation to support SFDRR</u>: The demonstration project showcases the essential and emerging approach to mainstreaming DRR into urban planning and development plans as a regular management and planning process, and as an integral part of local government functions, operations, and services as shown in the Sendai Framework for Disaster Risk Reduction 2015-2030. Urban planning can play a key role in disaster prevention as it helps guide and govern mid-term and long-term plans towards sustainability.
- 6.14 <u>Utilization of GIS in ASEAN:</u> GIS software is a powerful tool to bridge disaster risk and urban planning. In the case of Denpasar for example, the JICA Project Team provided GIS training for local government officers such as BAPPEDA, BNPB, BPBD, PU, etc., (at both the city and provincial levels). When the demonstration project finishes, it is expected that some trained staff will be able to continue their engagement and take collective efforts in DRR management on their own towards sustainability. In addition, GIS training is also expected to be conducted in other ASEAN Member States.
- 6.15 <u>Collaboration between the local government and national government:</u> A local/provincial disaster management plan is to be prepared by the local government based on the action plan. On the other hand, the national government is expected to execute the following supportive actions:
  - Technical support such as preparation of standards, guidelines, manuals, and so forth not only for supporting local governments to formulate plans but also for ensuring a certain level of technical quality in planning among provinces.
  - Financial support by preferentially allocating budgets to provinces that are willing to formulate local/provincial disaster management plan.
- 6.16 <u>Establishment of National Network/Forum:</u> At the national level, it is useful to establish and leverage on a national network or forum of different municipalities who share a common disaster risk for information exchange, experience sharing, capacity building as well as possible collective efforts.
- 6.17 <u>Localization of Checklist:</u> It is suggested to appropriately localize the checklists for other ASEAN Member States. The checklists were originally formulated by the CN 18 project as a common or standard version for ASEAN Member States. However, the implementation of the checklists through the demonstration project has revealed that an improvement of their contents is needed.

# 7. REGIONAL WORKSHOP

- 7.1 The 3<sup>rd</sup> ASEAN Urban Resilience Forum took place on 17-18 July 2018 in Luang Prabang, Lao PDR. Seven ASEAN Member States (AMS) representing Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Thailand, and Viet Nam, one representative each from ASEC and AHA Centre, Senior Advisor from JICA, nine representatives from Luang Prabang and five members from the JICA Project Team attended the forum.
- 7.2 The core objectives of the forum were:
  - Sharing of Experience and Lessons Learnt obtained from the Demonstration Project;
  - Utilization of Guidebook for Building Resilient Cities and ASEAN Urban Resilience Check List;
  - Sharing the experience and lesson learned from AMS.
- 7.3 On the first day, experiences of Denpasar and Luang Prabang on brief of demonstration project in each city were presented. Both cities focused on the action plan for formulating disaster risk mitigation and urban planning as the result of the demonstration project. The project produced a set of action plans for consideration for the both cities in the masterplan for the city development. This session showed how different cities approach similar aspects of adaptation.
- 7.4 On the second day, group works on challenges and gaps for dissemination of guidebook and checklist were conducted. Each group worked on one particular objective. The main questions that needed to be addressed in these group works included evaluation of current situation on Disaster Risk Assessment (DRA) and issues and solution on DRA. The final agenda of the forum was exploring the future actions for building resilient cities in ASEAN through a panel discussion which involved one panelist from each AMS, ASEC and AHA Centre representative. The main objective of the panel discussion was for dialogue and engagement of each representative to utilize the CN18 output.
- 7.5 There are three main topics in the panel discussion: 1) Who should do what for dissemination of Checklists in ASEAN?, 2) Who should do what for local governments to conduct Disaster Risk Assessment?, and 3) Who should do what for involving the important stakeholders such as urban planners and local government? Main points of discussion are summarized in the following table.

	Topics	Main Points of Discussion		
1	Who should do what for dissemination of Checklists in ASEAN?	The checklist was designed as a tool for the local government to aware of their weakness and make regulation based on the area situation. The panelists agreed that National and Local Governments are responsible to disseminate the checklist.		
2	Who should do what for local governments to conduct Disaster Risk Assessment?	Conducting disaster risk assessment requires analysis skills with GIS software and technical knowledges on hazards. Nowadays, most of National Government in AMS has capacity on that skills. Transfer knowledge such as training of trainers is needed to support Local Government on conducting disaster risk assessment.		
3	Who should do what for involving the important stakeholders such as urban planners and local government?	Campaign is important to improve awareness of disaster risk assessment at every level. In addition, certified urban planner and NGO who has a strong influence in planning and development aspect, can collaborate with relevant stakeholders and build awareness on importance of urban resilience.		

**Topics and Main Points of Panel Discussion** 

Source: JICA Project Team

# CONCLUSION

# 8. CONCLUSION AND RECOMMENDATION

# I. CONCLUSION

- 8.1 The Project on Building Disaster and Climate Resilient Cities in ASEAN has been implemented from November 2015 to July 2018 with the assistance from the Japan International Cooperation Agency (JICA). Both the Project Steering Committee (PSC) members and the JICA Project Team (JPT) have worked together to attain the three outputs of the project.
- 8.2 During the project period, ten PSC meetings from the 2nd PSC to 11th PSC were held to share the progress and issues of the project and to confirm the next steps for the outputs. Events including 1st and 3rd ASEAN Urban Resilience Forum (AURF), the 1st to 4th Workshops for Urban Resilience were also held to exchange ideas for urban resilience as well as for project outputs such as the future image of AURF, the draft Terms of Reference (TOR) of the demonstration project and implementation of the demonstration project, guidebook, and checklists for urban resilience.

# Output 1:

- 8.3 Establishment of ASEAN Urban Resilience Forum: The regional framework called "ASEAN Urban Resilience Forum (AURF)" was established and the forum was organized three times in July 2016, May 2017, and July 2018. The first two forums were held mainly for sharing knowledge and experience among the participants and sharing ideas for developing plans for future AURF and producing guidebook and checklists. The 3rd AURF was discussed on how to utilize CN 18 outputs after this project is completed.
- 8.4 **Development of Communication Tools:** Both PSC members and the JICA Project Team have worked to develop communication tools to increase urban resilience in the ASEAN. The communication tools include website, Facebook page, mailing list, and newsletters.
- 8.5 **Planning for Future AURF:** To strengthen the functions of the established AURF and ensure the sustainability, the JICA Project Team worked together with PSC members to develop action plan for future AURF, draft rule of the forum, draft concept note for the AURF, and the draft TOR for the forum secretariat. In the 9th ASEAN Committee on Disaster Management (ACDM) Working Group (WG) meeting on Prevention and Mitigation (P&M), the WG members concluded that the WG would take over the action plan, the rule, the concept note, etc. drafted by the JICA Project Team and finalize them on their own.

# Output 2:

- 8.6 **Listing Urban Cities in the ASEAN and Gathering Information:** the JICA Project Team worked together with the national project coordinator of each ASEAN Member States (AMS) to select 817 long list cities, 56 middle list cities, 16 short list cities, and eight candidate cities through step-wise screening based on preliminary disaster risk assessment and discussion with each AMS.
- 8.7 **Development of the Draft TOR of the Demonstration Project:** the JICA Project Team developed the draft TOR of the demonstration project through discussions with PSC members and attendants of the forums and workshops. The demonstration project of both types aims at contributing four priority actions of Sendai Framework for Disaster Risk Reduction. Conducting disaster risk assessment and reflecting the assessment results for improving contingency plan, urban plan, and development plan, is to be emphasized in the demonstration project.

8.8 **Implementation of Demonstration Projects:** The demonstration project with JICA support was implemented in Luang Prabang, Lao PDR, and Denpasar, Indonesia. The local governments of the two cities developed action plans for improving disaster risk reduction plan and land use plan by using checklists and referring to the results of the preliminary disaster risk assessment. Issues in using the checklists and conducting the preliminary disaster risk assessment, good practices for building urban resilience and lessons learned from other ASEAN cities were extracted from the demonstration project.

Output 3:

- 8.9 **Development of "Guidebook for Urban Resilience"**: Through discussions with PSC members and attendants of the forums and workshops, the JICA Project Team developed about 100-page "Guidebook for Urban Resilience" The objectives of this guidebook are for government officials in-charge of DRR and urban planning and management at both the national and local level to achieve the following: i) to understand disaster risk, ii) to understand how to address issues and weak points for disaster reduction, iii) to mainstream disaster risk reduction in urban planning and development plan, and iv) to learn good practices and lessons learned from other city cases.
- 8.10 **Development of "ASEAN Urban Resilience Checklist":** As a part of the above guidebook, the JICA Project Team developed the "ASEAN Urban Resilience Checklist" through workshops in Indonesia, Lao PDR, and Thailand and regional workshops. The objectives of the checklist for local government are: 1) to understand the current status of disaster risk reduction and urban planning and clarify weaknesses through the checklist; 2) to identify necessary activities on disaster risk reduction and urban planning for urban resilience; and 3) to utilize the checklist is to understand the situation of local governments and examine necessary supports on disaster risk reduction and urban planning. There are two types of checklists: A) Checklist for Disaster Risk Management and B) Checklist for Resilient Urban Development.

# **II. RECOMMENDATION**

- 8.11 **Continuation of ASEAN Urban (Disaster) Resilience Forum:** The co-chairs and ASEC as the forum secretariat are requested to continue making an effort to hold ASEAN Urban (Disaster) Resilience Forum on their own after the assistance from JICA is completed. The co-chairs would play a role to plan, operate, monitor, and evaluate the forum, as well as to raise funds. ASEC would schedule the forum and coordinate with other AMS. The products such as the website, Facebook, and mailing list shall be utilized and promoted to involve the concerned stakeholders.
- 8.12 **Finalization of Concept Note, Terms, and Action Plan for Future Forum:** The co-chairs with other members of ACDM WG on P&M shall re-examine and finalize the concept, terms, action plan, drafted by the JICA Project Team, to make a distinction between the current similar forums in the region and the forum to be re-examined.
- 8.13 Utilization of Products developed in the Project: Both the co-chairs and ASEC shall continue related activities for building urban resilience by efficiently utilizing the website, Facebook, mailing list, database, guidebook and checklist, which were developed in this project. The website, Facebook, and mailing list can be used for enhancing communication with the concerned stakeholders and promoting their participation to the activities. AHA Centre shall utilize the database to disseminate city-level data and information. Both the co-chairs and ASEC shall distribute the guidebook including checklist to the concerned stakeholders of each AMS and monitor and evaluate the usage of the guidebook and checklist by each AMS.

- 8.14 **Dissemination of Experience of Demonstration Project:** Two demonstration projects in each city in Lao PDR (Luang Prabang) and Indonesia (Denpasar) have captured the lessons learned from their implementation. The followings are the further necessary actions to be taken in consideration with the lessons learned from the demonstration projects:
  - <u>Checklist:</u> Appropriate localization of the checklists including arrangements of contents, wording of questions, and institutional legitimacy by the government would be necessary when these are introduced into AMS, taking account of each country's local conditions.
  - <u>Disaster Risk Assessment:</u> It was still a big challenge for the local government to utilize data and manipulate the software due to insufficient skill and opportunity including budgets. As small-medium cities or local governments in ASEAN countries may face similar issues, an effective mechanism for the dissemination of this technical tool, even if open source data is available, must be established by such as cooperation with the national institution, utilization of private consulting firms or universities, and national funding supports.
  - <u>Primary Data Collection</u>: The appropriate planning process for a disaster risk management plan and an urban land use and development plan shall rely on sufficient primary data through scientific analyses. Therefore, baseline survey and database are required to monitor quantitative changes in statistical data such as hydrological data, socio-economic statistics, and urban assets information.
  - <u>Promotion of Urban Resilience Activities:</u> Continuous and active supports and promotion of urban resilience activities in the AMS shall be taken by the ASEAN through monitoring projects relating to urban resilience and dissemination of the outputs of the CN 18 project (e.g., guidebook, checklists) through the websites and the ASEAN Urban Disaster Resilience Forum.
- 8.15 Awareness Raising for Promoting Disaster Risk Reduction: All AMS shall raise awareness in promoting disaster risk reduction based on the Sendai Framework for Disaster Risk Reduction. Efforts for disaster risk reduction shall be shared and discussed in the ASEAN Urban Resilience Forum, as well as the implementation of the demonstration project and utilization of the products developed in the project.
- 8.16 **Coordination with Urban Planning Sector:** National disaster management organizations in each AMS shall coordinate with other stakeholders such as urban planning, health, education, public works, etc. This coordination is necessary at both the national level and local level for mainstreaming of disaster risk reduction into other sector development. Disaster management organizations at the national level and local level shall provide inputs on disaster risk information and data to other concerned organizations who draw up their sector plans.

# Building Disaster and Climate Resilient Cities in ASEAN

# **Final Report**

LOCATION MAP EXECUTIVE SUMMARY TABLE OF CONTENTS LIST OF TABLES LIST OF FIGURES ABBREVIATIONS

# TABLE OF CONTENTS

		Page
INTR	ODUCTION	I-1
I.1	Background	I-1
I.2	Outline of the Project	I-2
I.3	Project Steering Committee Discussions	I-5
I.4	Achievement in the Project	I-8
I.5	Composition of Final Report	I-11

# PHASE 1: DEVELOPMENT OF IMPLEMENTATION FRAMEWORK

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

	FORMATION OF PARTNERHIPS	1-1
1.1 Ov	verview of Output 1	1-1
1.1.1	Objective of Output 1	1-1
1.1.2	Scope of Works for Output 1	1-1
1.2 Es	tablishment of ASEAN Urban Resilience Forum and Holding Workshop	1-2
1.2.1	Establishment of ASEAN Urban Resilience Forum	1-2
1.2.2	Holding ASEAN Urban Resilience Forum meeting	1-2
1.2.3	Development Action plan for ASEAN Urban Resilience Forum	1-5
1.2.4	Holding Workshops	1-9
1.3 Fa	cilitation for Enhancing Networking among Stakeholders	1-17
1.3.1	Development of Terms of Forum Membership	1-17
1.3.2	Developing Mailing List	1-18
1.3.3	Development of Website	1-22
1.3.4	Establishment of Management Board and Networking after the Project	1-24
1.3.5	Promotion for Active Networking among Persons involved in Forum	1-25
1.4 Iss	sues and Way Forward on Output 1	1-26
СНАРТЕ	R 2: [OUTPUT 2] EVALUATION OF CANDIDATE CITIES AND PARTNERSHIP AND COMMITMENT BUILDING FOR DEMONSTRATION PROJECT	D R 2-1
2.1 Ov	verview of Output 2	2-1
2.2 Ap	oproaches for Evaluation of Candidate Cities for Demonstration Project	2-2
2.2.1	Evaluation Methodology of Candidate Cities	2-2
2.2.2	Overall Evaluation Process and Criteria of Candidate Cities for Demonstration	
	Project	2-3
2.2.3	Natural Hazard Conditions in ASEAN	2-6
2.3 Fi	rst Preliminary Risk Assessment for Milddle List Cities	2-12

2.3.1	Basic Status of Long List Cities (817 cities)	2-12
2.3.2	Assessment of Long List Cities for Middle List Cities	2-15
2.4 Se	cond Priminary Risk Assessment for Short List Cities	2-23
2.4.1	Methodology of 2 <sup>nd</sup> Preliminary Risk Assessment for the Short List Cities	2-23
2.4.2	Vulnerability Assessment of Middle List Cities	2-24
2.4.3	Capacity Assessment at the Middle List Cities	
2.4.4	Shortlisted Cities and Candidate Cities for the Demonstration Project	2-34
2.5 De	evelopment of Database	2-44
2.6 De	evelopment of Draft TOR for the Demonstration Project	2-48
2.6.1	Demonstration Project as the Framework for the Draft TOR Development	2-48
2.6.2	Objectives of the Demonstration Project	2-49
2.6.3	Framework and Approaches for Formulating the Demonstration Project	2-49
2.6.4	First Workshop for the Demonstration Project Formulation in Combinati	on
	with Risk Assessment Workshop	
2.6.5	Proposed Framework for the Draft TOR	
2.7 Iss	sues and Way Forward on Output 2	2-56

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

	RESILIENT CITIES IN ASEAN	3-1
3.1 O	verview of Output 3	3-1
3.2 St	udy on Related Activities in ASEAN Countries (such as Resilient Cities	
С	ampaign by UNISDR)	3-2
3.2.1	Resilient Cities Campaign (UNISDR)	3-2
3.2.2	100 Resilient Cities (Rockefeller Foundation)	3-4
3.2.3	Resilient Cities Series (International Council for Local Environmental	
	Initiatives: ICLEI)	3-5
3.2.4	City Resilience Profiling Program (UN-Habitat)	3-6
3.2.5	Associated Program on Flood Management (WMO)	3-7
3.2.6	Asia Pacific Adaption Network: APAN	3-7
3.2.7	Effects of Related Activities	3-8
3.2.8	Output Image	3-10
3.3 D	ata Collection on Good Practices in Projects for Enhancing Resilience of Urban	
С	ities, and Lessons Learned from Past Natural Disasters	3-10
3.3.1	Data Collection on Damages Caused by Natural Disasters in Urban Cities	3-10
3.3.2	Data Collection on Good Practices and Lessons Learned	3-13
3.4 G	uidebook for Building Resilient Cities	3-26
3.4.1	Development Concept of the Guidebook	3-26
3.4.2	Workshops	3-28
3.4.3	Main Points of Guidebook	3-36
3.4.4	Development of Guidebook	3-37
3.4.4	Risk Assessment for Building Resilient Cities	3-39
3.4.5	Checklist for Building Disaster Risk Resilient Cities	3-45
3.5 Is	sues and Way Forward on Output 3	3-56

# **PHASE 2: IMPLEMENTATION OF DEMONSTRATION PROJECT**

CHAP	TER 4: OVERVIEW OF DEMONSTRATION PROJECT	4-1
4.1	Background	4-1
4.2	Outline of Demonstration Project	4-2
4.3	Achievement of Demonstration Project	4-3
	5	

# CHAPTER 5: DEMONSTRATION PROJECT IN LUANG PRABANG,

	LAO PDR	
5.1	Activities	
5.2	Encountered Issues and Solutions	
5.3	Good Practices	
5.4	Lessons Learnt for other ASEAN Cities	
СНАР	TER 6: DEMONSTRATION PROJECT IN DENPA	SAR, INDONESIA 6-1
6.1	Activities	
6.2	Encountered Issues and Solutions	
6.3	Good Practices	
6.4	Lessons Learnt for other ASEAN Cities	
СНАР	TER 7: REGIONAL WORKSHOP (The 3 <sup>rd</sup> ASEA	N Urban Resilience

#### 

7.1	Overview of the 3 <sup>rd</sup> ASEAN Urban Resilience Forum	/-1
7.2	Discussions in the 3 <sup>rd</sup> ASEAN Urban Resilience Forum	7-2
7.3	Outcome of the 3 <sup>rd</sup> ASEAN Urban Resilience Forum	7-9
7.3.	.1 Achievement of the 3rd ASEAN Urban Resilience Forum	7-9
7.3	2 Lessons Learned for Future Forum	7-11

# CONCLUSION

CHAP	TER 8:	CONCLUSION AND RECOMMENDATION	
8.1	Conclusi	on	
8.2	Recomm	endation	

# APPENDIX

# OVERALL: PHASE 1 & 2

APPENDIX 1 MINUTES OF MEETING FOR 1<sup>st</sup> to 11<sup>th</sup> PROJECT STEERING COMMITTEE MEETINGS

# PHASE 1: DEVELOPMENT OF IMPLEMENTATION FRAMEWORK

# (Output 1)

APPENDIX 2 FORUM NETWORKING

# (Output 2)

- APPENDIX 3 SELECTION OF CANDIDATE CITIES FOR DEMONSTRATION PROJECT
- APPENDIX 4 DRAFT TERMS OF REFERENCE FOR DEMONSTRATION PROJECT

# (Output3)

- APPENDIX 5 INPUT INFORMATION FOR DEVELOPING TOOLS ON BUILING RESILIENT CITIES
- APPENDIX 6 TOOLS ON BUILING RESILIENT CITIES

# **PHASE 2: IMPLEMENTATION OF DEMONSTRATION PROJECT**

APPENDIX 7 PRODUCTS OF DEMONSTRATION PROJECT

# LIST OF TABLES

Table I.2.1	Roles of the Relevant Bodies in the Project	I-3
Table I.3.1	Record of Project Steering Committee Meeting	I-5
Table I.4.1	Main Activities of the Project (Phase 1)	I-8
Table I.4.2	Main Activities of the Project (Phase 2)	I-9
Table 1.2.1	Main Agenda of Forum Meeting	1-2
Table 1.2.2	Outline of Action Plan (draft)	1-6
Table 1.2.3	Summary of the Draft Concept Note	1-7
Table 1.2.4	Summary of draft TOR for Secretariat of the ASEAN Urban Resilience Forum	1-8
Table 1.2.5	Schedule and Agendas of Implemented Workshops	1-9
Table 1.3.1	Draft Terms of Forum Membership	1-17
Table 1.3.2	List of NPCs	1-18
Table 1.3.3	Mailing List of AURF	1-19
Table 1.3.4	Outline of the Website	1-23
Table 1.3.5	Formation of Management Board	1-24
Table 1.3.6	Topics of Newsletters	1-25
Table 2.2.1	Adopted Administrative Status of the City in AMS for the Project	2-3
Table 2.2.2	Overall Steps for the Assessment and Evaluation Process for the Selection of Candidates for the Demonstration Project	2-5
Table 2.2.3	Applicable Criteria in Each Step for Preliminary Risk Assessments (PRAs)	2-6
Table 2.2.4	Earthquakes with 1,000 or More Deaths in the ASEAN Region (since 1900)	2-7
Table 2.3.1	Character of Long Listed Cities in AMS	2-12
Table 2.3.2	Measurement Indicators and Scoring Grade for Key Infrastructure and Agglomerate Industrial Area	2-16
Table 2.3.3	Hazard Index for 1st Preliminary Risk Assessment	2-16
Table 2.3.4	Type and Cause of Floods	2-17
Table 2.3.5	Flood and Water Hazard Assessment by GDPR Data	2-17
Table 2.3.6	Criteria for Assessment Scoring of Cities in AMS	2-18
Table 2.3.7	Summary of Middle List Cities by the 1st Preliminary Risk Assessment	2-19
Table 2.3.8	Cambodia Middle List Cities from the 1st Preliminary Risk Assessment	2-20
Table 2.3.9	Indonesia Middle List Cities from the 1st Preliminary Risk Assessment	2-21
Table 2.3.10	Lao PDR Middle List Cities from the 1st Preliminary Risk Assessment	2-21
Table 2.3.11	Malaysia Middle List Cities from the 1st Preliminary Risk Assessment	2-21
Table 2.3.12	Myanmar Middle List Cities from the 1st Preliminary Risk Assessment	2-22
Table 2.3.13	Philippines Middle List Cities from the 1st Preliminary Risk Assessment	2-22
Table 2.3.14	Thailand Middle List Cities from the 1st Preliminary Risk Assessment	2-23
Table 2.3.15	Viet Nam Middle List Cities from the 1st Preliminary Risk Assessment	2-23
Table 2.4.1	Indicator of Each Type of Natural Hazard for 2nd PRA	2-25
Table 2.4.2	Weighing Coefficient of Earthquake and Cyclone/Wind	2-26

Table 2.4.3	Points for Evaluating Agglomerate Industrial Areas and Regional Infrastructure
Table 2.4.4	Result of Vulnerability Assessment of Exposures against Earthquake and Tsunami
Table 2.4.5	Result of Vulnerability Assessment of Exposure against Flood, Cyclone/Wind, and Cyclone/Surge2-29
Table 2.4.6	Contents and Number of Questionnaire Items for Middle List Cities
Table 2.4.7	Categorized Questionnaire Items (extract)
Table 2.4.8	Total Number of Questionnaire Items for the Capacity Assessment
Table 2.4.9	Example of Calculating Capacity Point and Lack of Capacity Point
Table 2.4.10	Calculation Result of Capacity and Lack of Capacity Point
Table 2.4.11	Number of Cities in Short List
Table 2.4.12	Shortlisted Cities and Candidate Cities
Table 2.4.13	Main Indicator in Cambodia 2-36
Table 2.4.14	Main Indicator based on Flood in Indonesia
Table 2.4.15	Main Indicator based on Earthquake in Indonesia  2-37
Table 2.4.16	Main Indicator based on Tsunami in Indonesia
Table 2.4.17	Main Indicator in Lao PDR
Table 2.4.18	Main Indicator based on Flood in Malaysia
Table 2.4.19	Main Indicator based on Earthquake in Malaysia  2-38
Table 2.4.20	Main Indicator based on Flood in Myanmar
Table 2.4.21	Main Indicator based on Earthquake in Myanmar
Table 2.4.22	Main Indicator based on Tsunami in Myanmar
Table 2.4.23	Main Indicator based on Cyclone/Surge in Myanmar
Table 2.4.24	Main Indicator based on Cyclone/Wind in Myanmar
Table 2.4.25	Main Indicator based on Flood in the Philippines
Table 2.4.26	Main Indicator based on Earthquake in the Philippines
Table 2.4.27	Main Indicator based on Cyclones/Surge in the Philippines
Table 2.4.28	Main Indicator in Thailand
Table 2.4.29	Main Indicator based on Tsunami in Viet Nam
Table 2.4.30	Main Indicator based on Flood in Viet Nam
Table 2.4.31	Main Indicator based on Cyclones/Typhoon Surge (Wind) in Viet Nam 2-43
Table 2.4.32	Main Indicator based on Cyclones/Typhoon Surge (Surge) in Viet Nam 2-43
Table 2.5.1	Process for Developing GIS Database
Table 2.5.2	Outline of Collected Administrative Boundary GIS Data
Table 2.6.1	Target Cities for Demonstration Project in AMS 2-51
Table 2.6.2	1st Workshop for the Demonstration Project in Combination with Risk Assessment
Table 2.6.3	Proposal for Executing Agencies of the Project
Table 3.2.1	Fundamental Information of RCC 3-2
Table 3.2.2	Fundamental Information of 100 RC 3-4
Table 3.2.3	Fundamental Information of RCS (ICLEI) 3-5
Table 3.2.4	City Resilience Profiling Program (UN-Habitat)
Table 3.2.5	Associated Program on Flood Management (WMO)

Table 3.2.6	Asia Pacific Adaption Network: APAN
Table 3.3.1	Summary of Collected Information on Natural Disasters in AMS
Table 3.3.2	Categorizing Good Practice and Lessons earned with the Sendai Framework
Table 3.3.3	Risk Assessment
Table 3.3.4	Disaster Risk Assessment
Table 3.3.5	Early Warning System-1
Table 3.3.6	Early Warning System-2
Table 3.3.7	Early Warning System-3
Table 3.3.8	Urban Planning (Land Use)
Table 3.3.9	Government Plan
Table 3.3.10	Master Plan
Table 3.3.11	Urban Planning
Table 3.3.12	Building Code
Table 3.3.13	Sustainable Development
Table 3.3.14	National Disaster Memorial Park
Table 3.3.15	Bhada City Redevelopment Plan
Table 3.3.16	Relocation Plan (Urban Plan)
Table 3.3.17	Regulation and Rule
Table 3.3.18	Evacuation Drill
Table 3.4.1	Contents of Guidebook
Table 3.4.2	1st Workshop for Risk Assessment (including the Demonstration Project)
Table 3.4.3	Workshop for Trial Implementation of Draft Checklist
Table 3.4.4	2nd Workshop for Urban Resilience in ASEAN
Table 3.4.5	3rd /4th Workshop for Proposed Checklist and Guidebook Formulation
Table 3.4.6	Outline of the Guidebook
Table 3.4.7	Role of Fragility Curve and Loss Exceedance Curve
Table 3.4.8	Data on Disaster Scale and Damage
Table 3.4.9	Draft Fragility Function in ASEAN
Table 3.4.10	Example of Measures Related to Fragility Curve
Table 3.4.11	Contents of Checklist A for Disaster Risk Management
Table 3.4.12	Contents of Checklist B for Resilient Urban Development
Table 3.4.13	Typical Scoring Criteria by Level of Activity Type and Grade for Questions of Checklists A and B
Table 5.1.1	Project Coordination Unit (PCU) and Members for the Demonstration Project in Luang Prabang
Table 5.1.2	Project Implementation Unit (PIU) and Members for the Demonstration Project in Luang Prabang
Table 5.1.3	Key Data Information from Open Source and Semi-open Source Data Collection for Hazard Assessment
Table 5.1.4	Plans, Programs, and Relevant Information for the Demonstration Project
Table 5.1.5	Major Contents of DMP Action Plan for Luang Prabang
Table 5.1.6	Major Topics of National Workshop in Lao PDR

Table 6.1.1	Project Coordination Unit (PCU) and Members for the Demonstration Project in Denpasar	6-1
Table 6.1.2	Project Implementation Unit (PIU) and Members for the Demonstration Project in Denpasar	6-2
Table 6.1.3	Key Data Information for Tsunami Hazard Assessment	6-3
Table 6.1.4	Collected GIS Data for Preliminary Tsunami Risk Assessment	6-3
Table 6.1.5	Plans, Programs, and Relevant Information for the Demonstration Project	6-4
Table 6.1.6	Action List regarding Tsunami on RPB	6-6
Table 6.1.7	Review of the RTRW Kota Denpasar 2011-2031	6-8
Table 6.1.8	Review of Building Code in Denpasar City (Perda Denpasar 05-2015)	6-11
Table 6.1.9	Number of Buildings and Infrastructure in Tsunami Prone Areas	6-19
Table 6.1.10	Important Facilities Located at the Tsunami Prone Area	6-22
Table 6.1.11	Opinions and Suggestions Obtained from Kota Denpasar during the Action Plan Workshop	6-27
Table 6.1.12	Priority Actions for Tsunami Resilience in Kota Denpasar	6-32
Table 6.1.13	Major Topics of the National Workshop in Indonesia	6-36
Table 7.1.1	The 3rd AURF Agenda	7-1
Table 7.1.2	Members for the Presentation of the Demonstration Project in Denpasar	7-3
Table 7.1.3	Members for the Presentation of the Demonstration Project in Luang Prabang	7-4
Table 7.1.4	Activities Program and Results of Group Work by AMS in the Forum	7-6
Table 7.1.5	Key Questions and Main Opinions on the Group Work	7-7

# LIST OF FIGURES

Figure I.2.1	Management Structure of the Project	I-3
Figure I.5.1	Composition of the Report	I-11
Figure 1.2.1	Photos of Workshops	1-11
Figure 1.2.2	Q1-1 Your Overall Impression on "Checklists both of A & B"	1-12
Figure 1.2.3	Q1-2 Your Assessment on "Checklist A: Disaster Risk Management"	1-12
Figure 1.2.4	Q1-3 Your Assessment on "Checklist B: Resilient Urban Development"	1-12
Figure 1.2.5	Q2 Your Opinions to Improve Proposed Checklists	1-13
Figure 1.2.6	Q3-1 Purpose of Checklist	1-13
Figure 1.2.7	Q3-2 Respondent of Checklist	1-14
Figure 1.2.8	Q3-3 Frequency of Checklist	1-14
Figure 1.2.9	Q4-1 Contents of Guidebook	1-15
Figure 1.2.10	Q4-2 Your Expectation on Proposed Table of Contents	1-15
Figure 1.2.11	Q4-3 Your Expectation or Opinion on Good Practices by the Proposed Guidebook	1-16
Figure 1.3.1	Image of Developed Website	1-23
Figure 1.3.2	Top Page of the Facebook Page	1-24
Figure 2.2.1	Past significant seismic activities in ASEAN region	2-8
Figure 2.2.2	Earthquake hazard map of ASEAN	2-8
Figure 2.2.3	Past significant tsunami events in ASEAN region	2-9
Figure 2.2.4	Outline of Flood Disaster for 30 years	2-10
Figure 2.2.5	Outline of Storm Disaster for 30 years	2-11
Figure 2.3.1	Distribution of Long Listed Cities (817 cities) in AMS	2-12
Figure 2.3.2	Geographical Distribution of Long Listed Cities (817 cities) in AMS	2-13
Figure 2.3.3	Major Seaports and Airports in AMS	2-14
Figure 2.3.4	Agglomerate Industrial Areas in AMS	2-14
Figure 2.3.5	Distribution of Middle Listed Cities by Natural Hazard Type in AMS	2-20
Figure 2.4.1	Formula of 2nd Preliminary Risk Assessment for Short List Cities	2-24
Figure 2.4.2	Conversion from Exposure Point Data to Mesh Data	2-25
Figure 2.4.3	Image of Estimating Exposure Values	2-26
Figure 2.4.4	Frequency Distribution of Capacity Point	2-34
Figure 2.4.5	Correlation between "Prevention & Mitigation" and "Preparedness"	2-34
Figure 2.5.1	Structure of GIS Database	2-46
Figure 2.5.2	1 <sup>st</sup> Preliminary Risk Assessment of Flood	2-47
Figure 2.5.3	2 <sup>nd</sup> Preliminary Risk Assessment of Flood around Luang Prabang City in Lao PDR	2-47
Figure 2.5.4	1 Square Kilometers Mesh Population Distribution Map in Thailand	2-48
Figure 3.2.1	Structure of Resilient Cities Campaign and City Resilience Profiling Program	3-9
Figure 3.2.2	Structure of Associated Programs on Flood	3-9
Figure 3.4.1	Conceptual Diagram of How to Utilize the Guidebook	3-28

Figure 3.4.2	Photographs of 1st Workshop for Risk Assessment
Figure 3.4.3	Photographs of the Workshops for Trial Implementation of the Draft Checklist
Figure 3.4.4	Photographs of the 2nd Workshop for Urban Resilience in ASEAN
Figure 3.4.5	Photographs of 3rd /4th Workshop for Proposed Checklist and Guidebook Formulation
Figure 3.4.6	Cover Page of the Designed Guidebook
Figure 3.4.7	Planning Flow of Building Resilient Cities in Japan
Figure 3.4.8	Flow of Risk Assessment of Earthquake and Tsunami
Figure 3.4.9	Procedure for Measure Planning for Resilience by Fragility Curve and Loss Exceedance Curve
Figure 3.4.10	Example of Fragility Curve (Left) and Loss Exceedance Curve (Right)
Figure 3.4.11	Study Flow of Fragility Curve
Figure 3.4.12	Examples of Fragility Curve
Figure 3.4.13	Four Priority Actions as a Framework for the Proposed Checklist
Figure 3.4.14	Cross-interaction for Effective Planning and Implementation Process for the Two Checklists
Figure 3.4.15	Checklist as a Monitoring and Consolidation Tool in the PDCA Cycle for DRR and Urban Resilience Activities
Figure 3.4.16	Checking Activities as a Part of PDCA Cycle
Figure 3.4.17	Elements of STEP 2 and STEP 3 in the Proposed Checklists
Figure 3.4.18	Elements of STEP 4 and STEP 5 in the Proposed Checklists
Figure 5.1.1	Response Scores by Group (SFDRR Priority Actions) and Respondent Organization Distribution of the Result of Checklist (A)
Figure 5.1.2	Response Scores by Group (SFDRR Priority Actions) and Respondent Organization Distribution of the Result of Checklist (B)
Figure 5.1.3	Flood Probability Analysis in Case of 50 years $(24,400 \text{ m}^3/\text{s})$ and 100 years $(26,400 \text{ m}^3/\text{s})$ Flood Exceedance Probabilities
Figure 5.1.4	Image of Sequential Steps for Activity 4-1
Figure 5.1.5	Image of Formulating Programs in DMP Action Plan for Luang Prabang
Figure 5.1.6	Planning Process to Formulate the Action Plans
Figure 6.1.1	Tsunami Evacuation Map at Sanur Area
Figure 6.1.2	Relationship between the Two Checklists
Figure 6.1.3	Responded Scores by Group (SFDRR Priority Actions) and Respondent Organization Distribution of the Result of Checklist (A)
Figure 6.1.3	Responded Scores by Group (SFDRR Priority Actions) and Respondent Organization Distribution of the Result of Checklist (B)
Figure 6.1.4	2008 Version (on the left) and 2012 Version (on the right) of Tsunami Hazard Map Prepared by PVMBG
Figure 6.1.5	Tsunami Hazard Map by BNPB
Figure 6.1.6	Peta Penggunaan Lahan Kota Denpasar
	(Land Use Map of Denpasar City, as of 2009)
Figure 6.1.7	Distribution of Government Offices Located at the Tsunami Prone Area
Figure 6.1.8	Distribution of School Located at the Tsunami Prone Area
Figure 6.1.9	Distribution of Tourism Facility Located at the Tsunami Prone Area
Figure 6.1.10	Distribution of Health Facility Located at the Tsunami Prone Area

Figure 6.1.11	Distribution of Social Facility Located at the Tsunami Prone Area	6-21
Figure 6.1.12	Distribution of Worship Facility Located at the Tsunami Prone Area	6-22
Figure 6.1.13	Identification of Tsunami Evacuation Difficulty Area	6-24
Figure 6.3.1	Disaster Preparedness Certification Issued by BPBD Bali Province	6-40
Figure 7.1.1	Result of Group Work with Average Capacity on DRA	7-7
## **ABBREVIATIONS**

AADMER	ASEAN Agreement on Disaster Management and Emergency Response
ACDM	ASEAN Committee on Disaster Management
ADRC	Asian Disaster Reduction Center
AEC	ASEAN Economic Community
AHA Centre	ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management
ALOS	Advanced Land Observing Satellite
AMS	ASEAN Member States
APAN	Asia Pacific Adaption Network
ASEAN	Association of Southeast Asian Nations
ATR	Kementerian Agraria dan Tata Ruang (Ministry of Land Affairs and Spatial Planning, Indonesia)
AURF	ASEAN Urban Resilience Forum
BNPB	Badan Nasional Penanggulangan Bencana (National Disaster Management Authority, Indonesia)
CCA	Climate Change Adaptation
CN	Concept Note
C/P	Counterparts
CRPP	City Resilience Profiling Programme under UN-Habitat
CSO	Civil Society Organization
DDPM	Department of Disaster Prevention and Mitigation, Ministry of Interior, Thailand
DEM	Digital Elevation Model
DLSW	Department of Labor and Social Welfare
DMRS	Disaster Monitoring and Response System
DMP	Disaster Management Plan
DNDPC	Department of Natural Disaster Prevention and Control, Directorate of Water Resources, Ministry of Agriculture and Rural Development, Viet Nam
DP-LP	Demonstration Project in Luang Prabang
DPWT	Department of Public Works and Transportation
DRA	Disaster Risk Assessment
DRR	Disaster Risk Reduction
EM-DAT	Emergency Events Database
ERAT	Emergency Response and Assessment Team
GAR	Global Assessment Report on Risk Reduction
GAR-UNISDR	Global Risk Report-UNISDR
GDP	Gross Domestic Product
GIS	Geographic Information System
GRDP /UNEP	Global Risk Data Platform by the United Nations Environment Programme

НСМС	Ho Chi Minh City, Viet Nam
IAEE	International Association for Earthquake Engineering
ICEM	International Center for Environmental Management
ICLEI	International Council for Local Environmental Initiatives
IFM	Integrated Flood Management
IF Net	International Flood Network
IWRM	Integrated Water Resources Management
JAXA	Japan Aerospace Exploration Agency
JICA	Japan International Cooperation Agency
KIM	Knowledge and Innovation Management
MARD	Ministry of Agriculture and Rural Development
MOLSW/MLSW	Ministry of Labour and Social Welfare, Lao PDR
MONRE	Ministry of Natural Resources and Environment, Lao PDR
MOU	Memorandum of Understanding
NCDM	National Committee for Disaster Management, Cambodia
NDMC	National Disaster Management Centre, Brunei Darussalam
NDRP	National Disaster Response Plan in Philippines
NDRRMC	National Disaster Risk Reduction and Management Council in Philippines
NDRRMP	National Disaster Risk Reduction and Management Plan in Philippines
NGO	Non-governmental Organization
NOAA	National Oceanic and Atmospheric Administration, United States Department of Commerce
NPC	National Project Coordinator
NPO	Nonprofit Organization
OCD	Office of Civil Defense, Philippines
P&M	Prevention and Mitigation
PCU	Project Coordination Unit
PDCA	Plan-Do-Check-Act
PGA	(Peak Ground Acceleration
PIU	Project Implementation Unit
PRA	Preliminary Risk Assessment
PSC	Project Steering Committee
PTWC	Pacific Tsunami Warning Center
PVMBG	Pusat Vulkanologi dan Mitigasi Bencana Geologi (Center for Volcanology & Geological Hazard Mitigation, Indonesia)
RCC	Resilient Cities Campaign
SCDF	Singapore Civil Defense Force
SFDRR	Sendai Framework for Disaster Risk Reduction
SNS	Social Networking Service

TOR	Terms of Reference
ТОТ	Training of Trainer
UDAA	Urban Development and Administration Authority-Luang Prabang
UDLP	Urban Development and Land Use Plan
UNEP GRID/Geneva	Global and Regional Integrated Data-Geneva
UNISDR	United Nations Office for Disaster Risk Reduction
USAID	United States Agency for International Development
USGS	United State Geological Survey
UTC	Coordinated Universal Time
WG	Working Group
WMO	World Meteorological Organization

# INTRODUCTION

# **INTRODUCTION**

### I.1 Background

Due to their climatic environment and geological properties, disaster risk in the Association of Southeast Asian Nations (ASEAN) area is high and it brings a number of disasters to the ASEAN countries. Approximately 90% of victims of natural disasters are from Asia according to the 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% of the world's population would live in urban areas. This unprecedented growth of cities, particularly in countries in the ASEAN Region, causes problems in 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 their own countries, but cities are highly interconnected to the global economic system. When disasters strike in such economic centers, the ripple effects can be felt for thousands of miles and years to come. In fact, the Great East-Japan Earthquake in Japan and the Chao Phraya River Great Flood in Thailand, which 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 global, economy.

Hence, building urban resilience to disaster and climate risks has become an important issue in the ASEAN Region, and the ASEAN Committee on Disaster Management (ACDM) and ASEAN countries have been addressing disaster risk reduction at the regional level. ASEAN Agreement on Disaster Management and Emergency Response (AADMER) prepared by ACDM has a rolling plan, namely AADMER Programme. AADMER Programme Phase 2 (2013-2015) formulated 21 concept notes, and this project has been implemented since November 2015 based on Concept Note 18 (CN 18) among the 21 concept notes.

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

In April 2016 during the project period, AADMER Work Programme 2016-2020 was newly launched. After that, this project has been consistent with "Build Safely", which is one of the priority programme of the new AADMER Work Programmee. "Build Safely" plans ASEAN Urban Planners Forum, to which ASEAN Urban Resilience Forum in CN18 will be integrated.

# 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 the ACDM Working Group on Prevention and Mitigation, this project will develop the implementation framework for CN 18. <u>Overall, this project aims to increase the resilience of ASEAN cities</u> 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 resilient city, and commitment and partnership-building for the demonstration project on risk assessment of priority cities in AMS; and capacity development for urban resilience through implementation of the demonstration project in two cities in ASEAN.
  - **Output 3:** Development of tools on building resilient cities in ASEAN.
- (3) Project Area: ASEAN countries (10 member-states)
- (4) Management Structure

The management structure of the project is shown in Figure I.2.1. The ACDM, each AMS, ASEAN Secretariat, ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre), and the JICA Project Team are the stakeholders of the project. The roles of the 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** 

Organization	Roles
The ASEAN	• Overviewing the project (i.e. JICA will report on the progress and result of the project )
Committee on	• Supporting the project team to implement the project by asking member states to give the
Disaster	team necessary arrangements such as for gathering and providing information, gathering
Management	participants to any type of meetings, etc. within the responsibility of ACDM, ASEAN
(ACDM)	Secretariat or ASEAN Member States
	• Suggesting the utilization or application of the result of the project to the member states
Project	• Overseeing and providing guidance to the implementation and management of the
Steering	proposed project on behalf of the ACDM Working Group.
Committee	• 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.
ASEAN	• Joining the project as a resource organization to provide technical comments on the
Secretariat	implementation of the project
	<ul> <li>Joining the project by participating in important meetings</li> </ul>
	Provides guidance in the implementation and administration of the project.
The ACDM	• Reviewing and evaluating the progress and result of the project and submits
Working Group	recommendations to ACDM.
on Prevention	• Provides guidance and recommendations to the project team.
and Mitigation	• 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.
	• Coordination with own ASEAN member state to assist the project team in

implementation of the activities such as gathering necessary information, if necessary.
<ul> <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>
<ul> <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"

#### (5) Addressed Points in the Project

Before starting this project, the Sendai Framework was adopted by the United Nations (UN) Member-States on March 18, 2015 at the 3rd UN World Conference on Disaster Risk Reduction in Sendai, Japan. The ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme 2016-2020 was launched in the 3rd AADMER Partnership Conference in April 2016 in Semarang, Indonesia.

In this context, the JICA Project Team has addressed the above two frameworks during the project. The JICA Project Team has assisted in the implementation of the project to materialize the priority actions of the Sendai Framework and formulated action plans to be consistent with the one of the eight priority programmes, "Build Safely", specified in the AADMER Work Programme 2016-2020.

The Sendai Framework on Disaster Risk Reduction has four priorities for action such as i) understanding disaster risk, ii) strengthening disaster risk governance to manage disaster risk, iii) investing in disaster risk reduction for resilience, and iv) enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction. The JICA Project Team has prepared the draft terms of reference (TOR) for the demonstration project in Output 2 and produced a guidebook including checklists for urban resilience in Output 3 by aiming at materializing the four priorities. The agenda of the ASEAN Urban Resilience Forum and Workshops for Urban Resilience in Output 1 addressed the four priorities.

AADMER Work Programme 2016-2020 has eight priority programmes: i) Aware: Risk Aware ASEAN Community, ii) Build Safely: Building safe ASEAN infrastructure and essential services, iii) Advance: A disaster resilient and climate adaptive ASEAN community, iv) Protect: Protecting economic and social gains of the ASEAN community integration through risk transfer and social protection, v) Respond as one: Transforming mechanisms for ASEAN's leadership in response, vi) Equip: Enhance capacities for one ASEAN, one response, vii) Recovery: ASEAN resilience recovery, viii) Lead: ASEAN Leadership for Excellence and Innovation in Disaster Management.

# I.3 **Project Steering Committee Discussions**

After the JICA Project Team (consultant team) was formed in November 2015, ten project steering committee meetings (PSCs) have been held. The first PSC meeting held on June 25, 2016 was the meeting before the JICA Project Team was formed, so this report does not mention discussions in the first PSC. Table I.3.1 shows the main discussion results of the second to eleventh PSC meetings. The details of the discussion are shown as minutes of meetings in Appendix 1.

Date	Meeting	Contents of Discussion
December 3, 2015	2 <sup>nd</sup> Project Steering Committee	<ul> <li>PSC members agreed and accepted the inception report.</li> <li>PSC members agreed on the criteria of selecting cities for the preparation of the TOR for the demonstration project in Output 2 of the project.</li> <li>Nomination of national project coordinators of the project from ten AMS by the ACDM Focal Points was also agreed.</li> <li>PSC members agreed to support the data and information collection by the JICA Project Team.</li> </ul>
April 7, 2016	3 <sup>rd</sup> Project Steering Committee	<ul> <li>PSC members confirmed the validity of the progress including visits to AMS discussing the 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>PSC agreed to share the meeting report of the 3<sup>rd</sup> PSC Meeting to Singapore and Brunei Darussalam, and recommended 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:</li> <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; and</li> <li>To link the conduct of the forum with ADDM under the leadership of ACDM Chair.</li> <li>PSC members agreed on the preliminary idea of the workshops to be held in the project.</li> </ul>
July 27, 2016	4 <sup>th</sup> Project Steering Committee	<ul> <li>PSC members confirmed the validity of the progress including evaluation criteria of the 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 the draft TOR of the 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 the AHA Centre.</li> <li>PSC members also agreed on the outline of the 1<sup>st</sup> workshop to be held in the project.</li> </ul>
December 7, 2016	5th Project Steering Committee	<ul> <li>PSC members confirmed the validity of the progress including the results of the 1<sup>st</sup> ASEAN Urban Resilience Forum, open Facebook account for CN18, visit to AMS for discussing short listed cities and candidate cities for the demonstration project, and the results of workshops for trial implementation on "Checklists for Urban Resilience".</li> <li>PSC members agreed with the two-month extension of the project period to June 2017.</li> <li>PSC members confirmed that continuous discussion about the fund for ASEAN Urban Resilience Forum. PSC members proposed that AHA Centre would assume a</li> </ul>

 Table I.3.1
 Record of Project Steering Committee Meeting

-		role of moderator to some up with the contents/information and the state of the
		<ul> <li>role of moderator to come up with the contents/information and check the validity of contents/information that the other stakeholders provide.</li> <li>PSC members agreed with the preliminary idea of the draft TOR of the demonstration project, which includes Outcome 1) Conducting Disaster Risk Assessment, 2) Identification of Planning and Development Issues, and 3) Formulation of Action Plan and Guidelines.</li> <li>PSC members also agreed that the JICA Project Team would develop the outline of the guidebook based on the feedback from the participants of the 1<sup>st</sup> and 2<sup>nd</sup> workshops with the harmonization with checklists.</li> </ul>
		• PSC members also agreed that the JICA Project Team would elaborate the checklists for urban resilience based on the feedback from the participants of workshops for trial implementation on "Checklists for Urban Resilience" and 3 <sup>rd</sup> and 4 <sup>th</sup> workshops to be held in March 2017.
March 1, 2017	6 <sup>th</sup> Project Steering Committee	<ul> <li>PSC members confirmed the validity of the progress including future integration of ASEAN Urban Resilience Forum with ASEAN Planners Forum, progress of website development, final results of candidate cities for the demonstration project, outline of draft TOR of the demonstration project, database developed by the JICA Project Team, and progress of developing the Guidebook for Urban Resilience containing checklists.</li> <li>PSC members suggested that the JICA Project Team present the draft TOR in the 7<sup>th</sup></li> </ul>
		<ul> <li>PSC meeting by reflecting comments on status of disaster risk assessments in each candidate city, contents of training module, and division of implementation agency into implementation agency and coordinating agency.</li> <li>PSC members also suggested to the JICA Project Team to check the copyright of data stored in the developed database.</li> <li>PSC members suggested to the JICA Project Team to present the guidebook in the 7<sup>th</sup></li> </ul>
		<ul> <li>PSC meeting and elaborate the checklists based on the 3<sup>rd</sup> and 4<sup>th</sup> workshops.</li> <li>PSC members agreed on the draft agenda and target groups of the 2<sup>nd</sup> ASEAN Urban Resilience Forum.</li> </ul>
July 6, 2017	7 <sup>th</sup> Project Steering Committee	<ul> <li>PSC members confirmed the validity of the main points of draft final report presented by the JICA Project Team, and accepted the draft final report.</li> <li>PSC members agreed the inclusion of the implementation phase of demonstration project for two cities into the project and extension of the project period tentatively by the and of March 2018</li> </ul>
		<ul> <li>PSC members also agreed that the JICA Project Team would clarify necessary activities and preparation by the governments in AMS, confirm willingness and availability of possible two candidate cities, and select two target cities.</li> <li>PSC members confirmed actions for sustainable use of CN18 outputs such as ASEAN Urban Resilience Forum, website and Facebook, and the guidebook.</li> <li>PSC members agreed that monitoring and evaluation as well as taking necessary actions on output of CN18 would be discussed in every ACDM WG on P&amp;M.</li> </ul>
September 4, 2017	8 <sup>th</sup> Project Steering Committee	<ul> <li>PSC members agreed to extend the project period until the end of June 2018 to conduct the demonstration project.</li> <li>The JICA Project Team distributed and presented the second inception report.</li> <li>The JICA Project Team informed PSC of the revised draft TOR of the demonstration project. The revision includes key activities and inputs by the national and local governments, and the implementation structure based on the comments/inputs received during the 7<sup>th</sup> PSC.</li> <li>PSC recommended that the JICA Project Team present the "Ranking of Selecting Target Cities for the Demonstration Project" during the ACDM WG on P&amp;M on</li> </ul>
		<ul> <li>September 7, 2017 for the selection of the two target cities for the demonstration project.</li> <li>PSC agreed to consult with National Disaster Management Organization (NDMO) of the selected target cities upon approval of WG on P&amp;M during the 8<sup>th</sup> ACDM WG on P&amp;M.</li> <li>For follow-up activities, co-chairs reconfirmed the necessity of both the website and Facebook as tools for knowledge sharing. PSC requested the JICA Project Team to send the soft copy version with tracked changes for final review for the endorsement by ACDM</li> </ul>
November 15, 2017	9 <sup>th</sup> Project Steering Committee	<ul> <li>PSC members confirmed the progress of the demonstration project for Luang Prabang in Lao PDR and Denpasar in Indonesia regarding the establishment of each coordination and implementation body at the national and local levels.</li> <li>PSC members proposed Lao PDR as the candidate to host the 3<sup>rd</sup> AURF and confirmed that ASEC would facilitate the distribution of invitation and support the host country in hosting the 3<sup>rd</sup> AURF.</li> <li>PSC members proposed to the JICA Project Team to further discuss with AHA Center</li> </ul>

-		on the content of the website and other technical issues related to the website
		maintenance
		• For the Guidebook ASEC informed the PSC members that the guidebook is
		undergoing internal review within ASEC
December 21	1.0th	• PSC members took notes on the progress of the project and recognized the
December 21,	10	significance of the demonstration project from the following viewpoints:
2017	Project	Sharing of experience to overcome obstacles that other cities in ASEAN will
	Steering	encounter and
	Committee	Sharing good practices to coordinate among the concerned government
		organizations for building resilient cities.
		• PSC members suggested to the co-chairs to facilitate the dissemination of the
		outcomes of the demonstration project through ACDM WG meeting on P&M.
		• PSC members noted the basic framework of the 3 <sup>rd</sup> ASEAN Urban Resilience Forum
		such as the objective, target participants, and tentative date.
		• PSC members noted that the ASEAN Urban Resilience Forum (ASEAN Urban
		Planners Forum) would be continued in the future, for promoting knowledge and
		experience sharing towards building resilient cities in ASEAN. PSC members
		proposed to take the following measures for continuing the forum:
		Finding the budget source; and
		Synergizing with other activities under AADMER program 2016-2020
		• For the website, PSC members noted that the result of the discussion between AHA
		requested to provide the information to AHA Center for web undefind
		• For Facebook PSC members noted the differences between Facebook and the
		website: for the time being will keep the Facebook account informally
		• For the guidebook, PSC members noted the schedule towards the distribution in the
		3 <sup>rd</sup> ASEAN Urban Resilience Forum. ASEC agreed to check the revised contents and
		send the list of the translators and facilitate the process for ad referendum
		endorsement by ACDM.
July 19, 2018	11 <sup>th</sup>	• PSC members confirmed the validity of the main points of Draft Final Report (2)
	Project	presented by JICA Project Team and accepted the Draft Final Report (2).
	Steering	• ASEC updated the PSC meeting that the $32^{nd}$ ACDM meeting held in Malaysia on
	Committee	June 26, 2018, endorsed the Guidebook for Urban Resilience.
	Committee	• PSC members agreed that ACDM WG on P&M would continue making efforts to
		of the future forum and recognizing from averts of the future forum such as
		of the future forum and recognizing framework of the future forum such as
		plan drafted by JICA Project Team.
		• PSC members agreed that AHA Centre would technically manage the website
		developed in the project and Co-chairs through ASEC would request each AMS to
		provide information of the related activities for urban resilience. PSC members
		agreed that Facebook would be used as informal communication tool and Co-chair
		would be the administrators of the Facebook.
		• PSC members agreed that ACDM WG on P&M would keep using long list, middle
		list, and short list of the cities in ASEAN. The list of the cities in ASEAN will be
		included in the ASEAN Risk Monitor and Disaster Management Review (ARMOR)
		• PSC members agreed that ACDM WG on P&M would utilize and update database
		aeveloped in the project with AHA Centre.
		• FSC memories agreed that Co-chains would encourage ASEAN Memories as well as development partners to refer the draft TOR of the demonstration project
		developed by IICA Project Team in future
		<ul> <li>PSC members agreed that Co-chairs would take initiatives to disseminate Guidebook</li> </ul>
		and checklists to both national level and local level of each AMS and monitor and
		evaluate the disseminated by taking opportunities of relevant ASEAN platforms and
		initiatives.
		• Co-chair, Lao PDR, agreed to support Luang Prabang Provincial Government to
		implement action plan developed in the demonstration project and continue using
		ASEAN Urban Resilience Checklists.
		• Co-chairs, Lao PDR and Thailand, agreed to request BNPB, NDMO of Indonesia, to
		support Denpasar City Government for implementation of action plan developed in
		the demonstration project and to continue ASEAN Urban Resilience Checklists.
		• PSC members also agreed to continue communication among Co-chairs of ACDM
		we on raw, ASEC, AHA Centre, and development partners including JICA for future partnership on A ADMEP Work Programme (2016, 2020) and beyond

### I.4 Achievements in the Project

The project is largely divided into two phases: Development of Implementation Framework (Phase 1) and Implementation of Demonstration Project (Phase 2).

Chapters 1 to 3 delineates the achievement of each output for "Phase 1: Development of Implementation Framework". Here, the JICA Project Team summarizes the main achievement for each activity as shown in Table I.4.1. The activities in the table correspond to the outputs and activities mentioned in "7. Components of the Project" of the attached documents for the minutes of meetings on the first PSC members for the project. The JICA Project Team has worked with PSC members and the concerned officials in each AMS through PSC meetings, workshops for urban resilience, and the ASEAN Urban Resilience Forum, to produce outputs.

Activities	Achievement
Output 1	
1-1 Conducting regional seminar	The JICA Project Team assisted to establish the ASEAN Urban Resilience Forum and
and workshop	hold the 1st to 3rd ASEAN Urban Resilience Forum to share knowledge and
	experience on building resilient cities among the AMS. The JICA Project Team
	drafted the term, concept note, and action plan for future ASEAN Urban Resilience
	Forum. The JICA Project Team has also assisted to hold the 1st to 4th Workshops for
	Urban Resilience in December 2016 and March 2017 to collect ideas of the output of
	CN18.
1-2 Communication through the	The JICA Project Team prepared the draft rules of the forum. The JICA Project Team
network of the forum for	visited NPCs of each AMS in January and February 2016 and November and
promoting resilient cities	December 2016. The JICA Project Team has compiled the mailing list of NPCs and
	developed the website and Facebook account for promoting communication among
	the concerned stakeholders. Management of the website was transferred from the
	JICA Project Team to AHA Centre.
Output 2	
2-1 Listing urban cities in ASEAN	The JICA Project Team developed the long list and middle list for selecting the
and gathering information	candidate cities of the demonstration project by preliminary assessing disaster risks of
	cities in ASEAN. The JICA Project Team assisted each AMS to finalize shortlisted
	cities and candidate cities through the 2 <sup>nd</sup> preliminary disaster risk assessment and
	discussion with each AMS. As a result, the JICA Project Team assisted to select 817
	long list cities, 56 middle list cities, and 8 short list cities, which are the candidate
	cities of the demonstration project.
2-2 Development of the draft TOR	The JICA Project Team developed the draft TOR based on the discussion results of
of the demonstration project	the 1 <sup>st</sup> and 2 <sup>nd</sup> workshop and baseline survey results for the candidate cities and the
	results of 5 <sup>th</sup> and 6 <sup>th</sup> PSC meetings. The objective of the demonstration project is to
	attain the four priority activities of the Sendai Framework for Disaster Risk Reduction
	(SFDRR).
Output 3	
3-1 Conducting study on the result	The JICA Project Team collected information on related activities for building
or progress of the resilient cities	resilient cities by development partners such as UNISDR, Rockefeller Foundation,
campaign and other	and UN-Habitat, in order to extract ideas for developing a guidebook.
ASEAN-related initiatives	
3-2 Conducting study on good	The JICA Project Team collected information on past projects or programs in
practices and the lessons learned	ASEAN, in order to extract good practices and lessons learned. The collected good
from past projects or programs	practices and learned lessons were classified from the viewpoints of the four priority

Table I.4.1 Main Achievements of the Project (Phase 1)

related to enhancing resilience of	actions of SFDRR. The JICA Project Team mainly collected examples of prevention,
urban cities including developing	mitigation, and preparedness, which would come before a disaster.
countries	
3-3 Conducting a study towards	The JICA Project Team reviewed the research papers on fragility curves for
developing a guide to building	earthquake and flood. The JICA Project Team prepared the 1st draft of checklist and
resilient cities	conducted workshops of trial implementation of the checklist in Bima, Indonesia;
	Luang Prabang, Lao PDR; and Pathumthani, Thailand. After that, the JICA Project
	Team prepared the 2 <sup>nd</sup> draft of checklists based on the workshops' results and
	comments from PSC members. Based on the comments to the 2 <sup>nd</sup> draft in the 3 <sup>rd</sup> and
	4 <sup>th</sup> workshops, The JICA Project Team finalized the checklists for urban resilience.
3-4 Documentation of tools	The JICA Project Team compiled the above outputs from 3-1 to 3-3 and developed the
(Guidebook)	Guidebook for Urban Resilience including ASEAN Urban Resilience Checklist. The
	checklists have two types: A) Checklist for Disaster Riske Management and B)
	Checklist for Resilient Urban Development

Source: JICA Project Team

Chapters 4 to 7 cover Phase 2: Implementation of Demonstration Project. Chapter 5 delineates the achievement of the demonstration project in Luang Prabang, Lao PDR. Chapter 6 delineates the achievement of the demonstration project in Denpasar, Indonesia. Chapter 7 reports the overview and outputs of the 3<sup>rd</sup> ASEAN Urban Resilience Forum where the experience of the demonstration project is shared among the participants from each AMS. The JICA Project Team has worked with PSC members and the concerned officials of both the national government and local government in Lao PDR and Indonesia, through PSC meetings, and implementation of the demonstration project including national workshops. Table I.4.2 shows the main achievements of the project in Phase 2.

Activities	Achievement	
Demonstration Project in Luang Prabang, Lao PDR		
Establishment of an	A Project Coordination Unit (PCU) was established at the national level to supervise,	
Implementation System for the	coordinate and monitor the demonstration project. The PCU consists of officials of the	
Demonstration Project	Ministry of Labor and Social Welfare and the Ministry of Public Works and Transport.	
	A Project Implementation Unit (PIU) was also established at the local level. The PIU	
	consists of officials of the Provincial Department of Labor and Social Welfare and the	
	Provincial Department of Public Works and Transportation.	
Data Collection and Review of	PIU members with the JICA Project Team collected statistical data, hazard and	
Current Conditions	climate-related data, spatial data and GIS data, and plans, programs, and relevant	
	information. To grasp the status of the capacity for building resilient cities, the	
	ASEAN Urban Resilience Checklist was used.	
Preliminary Disaster Risk	Although the PIU or relevant stakeholders in the province were programmed to	
Assessment	conduct the preliminary disaster risk assessment, difficulties to implement the	
	assessment by their own were encountered due to lack of basic skills of software	
	manipulation. As a result, the JICA Project Team conducted the assessment and	
	focused workshops in order to let them understand the flow of the assessment and	
	how to utilize the result of the assessment.	
Formulation of Action Plans	The PIU formulated two action plans: 1) one for formulating disaster management	
	plan and 2) another for formulating urban land use and development plan. The action	
	plans were formulated based on the result of using checklists, preliminary disaster risk	
	assessment, and discussions among the concerned stakeholders through workshops.	
National Workshop	National workshop was held on April 4, 2018 with 47 participants in total including	
	42 national and provincial government officers related to urban resilience in Lao	

Table I.4.2 Main Achievements of the Project (Phase 2)

	PDR. The importance of coordination and cooperation between the disaster risk		
	management sector and urban planning sector in local government was recognized in		
	the workshop as one of the important further issues in the formulated action plans.		
Demonstration Project in Denpas	ar, Indonesia		
Establishment of Implementation	The PCU was established at the national level to supervise, coordinate, and monitor		
System for the Demonstration	the demonstration project. PCU consists of officials of the National Disaster		
Project	Management Authority (BNPB), Ministry of Agrarian Affairs and Spatial Planning		
	(ATR), Center for Volcanology & Geological Hazard Mitigation (PVMBG). A PIU		
	was also established at the local level. PIU consists of officials of the Regional		
	Disaster Management Agency (BPBD) of Denpasar City and Bali Province, and		
	Development Planning Agency at Sub-National Level (BAPPEDA) of Denpasar City,		
	and Public Works and Human Settlements Department of Denpasar City and Bali		
	Province.		
Data Collection and Review of	PIU members with the JICA Project Team collected statistical data, hazard		
Current Conditions	information, spatial data and GIS data, and plans, programs, and relevant information.		
	To grasp the status of capacity for building resilient cities, the ASEAN Urban		
	Resilience Checklist was used.		
Preliminary Disaster Risk	PIU with the JICA Project Team conducted preliminary disaster risk assessment		
Assessment	composed of tsunami exposure analysis and tsunami evacuation analysis. The analysis		
	found that Benoa Port sustaining logistics of Bail is located in a tsunami prone area.		
	Other findings such as distribution of schools, hospitals, and utility facilities were also		
	confirmed in the assessment.		
Formulation of Action Plans	PIU formulated an action plan to improve the existing action plan for building		
	resilience. The action plan was formulated based on the result of using checklists,		
	preliminary disaster risk assessment, and discussions among the concerned		
	stakeholders through workshops.		
National Workshop	National workshop was held on May 9, 2018 with 47 participants in total including		
	national and provincial government officers related to urban resilience in Indonesia.		
	BNPB stated that this national workshop could be a trigger for the future formation of		
	the working group forum for tsunami for communication of local governments prone		
	to tsunamis in conveying their aspirations to the central government. The Denpasar		
	City government also confirmed that close cooperation between BPBD and		
	BAPPEDA on disaster risk reduction and action plan formulation was achieved.		

# I.5 Composition of Final Report

This final report consists of an introduction and eight chapters, and it is largely divided into four parts: i) Introduction, ii) Phase 1: Development of Implementation Framework, iii) Phase 2: Implementation of Demonstration Project, and iv) Conclusion.





#### (1) Introduction

The Introduction chapter addresses the background; outline of the project such as goal, objectives, outputs, project area, and management structure, project steering committee discussions, and achievements in the project as mentioned earlier.

#### (2) Phase 1: Development of Implementation Framework

Chapter 1 covers Output 1 of the project, which is the "Establishment of a Regional Cross Sector Collaboration Mechanism and Formation of Partnerships". It contains the purpose of Output 1, Scope of Works for Output 1, establishment of ASEAN Urban Resilience Forum and Holding Workshops, and Facilitation for Enhancing Networking among Stakeholders.

Output2: "Evaluation of Candidate Cities and Partnership and Commitment Building for Demonstration Project are covered in Chapter 2. It contains Approaches for Evaluation of Candidate Cities for Demonstration Project, 1<sup>st</sup> and 2<sup>nd</sup> Preliminary Assessment, Development of Database, and Development of Draft TOR for Demonstration Project.

Chapter 3 covers Output 3 of the project: "Development of Tools on Building Resilient Cities in ASEAN". It contains Study on Related Activities in ASEAN Countries, Data Collection of Good Practices in Projects for Enhancing Urban Resilience, and Guidebook for Building Resilient Cities.

#### (3) Phase 2: Implementation of Demonstration Project

Inclusion of implementation of demonstration project was agreed in the 7<sup>th</sup> Project Steering Committee meeting on July 6, 2017. The demonstration project started in November 2017. Chapters 4 to 6 cover the implementation of the demonstration project. Chapter 4 is the introductory part of the demonstration project such as background, outline, and achievements. Chapters 5 and 6 cover the demonstration project such as activities, encountered issues and solutions, good practices and lessons learned for other ASEAN cities. Chapter 5 delineates the demonstration project in Luang Prabang, Lao PDR and Chapter 6 delineates the one in Denpasar, Indonesia. Chapter 7 reports the 3<sup>rd</sup> ASEAN Urban Resilience Forum where overall activities of the project mainly the experience of the demonstration project were shared and future directions for building resilient cities in ASEAN were discussed.

#### (4) Conclusion

Finally, Chapter 8 concludes this report with recommendations to ensure sustainability of project outputs such as ASEAN Urban Resilience Forum, Website, Lists of Cities (long list, middle list, and short list), and Guidebook for Urban Resilience including ASEAN Urban Resilience Checklists as well as good practices and lessons learned toward building resilient cities in ASEAN.

## PHASE 1: DEVELOPMENT OF IMPLEMENTATION FRAMEWORK

# 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 Objective of Output 1

(1) Background

The Concept Note 18 (CN18) as the framework of the Association of Southeast Asian Nations (ASEAN) Cooperation Project by the Japan International Cooperation Agency (JICA) (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 ten ASEAN Member States (AMS). In conjunction with Output 1, the following notes (strategies and activities) illustrated in CN18 are referred to as backgrounds of Output 1:

- Organization of the ASEAN Urban Resilience Forum (AURF): This forum will serve as a regional venue for policy formulation, networking, knowledge exchange, and technology transfer among government, private sector, non-government organizations (NGOs), academe, and other stakeholders.
- Establishment of a regional multi-sectoral collaborative mechanism in the ASEAN to pursue common goals and further collaborate on urban resilience: A mechanism that will help sustain the momentum and further pursue a collaborative program 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 increase the resilience of ASEAN cities to disasters includes the objective of Output 1, which is the "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 Output 1 to be implemented are stipulated in the scope of works of Output 1 as follows:

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

# 1.2 Establishment of ASEAN Urban Resilience Forum (AURF) and Holding Workshop

#### 1.2.1 Establishment of AURF

The JICA Project Team supports the establishment of the AURF for the concerned stakeholders from the ten ASEAN Member States (AMS). The ASEAN Secretariat, Lao PDR, and Thailand as co-chairs of the ASEAN Committee on Disaster Management (ACDM) Working Group (WG) on Prevention and Mitigation (P&M) are expected to lead and coordinate with other AMS.

#### 1.2.2 Holding ASEAN Urban Resilience Forum Meeting

The JICA Project Team supported to hold three AURFs as shown in Table 1.2.1. The first and the second AURFs were held to collect ideas for the future AURF of Output 1 and the guidebook and checklist of Output 3. The guidebook and checklist are addressed in Chapter 3 of this report. The third AURF was held to collect ideas and share experiences on the demonstration project on disaster risk assessment. The demonstration project was implemented in Luang Prabang, Lao PDR and Denpasar, Indonesia.

Forum Meeting	Expected Period	Venue	Agenda
First	July 28	Bangkok,	Introduction to CN18
forum	2016	Thailand	Relation between forum and CN18
meeting			Discussion on direction of AURF
			Presentation/speech by resource persons from JICA and UNISDR
			Group discussion on the issues of building urban resilience
Second	May 18-19	Denpasar,	Familiarization of the ASEAN Disaster Management Framework
forum	2017	Indonesia	• Presentation of "Practice of Building Resilient Cities" from participating
meeting			AMS
			Lecture for urban resilience and disaster risk reduction
			Group work and discussion on checklists
			Discussion on future forum
Third	July 17-18	Luang	Background and concept of demonstration project
forum	2018	Prabang,	Report of demonstration project in Luang Prabang and Denpasar
meeting		Lao PDR	Findings of demonstration Project
			Group work on checklist
			Website updating
			Preliminary Disaster Risk Assessment
			Key findings and Disaster Risk Assessment
			Panel discussion on how to utilize CN18 outputs

 Table 1.2.1
 Main Agenda of Forum Meeting

(1) 1st ASEAN Urban Resilience Forum (July 28, 2016 in Bangkok, Thailand)

The 1<sup>st</sup> AURF was held in Bangkok, Thailand on July 28, 2016. A total of 61 participants, including delegations from eight AMS, shared their knowledge on building disaster resilient cities in group discussions, after having inputs from JICA and the United Nations Office for Disaster Risk Reduction (UNISDR).

In the morning session, the Senior Advisor of JICA introduced Japan's experience and principles to build disaster and climate resilient cities. The Program Officer of UNISDR's Regional Office for Asia and Pacific from Bangkok made a presentation on building urban resilience in 2030 development agenda and gave advice for the establishment of AURF.

In the afternoon session, participants had a group discussion and were divided into four groups based on the type of hazards. The process of the discussion is as follows:

- 1. Sharing challenges on building resilient cities in ASEAN;
- 2. Discussing the solution for the challenges; and
- 3. Clarifying ideal cooperation on building resilient cities.

For the  $1^{st}$  and  $2^{nd}$  steps of the above process, participants introduced their issues and policy/regulation regarding building urban resilient cities with each other. Then as the  $3^{rd}$  step, referring to advanced solutions in other countries, participants discussed the ideal method to improve their situation.



Source: JICA Project Team

```
Photo 1.2.1 Group Discussion (Left) and Closing Remarks (Right) in the 1st AURF
```

(2) 2<sup>nd</sup> ASEAN Urban Resilience Forum (May 18-19, 2017 in Denpasar, Indonesia)

The 2<sup>nd</sup> AURF was held on May 18-19, 2017 in Denpasar, Indonesia to attain the following objectives:

- 1) to identify issues to be tackled for building resilient cities in ASEAN; and
- 2) to share CN18 activities, including utilization of the guidebook and checklist, and discuss future forum.

There were 48 participants in total consisting of delegations from eight AMS (i.e., Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand, and Vietnam), ASEAN Secretariat, ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Center), International Centre for Environmental Management (ICEM), JICA, and the JICA Project

Team. Each AMS dispatched its delegation consisting of government officials engaged in disaster management and urban planning.

### 1<sup>st</sup> Day

The main agenda of the 1<sup>st</sup> day were presentations on the "Practice of Building Resilient Cities" from each AMS. Disaster, issues, and good practice, including countermeasures on building resilient cities in each country, were introduced. Participants actively asked and provided inputs to the speaker after the presentation. The most frequent questions were addressed to the Thai delegation who introduced the infrastructure for water management, such as floodgate, road-raising, barrier, levee, and pumping machinery.

Dr. Hitoshi Baba, Senior Advisor of JICA, gave a lecture on "Urban Resilience and Disaster Risk Reduction", and participants asked him which solutions could be applied to developing countries in order to accelerate building resilient cities. Dr. Baba emphasized the importance of the commitment of the city to build a resilient city in all sectors and also to allocate a budget for it. Participants appreciated that the session was a good platform to share knowledge and best practices of different countries and create opportunities to extend networking among the countries involved.

### 2<sup>nd</sup> Day

The 2<sup>nd</sup> day was started with the JICA Project Team's presentations on database, guidebook, and how to fill out the checklists for disaster risk management and resilient urban development. AHA Center and ASEC also made presentations on their respective institutional activities related to disaster management and future activity plans. In response to the guidebook, participants commented that it was good enough, but it would be better to add other disasters such as drought, bank erosion, etc., and they wanted to receive it in their local languages immediately.

Most of the participants had also attended the "Workshop for Urban Resilience in ASEAN" held in December 2016 and March 2017, so they were already familiar with it. Participants who were not familiar with it could also fill it out without any problems after a clear explanation from the JICA Project Team. The most frequent comment on the checklist was whether it could be modified based on local conditions and improve the score criteria.



Photo 1.2.2 Group Discussion (Left) and Presentation (Right) in 2nd AURF

(3) 3<sup>rd</sup> ASEAN Urban Resilience Forum (July 17-18, 2018 in Luang Prabang, Lao PDR)

The 3<sup>rd</sup> AURF was held on July 17-18 2018 in Luang Prabang, Lao PDR to attain the following objectives. The details of the forum are delineated in Chapter 7 of this report.

- 1) To share experiences and lessons learned from the demonstration project;
- 2) To utilize the "Guidebook for Urban Resilience" and "ASEAN Urban Checklist" in ASEAN cities; and
- 3) To share the experiences and lessons learned from AMS.

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

(1) Development of the basic idea of action plan

Based on CN18, the JICA Project Team has developed the basic idea of action plan for AURF, 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 the National Project Coordinator (NPC) in each AMS in February 2016. The outline of concept of the action plan is shown in Table 1.2.2.

ACDM WG on P&M expressed, in the 9<sup>th</sup> ACDM WG meeting on P&M, that the AURF would be integrated with the ASEAN Urban Disaster Resilience Forum. The ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Program (2016-2020) mentions the establishment of the ASEAN Urban Planners Forum, with which the AURF will be integrated. In the meeting, ACDM WG on P&M concluded that the ASEAN Urban Planners Forum was renamed to ASEAN Urban Disaster Resilience Forum because ASEAN Urban Planners Forum may discuss other topics, such as economic development and transportation, which may stray off from disaster risk reduction.

Sections 1.2.3 and 1.3.1 in this report address the future AURF. The JICA Project Team assumes that ideas of this future forum are applied to the ASEAN Urban Disaster Resilience Forum which ACDM WG on P&M adopted.

Items	Contents	
1. Road map	<short 2-3="" term:="" years=""> Ground Work</short>	
	(Operation) Establishment of forum secretariat	
	(Funding) Raising fund to continue future forum	
	(Involvement) Involvement of local government (DRR and Urban Planning)	
	(Website) Development of website (one-way)	
	<middle 5="" in="" term:="" years=""></middle>	
	(Involvement) Involvement of the national and local government, academia, NGO, and civil society organization (CSO)	
	(Funding) Finding stable fund source	
	(Output) Publishing Good Practice Book for ASEAN Urban Resilience	
	(Website) Development of website with web-forum functions	
	<long 5="" after="" term:="" years=""></long>	
	(Involvement) Involvement of national and local government, academia, NGO, CSO, and nrivate sectors	
	(Operation) Transfer the forum operation to private sectors	
	(Output) Releasing joint statement for ASEAN Urban Resilience	
	(Impact) Resilient city plan is formulated in all AMS	
2. Outline of the forum	As the outline of the forum, the JICA Project Team proposes the forums' objective,	
	stakeholders, location of secretariat, period of activities, organization structure, operation	
	bodies (secretariat), and possible budget sources.	
3. Outputs/products of future	e <outputs></outputs>	
forum	O1. Establishment of collaborative mechanism (region, multi-sector)	
	O2. Sharing knowledge and experiences	
	O3. Capacity development	
	O4. Identification of next step for ASEAN Urban Resilience	
	<products></products>	
	P1 List of members/partners	
	P2-1 Website	
	P2-2 Good Practice Book	
	P3 Situation report (check list monitoring results)	
	P4 Action plan	
4. Possible management	As options for possible management/secretariat bodies, 1) consultant, 2) AADMER	
/secretariat bodies	partnership group, CSOs, etc., and 3) rotation of annual operation among each AMS could	
	be suggested. The JICA Project Team indicates characteristic features, merit, and demerit of	
5 Durant annual action	each possible option.	
5. Proposed annual action	Annual Action Plan (Proposed Base) will show the time schedule of each major stakenolder	
pian	of the forum in a proposed as example base. The forum will hold the annual seminar and the	
	maker to discuss important issues. The role of the ASEAN Secretariat will be a coordinator	
	among the forum and ACDM. The forum secretariat will be in charge of the planning	
	operation and management of the forum activities	
6 Draft terms of forum	The proposed contents of the draft terms of forum membership are shown as mentioned in	
membership	1 3 1	
menneeromp		

Table 1.2.2	<b>Outline of Action</b>	Plan	(Draft)
I GOIC IIIII	outline of Hetion	1 10011	( 2 1 410)

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

The JICA Project Team developed the draft concept note of the ASEAN Urban Disaster Resilience Forum and draft TOR for setting the secretariat for the future ASEAN Urban Disaster Resilience Forum and consulted with the Project Steering Committee (PSC) members at the meeting held in April 2016.<sup>1</sup> The summary of the draft concept note is shown in Table 1.2.3 and the summary of the draft TOR is shown in Table 1.2.4.

Contents	Summary
Introduction	The AADMER was ratified by all AMS on December 24, 2009. CN18: Building Disaster
	and Climate Resilient Cities in ASEAN has been set under the strategy and priorities for
	AADMER Work Program 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 concerns 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 an important agenda that the JICA Project Team needs to attend together with the regional aspect of all $\Delta MS$
	From November 2015 IICA is conducting a project of "Building Disaster and Climate
	Resilient Cities in ASEAN" in cooperation with ACDM to support some components of
	CN18. In this project, they will support to establish the AURE, but the forum needs a
	sustainable body for future operation.
Objectives	a. Providing shared learning opportunities about disaster and climate change risks in
5	ASEAN cities for AMS and relevant stakeholders.
	b. Providing 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 (i.e., the forum
	secretariat)
	c. Website for 1) knowledge and experience sharing, 2) a communication tool among the
	forum members and with other related organizations and campaigns, and 3) public
	relation tools for the forum activities
Activities	a) For the forum as a collaboration mechanism
	<short term=""></short>
	1) DRR and CCA information sharing
	2) Urban resilience learning
	3) Activities, knowledge, and learnings sharing
	<middle term=""></middle>
	1) Shared learning from urban resilience model project
	2) Progress sharing among AMS
	3) Multi-sectoral dialog on urban resilience

 Table 1.2.3
 Summary of the Draft Concept Note

<sup>&</sup>lt;sup>1</sup> As of April 2016, the name of the future forum was ASEAN Urban Resilience Forum. The name of "ASEAN Urban Disaster Resilience Forum" is used in this report for the future forum.

Final Report

Contents	Summary	
	<long term=""></long>	
	1) Multi-sectoral framework on urban resilience	
	2) Realization of DDR on regional cross-border mega disaster	
	b) For the seminar	
	1) Development of the Annual Work Plan with schedule and coordination arrangement.	
	2) Plan and operation of the seminar, including coordination among the AMS and	
	invitation of resource persons. (The forum secretariat will be in-charge of planning	
	and operation, and ACDM WG on P&M 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 members through the website.	
Participants	a. The forum secretariat will be in charge of organizing the seminar, writing a sem	
	report, and announcing public relation activities through the website.	
	b. Two representatives from each AMS will be invited to attend the seminar.	
	c. Appropriate resource persons from non-governmental sectors, 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	
	WG on P&M. All members can participate in the seminar. Expected members: cities in the AMS 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 the AADMER Fund.	
	b. Cost for each project proposed by the forum member as a pilot project of the forum will	
	be covered by international funds.	
Arrangement	a. Round-trip flights and hotel accommodations for government officers will be covered	
	by each AMS since it will be jointly held with event for ACDM.	
	b. Round-trip flights and hotel accommodations for resource persons will be covered by	
	the forum with the AADMER Fund.	
	c. Round-trip flights/any transportation fees and hotel accommodations for other seminar	
	participants will be covered by the participants themselves.	
	d. A draft agenda shall be circulated to ACDM WG on P&M prior to the seminar.	

Source: JICA Project Team

### Table 1.2.4 Summary of Draft TOR for Secretariat of the ASEAN Urban Disaster 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 the development of public relation material or new	
	etc.	
	5. Other administrative work which is needed for the forum operation	
Professional experience and	1. More than five years of experience to work with government officials or international	
qualifications	organizations	
	2. Fluent in English skills in reading, writing, listening, and speaking	

(3) Study and consultation of possible budget source for future CN18 activities

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

The JICA Project Team had a meeting with ASEC and confirmed the outline of the AADMER Fund. As the AADMER Fund is a replenishment fund depending on voluntary contributions currently coming only from the AMS, and other AADMER programs will also request for the AADMER Fund, it has uncertainty in terms of the amount of allocated budget and sustainability if the activities continue. Therefore, in the meeting, ASEC and the JICA Project Team agreed that the possibility of seeking support from other partners to support the activities should be considered as an alternative option for ensuring the budget for future CN18 activities.

Outline of AADMER Fund

- The fund depends on voluntary contributions coming only from the AMS (according to AADMER Fund regulations, contribution is open to other public and private partners, but so far, contribution has been coming only from the AMS).
- The basic rule of usage of the AADMER Fund is that a program has to get approval from the AMS in advance, then needs to be checked whether there is any sufficient budget in the fund.
- There is no ceiling budget for a proposal which requests financing from the AADMER Fund. The basic points are the approval of the AMS and the availability of funds. If there are no adequate funds to cover, some of the agreed program will be adjusted based on the priority level of the programs to be funded.
- Each year, many proposals requested for financing from the AADMER Fund.

### **1.2.4 Holding Workshops**

The JICA Project Team held workshops which targeted the national and local government officials working for urban planning and disaster risk reduction in the AMS. The JICA Project Team made presentations referring to the agenda of group works and played a role as a moderator. Participants were requested to actively participate in the workshop by expressing their ideas and opinions in group works by country. Table 1.2.5 shows the schedule and agenda of implemented workshops.

Workshops	Date/Venue	Agenda
1 <sup>st</sup> Workshop - How to Utilize Risk Assessment for Urban Resilience -	December 8, 2016 in Vientiane, Lao PDR	<ul> <li>Introduction of CN18 (JICA Project Team)</li> <li>Introduction to Disaster Risk Assessment (JICA Project Team)</li> <li>Disaster Risk Assessment for Flood/Cyclone (JICA Project Team)</li> <li>Disaster Risk Assessment for Tsunami/Earthquake (JICA Project Team)</li> <li>Question and Answer Sessions</li> <li>Orientation for Group Works (JICA Project Team)</li> <li>Group Work-1 (Discussion: Practice for Planning on Urban Resilience Project and Necessary Disaster Risk Assessment)</li> <li>Group Work-2 (Presentation)</li> </ul>

 Table 1.2.5
 Schedule and Agendas of Implemented Workshops

Workshops	Date/Venue	Agenda
2 <sup>nd</sup> Workshop - Toward Mainstreaming Disaster Risk Reduction in Land Use and Development Planning -	December 9, 2016 in Vientiane, Lao PDR	<ul> <li>Part 1: Role of Land Use/Development Planning in Disaster Risk Reduction (JICA Project Team)</li> <li>Part 2: Step-wise Risk-sensitive Urban Planning and Examples (JICA Project Team)</li> <li>Question and Answer Session</li> <li>Brief "Afternoon Session"</li> <li>Group Work-1 Key Issues on Risk-sensitive Land Use and Development Planning</li> <li>Group Work-2 Priority Actions to be taken in Risk-sensitive Land Use and Development Planning</li> <li>Presentation of Worksheets by each AMS Group</li> <li>Plenary Discussion</li> </ul>
3 <sup>rd</sup> -4 <sup>th</sup> Workshop - Development of Useful and Practical Checklists -	March 3, 2017 in Bangkok, Thailand	<ul> <li>Introduction of CN18</li> <li>Purpose and Contents of Checklist (JICA Project Team)</li> <li>Group Work on Checklist</li> <li>Group Discussion (Clarification)</li> <li>How to uUilize Checklist (JICA Project Team)</li> <li>Group Discussion (Issues and Solutions)</li> <li>Introduction and Explanation Guidebook (JICA Project Team)</li> <li>Group Work for Guidebook</li> <li>Answering Questionnaires</li> </ul>





Source: JICA Project Team

Figure 1.2.1 Photos of Workshops

The JICA Project Team also distributed questionnaires at the end of the workshops and made use of the feedback for finalizing the checklists and guidebook. The results of the questionnaires are shown in Figure 1.2.2 – Figure 1.2.11.





Note: 1 to 4 in the above figure shows 1. Very Low, 2. Low, 3. High, 4. Very High, respectively. Source: JICA Project Team

Figure 1.2.2 Q1-1 Overall Impression on Both "Checklists A & B"



Note: 1 to 4 in the above figure shows 1. Very Low, 2. Low, 3. High, 4. Very High, respectively. Source: JICA Project Team

Figure 1.2.3 Q1-2 Assessment on "Checklist A: Disaster Risk Management"



Note: 1 to 4 in the above figure shows 1. Very Low, 2. Low, 3. High, 4. Very High, respectively. Source: JICA Project Team

Figure 1.2.4 Q1-3 YAssessment on "Checklist B: Resilient Urban Development"



Source: JICA Project Team





Figure 1.2.6 Q3-1 Purpose of Checklist



Source: JICA Project Team





Figure 1.2.8 Q3-3 Frequency of Checklist



Source: JICA Project Team





Note: 1 to 4 in the above figure shows 1. Very Low, 2. Low, 3. High, 4. Very High, respectively. Source: JICA Project Team





Figure 1.2.11 Q4-3 Expectation or Opinion on Good Practices by the Proposed Guidebook

# **1.3** Facilitation for Enhancing Networking Among Stakeholders

## 1.3.1 Development of Terms of Forum Membership

The JICA Project Team has developed the proposed items of Terms of Forum Membership as shown in Table 1.3.1.

Item	Summary		
1. Name of forum	The name of the forum is "ASEAN Urban Disaster Resilience Forum".		
2. Objectives	a. Providing shared learning opportunities about disaster and climate change risks in		
	ASEAN cities for the AMS and relevant stakeholders		
	b. Providing shared learning opportunities about measures and implementation for		
	disaster risk reduction, especially from the aspect of urban planning		
	c. Making a cross-sectoral collaboration mechanism at the regional level to facilitate		
	partnerships among stakenoiders in urban development planning and disaster risk		
2 Momborshin	The following organizations can be a member of the forum: 1) control government of each		
3. Wentbership	$\Delta MS_{2}$ city government in $\Delta SE\Delta N_{3}$ 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 WG on P&M to have a membership.		
4. Supporting member	Private companies could be a supporting member of the forum. They are expected to		
11 5	contribute a supporting membership fee.		
	Note: Incentives of contribution should be discussed and finalized.		
5. Structure	The structure of the forum will be: 1) ACDM WG on P&M as the highest decision-making		
	body, 2) ASEAN secretariat as the coordinator between the forum and each AMS, 3) the		
	forum secretariat as the planning, operation, and management body, and 4) each member		
	and supporting members.		
6. Decision-making board	ACDM WG on P&M 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 to		
	provide information about their activities toward making a resilient city to be shared among		
	the forum.		
9. Decision-making process	Items in the 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, will consult with ACDM WG on P&M through the ASEAN Secretariat, and		
	will make a final decision on the proposed issue.		
10. Annual forum	The AURF (conference) will be held annually with participation of members of the forum.		
11. Annual meeting	The annual meeting will be held to discuss and make a yearly plan for the forum objectives		
	and activities. The members of the annual meeting will be the ACDM WG on P&M, the		
	ASEAN secretariat, and the forum secretariat.		
12 Budgeting	The budget source of the forum is to be specified		
120 200800008	NOTE: The proposed possible budget source is the 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.		
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.		

Table 1.3.1	<b>Draft Terms</b>	of Forum	Membership
	21410 101110		

### **1.3.2** Developing a Mailing List

A mailing list was developed to be one of the communication tools for the forum and the activities for the project "Building Disaster and Climate Resilient Cities in the ASEAN". The JICA Project Team has compiled the list of 13 NPCs, with their contact addresses, based on the information from the ASEAN Secretariat. Since these personal information should be protected, this report does not disclose the names and e-mail addresses of the NPCs.

Nation	Designation	Organization
Brunei Darussalam	Special Duties Officer Grade II, Public Relations Officer	International Affairs, National Disaster Management Center (NDMC)
	Officer	Preparedness and Training Department, National Committee for Disaster Management (NCDM)
Camboula	Officer	Information and Relations Department, National Committee for Disaster Management (NCDM)
Indonesia	Director	National Disaster Prevention and National Disaster Management Authority (BNPB)
	Director	National Disaster Management Office, Social Welfare Department, Ministry of Labour and Social Welfare (MOLSW)
Lao PDK	ТВА	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 (RRD), Ministry of Social Welfare
Philippines	Assistant Chief	Plans and Programs Division of the Office of Civil Defense (OCD), National Disaster Risk Reduction and Management Council of the Philippines (NDRRMC)
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)

Table 1.3.2 List of NPCs

Source: JICA Project Team

In order to develop the mailing list for networking, the JICA Project Team drafted the mailing list of the AURF, based on the list of participants in the 1<sup>st</sup> AURF held in Bangkok on July 28, 2016, the 1<sup>st</sup>-2<sup>nd</sup> Workshops for Urban Resilience in ASEAN held in Vientiane on December 8-9, 2016, and the 3<sup>rd</sup>-4<sup>th</sup> Workshops held on March 3, 2017. Since these personal information should be protected, this report does not disclose the names and e-mail addresses of the attendants of the AURF.

Nation	Designation	Organization
Brunei Darussalam	N/A	N/A
Cambodia	Deputy Director	Information and Relations, NCDM
	Executive Assistance to Senior Minister	Information and Relations, NCDM
	Official	Information and Relations, NCDM
	Deputy Director	Information and Relations, NCDM
	Director	BNPB
	Deputy Director	BNPB
	Analyst of Structural Mitigation	BNPB
	Head Section for Disaster Risk Management	BNPB
	Analyst of Disaster Mitigation	BNPB
Indonesia	Section Head of Risk Assessment	BNPB
	Staff of Directorate of Disaster Risk Reduction	BNPB
	Analyst of Structure Non Mitigation	Directorate of Disaster Risk Reduction
	Expert and Lecture on Disaster Management	Gadjah Mada University, Ministry of Higher Education and Research
	Chief Executive	Regional Disaster Management Authority of Bima City
	Head of Infrastructure and Development Region	Planning and Development Agency, Denpasar City
	Task Executive Head	Technical Disaster Handling Agency, Denpasar City
	Director General of Social Welfare Department	National Disaster Management Office, Social Welfare Department, MOLSW
	Deputy Director General	National Disaster Management Office, Social Welfare Department, MOLSW
	Deputy Director of Disaster Management Division	Social Welfare Department, MOLSW
	Technical and Cooperation Officer of Social Welfare Department	MOLSW
	Technical Officer	MOLSW
Lao PDR	Head of ASEAN Cooperation on Disaster Management Division	MONRE
	Deputy Director	ASEAN Disaster Cooperation Division, Department of Disaster Management and Climate Change, MONRE
	Director	Division for National Disaster Prevention and Control Committee Secretariat, Department of Disaster Management and Climate Change, MONRE
	Technical Officer	Department of Disaster Management and Climate Change, MONRE
	Head of Unit, Department of Disaster Management and Climate Change	Department of Disaster Management and Climate Change, MONRE
	Technical Staff of Planning and Cooperation Division, Department of Meteorology and Hydrology	Department of Disaster Management and Climate Change, MONRE

 Table 1.3.3
 Mailing List of AURF

Nation	Designation	Organization
	Division Head	Department of Housing and Urban Planning, Ministry of Public Works and Transport
	Technical Staff of The public Works and Transport Institute	Ministry of Public Works and Transport
	Technical Officer of Fire Prevention and Protection, Police Department, General Police Department	Ministry of Public Security
	Deputy Director of Division, Ministry of Education and Sport	Ministry of Education and Sport
	Coordinator of SNDPCC	Ministry of Health, Cabinet, Law Division
	Technical Officer of ASEAN Social-Culture Community Division, ASEAN Department	Ministry of Foreign Affairs
	Technical Staff	Labor and Social Welfare of Luang Prabang Province
	Deputy	Housing Urban Planning Section, Department of Public Works and Transport (DPWT), Luang Prabang Province
	Head of Section	DPWT, Khammouane Province
	Technical Staff	Labour and Social Welfare Department, Khammouan Province
	Deputy Head of Road and Bridge Administration	Department of Public Works and Transport of Bolikhamxay Province, Ministry of Public Works and Transport
	Division Head	Administration and Management Division, Department of Labour and Social Welfare of Bolikhamxay Province
	Director	Urban Development Division, Department of Housing and Urban Planning, Ministry of Public Works and Transport
	Director	NADMA
	Principal Assistant Director	NADMA
	Senior Assistant Director	NADMA
	Assistant Director	NADMA
	Assistant Director	NADMA
Malaysia	Town and Country Planning Officer	Federal Department of Town and Country Planning Peninsular Malaysia
	Senior Principal Assistant Director	Department of Town and Country Planning, Ministry of Urban Wellbeing, Housing and Local Government
	Senior Civil Engineer	Civil Engineering and Urban Transportation Department, Kuala Lumpur City Hall
	Assistant State Secretary (Administration)	Terengganu State Secretary Office
Myanmar	Director of Relief and Resettlement Department	Ministry of Social Welfare, Relief and Resettlement
	Assistant Staff Officer	Relief and Resettlement Department, Ministry of Social Welfare, Relief and Resettlement
	Planning Officer	Ministry of Social Welfare, Relief and Resettlement
	Assistant Director	Mandalay City Development Committee
	Assistant Chief Engineer/ Visiting Professor of Yangon Technological University	Yangon City Development Committee
	Staff Officer	Relief and Resettlement Department, Tanintharyi Region Office
	Staff Officer	Relief and Resettlement Department, Sagaing Region Office
	Assistant Staff Officer	Relief and Resettlement Department, Yangon Region
	Assistant Staff Officer	Relief and Resettlement Department, Bago Region

Nation	Designation	Organization		
		Plans and Programs Division of the Office of Civil Defense,		
	Assistant Chief	National Disaster Risk Reduction and Management Council of the Philippines		
	Planning Officer I	Office of Civil Defense, NDRRMC, Department of National Defense		
Philippines	Planning Officer II	Office of Civil Defense, NDRRMC, Department of National Defense		
	Director	OCD Region 3, Office of Civil Defense		
	Officer	City Disaster Risk Reduction and Management Office, Butuan City		
	Admin and Training Officer	City Disaster Risk Reduction and Management Office, Butuan City		
Singapore	Chief Inspectorate	Singapore Civil Defense Force, Ministry of Home Affairs		
	Operations Readiness Officer of 1st SCDF Division	Singapore Civil Defense Force, Ministry of Home Affairs		
	Section Commander Course Administrator	Singapore Civil Defense Force, Ministry of Home Affairs		
	Head Operations, SCDF 3RD Division	Singapore Civil Defense Force, Ministry of Home Affairs		
	Director of Research and International Cooperation Bureau	Research and International Cooperation Bureau, DDPM		
	Director of International Cooperation Division	Research and International Cooperation Bureau, DDPM		
	Civil Engineer, Senior Professional Level	Research and International Cooperation Bureau, DDPM		
	Foreign Relations Official, Professional Level	Research and International Cooperation Bureau, DDPM		
	Plan and Policy Analyst, Professional Level	Research and International Cooperation Bureau, DDPM		
	Plan and Policy Analyst	Research and International Cooperation Bureau, DDPM		
	Plan and Policy Analyst	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
Thailand	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, DDPM		
	Staff	Research and International Cooperation Bureau, 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		
	Vice Director	Office of Directorate of Water Resources, Ministry of Agriculture and Rural Development		
	Head of Department	Binh Dinh Water Resource Department		
Nation	Designation	Organization		
---------------	---	--	--	--
	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		
	Director	Department of Cantho Agriculture and Rural Development (Can Tho DARD), Can Tho People's Committee		
	Deputy Director	Sub-Dep in Central and Highland Regions, DNDPC		
	Vice Director	Department of Danang Agriculture and Rural Development (Da Nang DARD), Da Nang People's Committee		
	Officer	Department of Natural Disaster Prevention and Control/ Ministry of Agriculture Rural and Development (DNDP)		
	Chief of Office	Đà Nẵng Standing Office of Steering Committee of Natural Disaster Prevention , Search and Rescue / People's Committee of Da Nang City		
	Deputy Director of Department	Đăk Lăk Department of Agriculture and Rural Development		
	Manager	Nam Định Branch of Irrigation / Nam Định Department of Agriculture and Rural Development		
	Senior Official	Disaster Management Center, Directorate of Water Resources, Ministry of Agriculture and Rural Development		
	Officer of Department of Infrastructure construction	Directorate of Water Resources, Ministry of Agriculture and Rural Development		
ASEAN	Senior Officer	Disaster Management and Humanitarian Assistance Division		
Secretariat	Technical Officer	Disaster Management and Humanitarian Assistance Division		
лнл	Head of Operations	Operations Division		
AHA Center	Senior Disaster Monitoring and Analysis Officer	Operations Division		

Source: JICA Project Team

First, the contact addresses and information of government persons should be formulated in an MS Excel list and utilized for networking among the officers-in-charge of disaster management in the AMS. After that, the contact addresses of other participants should be added and formulated as a list to disseminate the progress of the Project. The JICA Project Team has developed the mailing list group by using Google groups and invited the abovementioned governmental persons. As of April 2017, 19 members joined the mailing list group and received the meeting documents of the workshops.

The address of the mailing list group is "asean-urban-resilience-forum@googlegroups.com".

To disseminate the information timely and to manage/update the list adequately, it would also be 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 on how far this mailing list will be open and how to organize the mailing list.

# **1.3.3** Development of Website

The JICA Project Team developed the Project's website, which was handed over to AHA Centre. The website is one of the communication tools to disseminate the progress and useful information for urban resilience. The outline of the prospected website was discussed in the 4<sup>th</sup> PSC on July 27, 2016, and PSC members came to the conclusion that AHA Centre should be the main actor. Based on this result, the JICA Project Team discussed with the AHA Centre how the website should be developed. The outline of the website is shown in Table 1.3.4., and the image on the top page of the website is shown in Figure 1.3.1.

The URL of the website is "http://aurf.ahacentre.org/".

Objectives	To disseminate progress of the Project.			
Objectives	> To provide a platform for networking among officials-in-charge of disaster management in AMS.			
	Schedule and report of the recent activities, such as PSC meeting, ASEAN Urban Resilience forum, workshop, etc.			
	➢ Guideline and checklist as outputs			
Contents	Information/examples collected in the survey			
Contents	<in future=""> <u>*The following are opinions of the 1<sup>st</sup> AURF participants from the AMS.</u></in>			
	Method and process to formulate Urban Resilience Plan with related information such as hazard map, flood risk, research, etc.			
	Database related to disaster management; exposure, satellite photo, city profile			
	Link collection to websites related to urban resilience in the ASEAN Region			
Function	Form for posting/contribution to update the data			
	➤ Web board for the AURF			
Effect	Promotion of opinion exchange/knowledge sharing among persons in charge of disaster management, especially urban resilience in the AMS			
Directory	Independent website *available to jump from AHA Centre's website			
Maintanana	Administrator: AHA Centre			
Maintenance	➢ Moderator for update: AHA Centre			

 Table 1.3.4
 Outline of the Website

Source: JICA Project Team



Source: AHA Centre (http://aurf.ahacentre.org/)

#### Figure 1.3.1 Image of Developed Website

In addition, the JICA Project Team has developed the Facebook page of the project and posted the Project's progress timely. According to AHA Centre's opinion, the AURF is basically for closed members, so there is no need to promote it widely to the public. In addition, there will be some problems such as administrator/moderator, duplication of the contents, and so on. Therefore, the JICA Project Team recommended using Facebook just as an alternative site until AURF's website is established. However, PSC members recommended keeping the Facebook page after the establishment of the AURF website. Figure 1.3.2 shows the top of the Facebook page.

The URL of the Facebook page is "https://www.facebook.com/ASEAN.CN18Project/".



Source: https://www.facebook.com/ASEAN.CN18Project/

Figure 1.3.2 Top Page of the Facebook Page

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

The JICA Project Team has proposed the possible options of the Management Board, i.e., 1) consultant, 2) AADMER partnership group, CSOs, etc., 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 Center together with the co-chairs of ACDM WG on P&M as the forum secretariat.

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

However, since ASEC has frequent business trips to ASEAN countries, and moreover, they have frequent position transfer, it has been a concern whether they are fully capable to do continuous and seamless performance as forum secretariat. Thus, it is recommended to get strong support from supporters, especially from the international organization, at least in the short term.

Position	Member	Roles				
	Co-chairs of P&M WG	- Planning overall subject of the seminar				
		- Planning overall subject of the seminar				
Forum Secretariat	ASEC	- Coordinating with ACDM WG on P&M				
	ASEC	- Acting as the contact point for invitees and participants for				
		logistic arrangement				
		- Planning detailed subject of the seminar and providing				
	ATTA Cantan	information resource				
Summentana	ATTA Center	- Making documents for the forum, if needed				
Supporters		- Making reports				
	International Organizations	- Knowledge sharing				
	International Organizations	- (Financial support)				

Table 1.3.5	Formation	of Management Board	d
14010 1.0.0	1 of mation	of management boar	

### 1.3.5 Promotion for Active Networking among Persons Involved in the Forum

The JICA Project Team has conducted the following activities for active networking among persons involved in the forum:

- Issuing project newsletters six times
- 1st Round Visiting to NPCs
- 2nd Round Visiting to NPCs
- (1) Issuing Project Newsletters

Starting with the 1<sup>st</sup> newsletter, which reported the launching of the Project in December 2015, a total of six newsletters were issued in English and Japanese by April 2017 and distributed to PSC members, NPCs, ACDM WG members on P&M, and other concerned officials in each AMS during PSC meetings, ACDM WG meetings on P&M, and visits to NPCs in the AMS.

Vol. 1	<ul> <li>Report of the 2<sup>nd</sup> PSC Meeting: Launching of the Project</li> <li>Introduction of the Project</li> </ul>
Vol. 2	<ul> <li>Report of the Project Progress: Nomination of NPCs</li> <li>Report of the 1<sup>st</sup> Round Visiting to NPCs</li> </ul>
Vol. 3	<ul> <li>Report of the 3<sup>rd</sup> PSC Meeting: Project Progress and Discussion on AURF Meeting and Workshop</li> <li>Report of the 5<sup>th</sup> ACDM Meeting on Prevention and Mitigation</li> <li>Middle Listed Cities</li> </ul>
Vol. 4	<ul> <li>Report of the 4<sup>th</sup> PSC Meeting: Project Progress and Discussion on Establishment of AURF and Workshop</li> <li>Report of the 1<sup>st</sup> AURF</li> <li>Result of Questionnaire on AURF</li> </ul>
Vol. 5	<ul> <li>Report of the 1<sup>st</sup>-2<sup>nd</sup> Workshop for Urban Resilience in ASEAN</li> <li>Short Listed Cities and Candidate Cities for Demonstration Project</li> <li>Report of the Workshops for Trial Implementation of Checklist</li> </ul>
Vol. 6	<ul> <li>Report of the 6<sup>th</sup> PSC Meeting: Project Progress and Discussion on Website Development, Draft TOR, Checklist and Guidebook</li> <li>Report of the 3<sup>rd</sup>-4<sup>th</sup> Workshop for Urban Resilience in ASEAN</li> <li>Result of Questionnaire on Checklist and Guidebook</li> </ul>
Vol. 7	Report of the 2 <sup>nd</sup> ASEAN Urban Resilience Forum

 Table 1.3.6
 Topics of Newsletters

Source: JICA Project Team

#### (2) 1<sup>st</sup> Round Visit to NPCs (January 26, 2016 to February 24, 2016)

In this visit, not only the outline and the progress of the Project were shared, but also the cooperation between the JICA Project Team and each NPC was established. The JICA Project Team thereby continued to exchange views with NPCs after the visit and formulated the drafts of the long list and the middle list.

(3) 2<sup>nd</sup> Round Visit to NPCs

The  $2^{nd}$  round visit to the eight AMS has been conducted between November 2016 and early December 2016. The main objectives of the visit are to share the progress of the Project, to explain the results of the  $2^{nd}$  preliminary disaster risk assessment for selecting candidate cities for demonstration

project, and to discuss the shortlisted cities and candidate cities based on the results and opinions of NPCs related to 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, the ASEAN, including the AMS, ASEAN Secretariat, and AHA Center, is supposed to sustain and operate the forum. To ensure sustainability, the following issues should be tackled:

• To raise funds and find source of budget

Raising funds is a critical issue to sustain the forum. In the 3<sup>rd</sup> PSC, the AADMER Fund is proposed as one of the funding sources and discussed as follows:

a. The cost for forum management, the seminar, and website operation and maintenance will be covered by AADMER Fund.

b. The cost for each project proposed by the forum members as a pilot project of the forum will be covered by international fund.

However, it is uncertain if the Project can obtain necessary budget for the AURF from the AADMER Fund because it always depends on the contribution of the AMS. Therefore, the ASEAN should consider finding a development partner that can support the entire activity of the AURF.

• To prepare an action plan towards the next ASEAN Urban Disaster Resilience Forum

To ensure sustainability, an action plan towards the next ASEAN Urban Disaster Resilience Forum is needed. Details such as the demarcation between Lao PDR and Thailand, the actions that co-chairs should take, etc., should be included in the action plan. The future discussion of ACDM WG meeting on P&M should be reflected in the action plan.

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

For further active networking among the AMS, the following issues should be addressed after the assistance period by JICA:

• Providing an opportunity for networking in the AURF meeting

It is required to hold an annual meeting to gather AURF members and set time for the introduction of attendants and presentations by relevant organizations for interactive networking. In case the budget for the annual meeting is not secured, the installation of a forum board function on the website should be considered.

• Transmitting and sharing information periodically by mailing list and updating website

The mailing list, Facebook page, and website of the AURF should be maintained accordingly by managing private information, such as e-mail addresses, and posting activities of the AURF. Each AMS is required to provide information on urban resilience in each AMS to AHA Centre for updating website. AHA Centre has a role to manage the website and update the contents technically.

# 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 the 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 areas of risk-sensitive urban development, land use management plans, and investment programs through building the most cost-effective risk reduction and adaptation measures.

From several high-risk cities in the ASEAN, the candidate cities for the demonstration project will be selected based on the preliminary risk assessments (PRAs) described in this chapter, in which the framework of the demonstration project would also be 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 to be implemented in Output 2 are stipulated in the scope of works as follows:

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

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

# 2) Formulation of TOR for the demonstration projects

In order to implement the demonstration project after receiving support from JICA, activities of Output 2 include the formulation of the TOR as the framework to define the scope of works, the responsible and implementation bodies, and the necessary institutional arrangement for the project. The formulation of the draft TOR will be discussed later in Section 2.6.

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

# 2.2.1 Evaluation Methodology of Candidate Cities

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

(1) Principles for Evaluation of the Candidate Cities for the Demonstration Project

- **Representativeness** of natural hazards in ASEAN, which have frequently affected cities and caused considerable damages to their socioeconomic conditions. However, it should be noted that the types of natural hazards are limited to those that directly affect people and the assets of cities. These exclude hazards with immeasurable physical and spatial damages (e.g., forest fire, drought, etc.).
- **Replicability** to apply the demonstration project to similar urban municipalities or cities in AMS, with predominantly small-sized to medium-sized populations.
- Sustainability and preparedness for effective demonstration of the project in terms of capacity and project experiences on disaster risk reduction and management. If implemented as a good practice, a demonstration project can be achieved and may successfully influence other cities.
- Significance of economic exposure such as agglomerated industrial areas in cities to be protected from hazard risks. Several countries in AMS had economic assets and activities which had been greatly affected by natural hazards not only at the local level, but also at the national level in the past.
- Others, such as availability of basic information and data on current socio-economic status, hazards, development and land use plans, and presence of hazard management organizations can be considered as pre-conditions. National and regional significance in conjunction with policies and strategies of each member state are also considered for selection.

(2) Evaluation Method through PRAs for Cities with Typical Natural Hazards in AMS

In order to identify and select candidate cities in AMS, PRA is applied to the evaluation method of the demonstration project based on the three indicators, i.e.: intensity level of natural hazard dangers, scale of exposure, and level of capacity. A gradual evaluation process is noted due to limited availability of city level information. Taking into account the United Nations Office for Disaster Risk Reduction (UNISDR) Terminology 2009<sup>1</sup>, each indicator for the evaluation is defined and considered as follows:

- **Natural hazards** are dangerous phenomena or conditions which can lead to loss of life, injury, property damages, loss of livelihoods and services, social and economic disruption, or environmental damage in AMS. These could manifest in the form of floods, cyclone (i.e., typhoon, monsoon) winds and surges, earthquakes, and tsunami. Secondary information and quantitative data about natural hazards covering entire areas of AMS are available.
- **Exposure** is an assessment indicator for potential damages that may occur to exposed people and assets (e.g., population, infrastructure, and other key facilities) as a result of natural hazards

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

in a given event. This 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 a specific area of interest.

- **Capacity** is defined by institutions as societal coping abilities, as well as human knowledge and skills, and collective attributes such as social relationships, leadership, and management. In cities where capacity can be assessed through quantitative information and data, capacity gaps are identified for further action on disaster risk management.
- (3) Definition of City to be Applied to the Project

The term "city" covered in this project can be defined as an urban status administration of local governments according to each AMS administrative definition, although there may be some differences in terms of population or definition. Table 2.2.1 shows each adopted administrative status of the city in this project.

A total of 2,431 local governments, including rural and urban administration, are observed in AMS according to desktop information (e.g., countries' website and documents). Based on the aforementioned definition, cities subject for evaluation of the demonstration project are covered by 817 urban local governments as indicated in Table 2.2.1.

Country	Abbrevi ation	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	District	Daerah	36	
6. Myanmar	MMR	Township		330	
7. Philippines	PHL	City	City	145	
8. Singapore	SGP	There is no typical local government except the Community Development Council for the government program operation.			
9. Thailand	THA	City Municipality	Amphoe Mueang	44	
10. Viet Nam	VNM	Provincial City*	TPTTT (TX*)	61	
Total (Urban Local Government)					

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

Note: Abbreviations are adopted from the list of countries' abbreviation in the United Nations

\*In the case of Viet Nam, the city is defined basically by "Provincial City/TPTTT; however, some cities were selected at the level of towns (TX) through discussions with NPC of Viet Nam.

Source: JICA Project Team

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

(1) Overall Process and Steps for PRA and Selection of Candidate Cities

According to the principle and method for PRA mentioned in the previous section, 817 cities are evaluated based on three factors in order to select candidate cities for the demonstration project, but note that factors are based on different levels of data in the gradual evaluation process. There are three steps to narrow down the range of selection from an entire list of cities to the final candidate cities, while considering efficient and available data collection.

For natural hazard information in AMS, the Global Risk Data Platform by the United Nations Environment Programme (GRDP/UNEP), the Global and Regional Integrated Data-Geneva (UNEP GRID/Geneva), the UNISDR, and some updated data by the Global Risk Report-UNISDR (GAR-UNISDR) could provide the most efficient and suitable data sources for the assessment in terms of data homogeneity and accessibility covering all member countries.

In addition to GRDP/UNEP information, data collection is implemented through table-top surveys (e.g., website) for basic or general information from cities and field surveys through a subcontract survey in each member state. On the other hand, the evaluation process will take into account the interactions of each country, with recommendations on some candidate cities within each country based on some considerations. The process is shown in Table 2.2.2, and detailed assessments are described in further sections.

• STEP 1: First Preliminary Risk Assessment (1<sup>st</sup> PRA) for Middle List Cities

From the long list of cities from all local governments in AMS, only the identified 817 cities are assessed based on two factors: intensity and risk of key potential natural hazards and considerable vulnerability to exposures. Regional infrastructure such as seaports and airports are considered in this step. The long list will be narrowed 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 included in the middle list are further assessed based on three factors, i.e.: risk to natural hazards, exposure vulnerability, and coping capacity. The middle list will be narrowed down to a short list of cities based on data from surveys and through discussions and recommendations by each member 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 recommendations by each member state, considering the consistency with the principles of the demonstration project.



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

Note: \*\*GRDP/UNEP: UNEP-GRID/Geneva, UNISDR, \*\*\*Data collection mainly through table-top (e.g., website documents, satellite imageries), \*\*\* data gathering survey through subcontract survey conducted by the JICA Project Team, \*This includes all local governments (rural and urban) and 817 cities among local governments are covered by the preliminary risk assessment.

Source: JICA Project Team

## (2) Methodology of Assessment and Evaluation

The 1<sup>st</sup> PRA, 2<sup>nd</sup> PRA, and final evaluation are accomplished through quantitative analysis, which in principle is done by scoring elements and assigning grades in relation to the criteria (e.g., 1-5 points). In addition, based on the assessment results of each city, discussions are held with each AMS representative or National Project Coordinator (NPC) in order to review and recommend other cities as candidate cities. Detailed scoring methods for each step are described in further sections.

# (3) Assessment and Evaluation Criteria in Each Step

Criteria for assessment and evaluation are set in consideration with applicability of analysis in each step. In the case of STEP-1(1<sup>st</sup> PRA), homogeneity and availability of data are to be considered and used to assess 817 cities. Information based on subcontract 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 the final selection of candidates, wherein decision making is required from member-states and relevant stakeholders through evaluation of consistency with the evaluation principles of the 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 Preliminary Risk Assessments (PRAs)

Note: Data Resources

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

2: Data collection mainly through table-top (website documents, coordinates by satellite imageries from Google Earth) 3: Survey data mainly through the data gathering survey through subcontract conducted by the 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 the tropical climate zone, except for the northern parts of Lao PDR, Myanmar, and Viet Nam which belong to the 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, the Philippine Ocean Plate, and the Australia Plate. The collision of these tectonic plates causes earthquakes, tsunamis, and volcanic eruptions. Further, the volcanic geology, which is susceptible

to erosion, together with plentiful rainfall causes sediment disasters in Indonesia and in the 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 the ASEAN Region, there are mainly seven types of hazards in terms of number of occurrences between 1980 and 2011: earthquake including tsunami, flood, sediment disaster (wet), sediment disaster (dry), storm, volcano, and drought.

#### (2) Earthquake and Tsunami in ASEAN

Regarding earthquake-related disasters, this project targets two hazards, namely; earthquake and tsunami. In this section, characteristics and past significant events in relation to these hazards in the ASEAN Region are explained.

1) Earthquake

As illustrated in Figure 2.2.1, the past seismic activities in the ASEAN show that it is a region of varying high seismic hazard, especially in the Philippines and in Indonesia which are located near tectonic plates and have had a lot of earthquakes in the past. As shown in Table 2.2.4, the most number of earthquake casualties in the ASEAN Region occurred in the same two countries. In addition, the Sagaing Fault lies in Myanmar. Although there have been no reports of significant damage, there is a possibility of this fault causing devastating damage. The earthquake hazard map in Figure 2.2.2 shows high seismic risk in Myanmar.

No.	Date UTC	Location	Magnitude	Deaths
1	20/01/1917	Bali, Indonesia	-	1,500
2	16/08/1976	Mindanao, Philippines	7.9	8,000
3	16/07/1990	Luzon, Philippines	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

 Table 2.2.4 Earthquakes with 1,000 or More Deaths in the ASEAN Region (since 1900)

Note: \*includes deaths from resulting tsunami, UTC: Coordinated Universal Time Source: JICA Project Team based on EM-DAT

<sup>&</sup>lt;sup>2</sup> EM-DAT: The OGDA/CRED International disaster database: www.emdat.be - Université Catholique de Louvain - Brussels – Belgium



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





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 26 December 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. This catastrophic event killed about 174,500 people in the 14 countries. Besides this event, the Philippines had a lot of tsunami events in the past as shown in Figure. 2.2.3. The possibility of future significant tsunami events and damages should be given utmost attention.



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

# Figure 2.2.3 Past Significant Tsunami Events in the ASEAN Region

# (3) Flood and Water Hazards in the ASEAN Region

There are five types of water-related hazards, namely; flood, flashflood, drought, storm, and sediment disasters by rainfall. As the JICA Project Team consulted in the 2nd Project Steering Committee Meeting held on 3 December 2015, flood, cyclones/typhoon wind, and cyclones/typhoon surge are to be considered in this project. Disaster risk by flash flood and sedimentation is small in low lying urban areas where urban functions are accumulated. For drought, it is considered that the difference in land use does not impact to the scale of the disaster. Since this project aims at mainstreaming of DRR into urban planning including land use planning, targeting drought as one of the disaster types is not matching with the aim of this project.

Based on EM-DAT, the outline of flood disasters in the ASEAN Region for the last three decades 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. In addition, as seen in the graph, Thailand has remarkably high estimated total damage costs due to flood disasters in August to December 2011.

## (4) Storm

The outline of storm disasters in the last three decades is summarized in Figure 2.2.5. Storms occur most frequently in the Philippines, followed by Viet Nam, affecting a lot of people and causing death. In Myanmar, although the frequency of storm is not as high as compared with the Philippines and Viet Nam, the total death count and estimated damage cost were considerably high. In particular, the number of deaths exceeded 100,000 due to Cyclone Nargis which struck Myanmar 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 Disasters 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 Disasters for 30 years

# 2.3 First 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 known as "long list cities" are identified and extracted by urban administrative-status local governments in AMS. These cities include the capital cities or the secondary cities with the largest population in each country (e.g., Ho Chi Minh City: 5,880,000 people) and the cities with the smallest population (e.g., Injangyang Township in Myanmar:1,732 people). Reflecting on the different administration systems of AMS in relation to number of cities, there are considerable gaps in city population in largely-populated countries such as Myanmar, Philippines, and Indonesia, while average city population ranges widely from around 20,000 to 500,000 people. Detailed data on the long list cities are indicated in Appendix 3.

AMS	Number	Population Indicators (,000)		(,000)	Administration	Available
(code)	of Cities	Max-Min	Average	Median	Administration	Data Year
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		

Table 2.3.1 Character of Long Listed Cities in AMS

Source: JICA Project Team





Final Report



Source: JICA Project Team



(2) Considerable Exposures to be Assessed

#### 1) Key regional infrastructure

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

When cities are assessed in terms of vulnerability of exposures to potential natural hazards, regional infrastructure (e.g., seaports and airports as considerable exposures) are considered in the context abovementioned, whether they serve a city or not. Major regional seaports and airports serving international passengers and regional goods transportation in AMS are identified and 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, economic exposure is taken through agglomerate industrial areas, considering lessons learned from past disasters in industrial areas where deteriorated regional supply chain caused by floods resulted to significant damages in ASEAN economic activities. In this section, a certain level of industrial area with large-scale property (i.e., more than  $1\sim2$  ha) and a modern type of industrial area are considered to be selected through reviews of 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 $1^{st}$ PRA

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

As mentioned in the previous section, natural hazards that typically happen in AMS are considerable risks to affected exposures. For the 1<sup>st</sup> PRA, the types of natural hazards are identified as earthquake, tsunami, flood, tropical cyclone wind, and surge including monsoon and typhoon. This definition utilizes published natural hazard data with some risk assessment data from UNEP/UNISDR. Details are described in further sections.

Additionally, it should be noted that drought and other natural hazards are excluded for assessment due to the following reasons:

- Drought is one of the complex natural hazard phenomena which often happen at a long term and cause a wide range of damages to local areas. Therefore, scientific research for assessment is still not established internationally. In this regard, cities cannot be assessed for these events since spatial data for exposure vulnerability are not available.
- Other natural hazards, such as volcano eruptions, are also excluded because they happen in limited countries within AMS. Wildfires that leave cities in urban areas critically affected are also not considered as natural hazards. Also, there are no integrated data and sources at the city level in AMS.

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

As briefed in the previous section, long list cities are considered by the appropriate scale of populations for the 1<sup>st</sup> PRA according to the principles of the demonstration project. The following criteria are used to narrow down the list by identifying cities consistent with the principles:

- City at medium scale population in AMS: Capital cities and small cities with populations of under 10,000 people are excluded in accordance with the principles of the demonstration project.
- Cities within 90<sup>th</sup> percentile in each AMS: The top 5% of cities with the largest population and the bottom 5% of 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, the results of cities assessed and selected through quantitative scoring by utilizing the open-source data (UNEP/UNISDR) are reviewed by each AMS through discussions with NPC. Considering appropriateness of local information and conditions in each AMS, the assessed middle list cities are modified and finalized.

#### (2) Vulnerability Assessment Criteria for Key Exposures of Cities

As shown in Table 2.3.2, regional seaports and airports as key infrastructure were assessed using indicators such as their proximity to the city and the number of facilities. In a similar way, agglomerate industrial areas were assessed by their vulnerability in consideration with distance from the city and number of facilities. Both indicators were scored by assigning of grades  $(1\sim3)$  as shown in Table 2.3.2.

#### Table 2.3.2 Measurement Indicators and Scoring Grade for Key Infrastructure and Agglomerate Industrial Area

Key Exposures		Scoring Grade by Conditions			
		3 points	2 points	1 point	0 point
Key	Regional airport (A)	Located within 10 km	Within 10 km either A or S	Within 10~20 km range (A+S, A or S)	No
Infrastructure	Regional seaport (S)	(A+S)			facilities
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 and Tsunami on Cities

For the 1<sup>st</sup> PRA, earthquake and tsunami hazards are evaluated based on the GRDP/UNEP and previous study results. The index used for assessment is shown in the table below.

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

 Table 2.3.3 Hazard Index for 1st Preliminary Risk Assessment

Source: JICA Project Team

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

On the other hand, tsunami hazard data from GRDP/UNEP is based on the Global Assessment Report on Risk Reduction (GAR) designed by the International Centre for Geo-hazards/NGI. The index represents expected affected percentage of each mesh over a minimum return period of 500 years. Based on these data, the hazard index value of each long list city was extracted on GIS from the maximum hazard index among meshes within an approximate 10-km radius of the city coordinates.

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

# 1) Characteristics of flood and other water hazards

Floods can be explained by multiple parameters, not only by rainfall. Floods usually result from a combination of meteorological, hydrological, and hydraulic extremes, such as extreme precipitation (rainfall), infiltration into the ground, runoff from the 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, the flood considered is urban flood as defined in Table 2.3.4.

Final	Report
1 mai	nepon

Types of		Ongot time	Duration		
flooding	Naturally occurring	Human induced	Onset time	Duration	
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 a few hours to days	
Pluvial and overland flood	Convective thunderstorms, severe rainfall, breakage of ice jam, glacial lake burst, earthquakes resulting in landslides	Land use 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	

Table 2.3.4 Type and Cause of Floods

Source: Cities and Flooding 2012, pp 56-57

Water hazards in general have a probability of occurrence within a specified period in a given area, with a given intensity. Therefore, these assessments require studies related to the analysis of physical aspects and phenomena through the collection of historical or recent records. In this study, only authorized data are used in hazard assessment.

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

For the 1<sup>st</sup> PRA, the cities in the long list were assessed based on conditions of flood, tropical cyclones including monsoon and typhoon, and by the wind (storm) and surge in each AMS. GRDP/UNEP data, which are open source data by UNEP/GRID-Geneva in association with UNISDR, were used as the secondary data for the 1<sup>st</sup> PRA. The data source is summarized in Table 2.3.5. It should be noted that the database of GRDP/UNEP is considered useful for evaluation and comparison on the same assumptions for hazard assessment, but data sets are not updated (i.e., data used are from 2015/2016), and some evaluation processes and methodologies are not publicized clearly.

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

Table 2.3.5	Flood and	Water Hazard	Assessment by	<b>GDPR Data</b>
-------------	-----------	--------------	---------------	------------------

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

#### (5) Quantitative Assessment of Natural Hazard Risks and Exposure Vulnerability in Cities

## 1) Natural hazards (risks) assessment of the cities

The cities in the long list were assessed in terms of the scores given to the 5-km grid units. In other words, the locations of cities identified by coordinates were automatically given a score based on the grid of GRDP/UNEP through GIS spatial analysis.

#### 2) Scoring for assessment of natural hazards

The assessment and index for natural hazards and exposure vulnerability resulting from works in (2), (3), and (4) were evaluated in an integrated manner through their normalization process. Weight factor was considered because natural hazards had a ten-point scoring scale thus resulting to higher score values, while exposure vulnerability had only a three-point scoring scale. Table 2.3.6 shows the overall criteria for scoring values, including criteria for the exposure vulnerability.

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

 Table 2.3.6 Criteria for Assessment Scoring of Cities in AMS

Note: \*only in the case of tsunami hazard Source: JICA Project Team

#### 3) Consideration with overall assessment of cities

Each score for the natural hazards and the exposure vulnerability was assessed and the middle list cities were identified with the following considerations:

- *Cities representing each typical natural hazard*: Each type of natural hazard may have their own and appropriate disaster mitigation measures to maximize their effectiveness in coping with a particular characteristic of natural hazard. Therefore, the identified evaluation for each type of natural hazard should be maintained, and scores of each natural hazard should not be integrated in order to select typical cities for each natural hazard.
- *Referential scores for the vulnerability of exposures:* The scoring values for the vulnerability of key exposures (i.e., 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 the quantitative assessment, the draft middle list cities were reviewed by the NPC of each AMS. There were some necessary modifications reflected by their concerns through confirmations by relevant city authorities in each AMS.

(6) Final Version of Middle List Cities

The results of the 1<sup>st</sup> PRA are summarized in Table 2.3.7, and a detailed list for each country is shown from Table 2.3.8 to Table 2.3.15. The major findings are briefed as follows: Appendix 4 shows the detailed score assessment of the middle list cities.

- Fifty-six cities (i.e. 6.8% of the total cities) in AMS are selected from the long list cities (817 cities).
- Selected cities mainly come from Myanmar, followed by Indonesia, Malaysia, Philippines, and Viet Nam in terms of number of cities affected in the long list cities.
- Flood is the predominant natural hazard, affecting 34 cities (i.e., 60% of the total cities), followed by tsunami where earthquakes are presumed as incidental events in countries such as Indonesia, Myanmar, Malaysia, and the Philippines.
- Some cities in AMS having multi-natural hazard potentials are not specified in relation to the principles of the demonstration project and the expected conditions because of difficult counter mitigation measures against multi-hazards and their probability of occurrence. 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 in other AMS, the cities in these countries are not included in the middle list.

AMS	Number of Cities with Typical Natural Hazards and Risks Type						
AMS	EQ	Tsunami	Flood	CY Wind	CY Surge	Total	
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	35	3	0	56	

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

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

Final Report



Source: JICA Project Team

Figure 2.3.5 Distribution of Middle Listed Cities by Natural Hazard Type in AMS

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

Table 2.3.8 Cambodia Middle List Cities from the 1st Preliminary Risk Assessment

Potential Major	C:4/T V-4-	Key Exposu	Key Exposures (City and Surroundings)		
Natural Hazard Risks	City/Iown: Kota	Population	Infrastructure and Industry		
	Semarang	1,672,999	19 industrial areas (L), local airport/seaport		
Flood	Samarinda	797,006	2 industrial areas (L), local airport		
	Gorontaro	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		
	Bandar Lampung*	1,167,101	2 industrial areas, local airport/seaport		
Tsunami	Denpasar	880,600	Tourism resorts, international airport/seaport		
	Banda Ache	249,499	1 industrial area (planned), international airport/seaport		

 Table 2.3.9 Indonesia Middle List Cities from the 1st Preliminary Risk Assessment

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 from the 1<sup>st</sup> Preliminary Risk Assessment

Potential Major	District: Muoung	Key Exposures (City and Surroundings)		
Risks		Population	Infrastructure and Industry	
	1. Takhek	90,800	3 industrial areas, domestic airport (Thai)	
Flood	2. Luangprabang	90,300	Tourism site (WH), international airport	
	3. Pakxane	45,000	Not specified	

Source: JICA Project Team

# Table 2.3.11 Malaysia Middle List Cities from the 1<sup>st</sup> Preliminary Risk Assessment

Potential Major	District	Key Exposures (City and Surroundings)		
Risks		Population	Infrastructure and 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), international airport/seaport	
	5. Kota Setar (Alor Setar)	366,787	15 industrial areas, local airport	
	6. Langkawi	94,997	International airport, seaport, tourism resorts	

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

 Table 2.3.12
 Myanmar Middle List Cities from the 1st Preliminary Risk Assessment

\*City is listed for Cyclone Wind. \*\*City is listed for Cyclone Surge.

Source: JICA Project Team

Table 2.3.13	Philippines	Middle List	<b>Cities from</b>	the 1st P	Preliminary	<b>Risk Assessment</b>
--------------	-------------	-------------	--------------------	-----------	-------------	------------------------

Potential Major	City	Key Exposures (City and Surroundings)		
Risks		Population	Infrastructure and Industry	
	1. Butuan	309,709	6 industrial areas, local airport, seaport	
Flood	2. Meycauayan	199,154	4 industrial areas	
	3. Cavite	101,120	8 industrial areas, international & 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	
	7. Mandaue	331,320	10 industrial areas, international airport/seaport	
Earthquake	8. Batangas	305,607	5 industrial areas, seaport	
	9. Olongapo	221,178	8 industrial areas, navy air base/seaport	

\*City is listed for Cyclone Wind. \*\*City is listed for Cyclone Surge. Source: JICA Project Team

Potential Major	Province (Changwat ) / District (Amphoe)	Key Exposures (City and Surroundings)		
Risks		Population	Infrastructure and Industry	
	1. Pathum Thani / Pathum Thani	220,154	1 industrial area	
Flood	2. Rayong / Rayong	364,544	7 industrial areas, international 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	

#### Table 2.3.14Thailand Middle List Cities from the 1st Preliminary Risk Assessment

\*City is listed for Cyclone Wind. \*\*City is listed for Cyclone Surge.

Note: Monsoon surge is potential major natural hazard risks for Nakhon Si Thammarat and Songkla. Source: JICA Project Team

Table 2.3.15Viet Nam Middle List Cities from the 1st Preliminary Risk Assessment

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

\*City is listed for Cyclone Wind. \*\*City is listed for Cyclone Surge. Source: JICA Project Team

# 2.4 Second Preliminary Risk Assessment for Short List Cities

# 2.4.1 Methodology of 2<sup>nd</sup> Preliminary Risk Assessment for 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 as the final step for the quantitative evaluation for the candidate cities 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 local consultants through field surveys in AMS. Especially for this assessment, a new factor is evaluated, specifically the coping capacity of the

local government on the vulnerability assessment by detailed natural hazard risks and their exposures in the cities. Figure 2.4.1 illustrates the applied formula for the 2<sup>nd</sup> PRA.

Also, it should be noted that this assessment is examined by comparative evaluation scoring within each AMS rather than absolute scoring of entire countries in AMS, considering the variety of socioeconomic conditions such as the population range and the 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 of Middle List Cities

As mentioned in the previous section, vulnerability assessment is done based on the hazard factor and the exposure factor. In this section, item (1) explains the natural hazard elements and item (2) explains the exposure factor. In addition, item (3) illustrates the methodology for the vulnerability assessment using these two elements. Finally, item (4) shows the result of the assessment.

(1) Natural Hazard Elements for Vulnerability Assessment

The hazard data used for the 2<sup>nd</sup> PRA follows five items. The indicator and data source for each hazard are described below. Table 2.4.1 thoroughly describes each indicator of natural hazards.

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

Natural H	azard	Description					
Earthquak	te	Earthquake hazard is evaluated in PGA. During an earthquake, the ground not only shakes, but it also experiences acceleration. PGA is a common indicator to express the hazard. Frequency is applied for 475 years (10% in 50 years) as a common scale on the basic idea of the expected largest earthquake in the operation period of a 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 gals.					
Tsunami		Tsunami hazard is evaluated to the extent where it is inundated by run-up with a 500-year return period. Since GAR data does not clarify the inundation depth, the run-up extent is applied.					
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-year return periods. In this study, the target flood is primarilyy for a 50-year return period, and/or secondly for a 100-year return period. The plan for river improvement is designed in the entire basin area, but this study focuses on the city as a point. Generally, a city cannot handle a 25-year flood. Also, in this study, there is not just one major target hazard. Thus, river improvement and river indicator do not have to match. Inundation depth is related to human assets, house assets, road and logistic assets, economic assets, and ecological assets. In this study, the target assets are not specified, and the inundation depth is set at 0.0 m.					
Cyclone	Wind	The cyclone wind data from GAR is available for 50, 100, 250, 500, and 1000-year return periods. As with flood hazards, the frequency is set to a 50-year return period. Cyclone/wind hazard is evaluated by wind speed, expressed in kilometers per hour (km/h). The threshold of damage is set to more than 90 km/h (or about 25 m/s), and the indicators are set to 135, 180, and more than 180 km/h.					
	Surge	Cyclone/surge: Cyclone/surge hazard is evaluated from historical data as well as from the 1 <sup>st</sup> PRA with GRDP data. Based on data from 1975 to 2007, the extent is evaluated as a tsunami indicator.					

Table 2.4.1 Indicator of Each Type of Natural Hazard for 2nd PRA

Source: JICA Project Team

#### (2) Exposure Elements for Vulnerability Assessment

In this study, the target assets for the exposure elements are defined as <u>human assets</u> and <u>physical assets</u>. The human assets are represented by population, while the physical assets are represented by Gross Domestic Product (GDP) as an economic indicator of agglomerate industrial area and regional infrastructure, specifically seaport and airport. GAR data (i.e., population and GDP) prepared by point data is converted to the point date 5-km mesh data. To estimate the population and GDP, this mesh data and municipality boundary overlap for quantitative evaluation. This process is described and illustrated as follows:

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 the boundary by dividing the rate of the population of the target municipality. Infrastructure: industrial area, airport, and seaport are evaluated for infrastructure data.



Each green point has the population and GDP data. The black line is the municipality boundary.



Convert from exposure point data to mesh data.



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

The exposure within the local government entity in combination with the hazard risk data were assessed by mesh attributes data through the scoring process and by utilizing GIS software. Provided below are detailed explanations of the method and the criteria for each type of natural hazards.



Image 1: Overlapped figure between exposure data and flood



Image 2: Red mesh data is counted for estimation exposure values

Source: JICA Project Team

#### Figure 2.4.3 Image of Estimating Exposure Values

### 1) In the Case of Earthquake and Cyclone/Wind

In order to estimate the exposure population and GDP with the different hazards, earthquake and cyclone/wind should be converted to measurable indicators using weighing functions since these indicators have a range of values. The equivalent value should be considered even for the different hazards (e.g., tsunami, flood, and cyclone/surge). The weighing function is shown in Table 2.4.2.

#### e.g., for earthquake hazard:

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

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		

 Table 2.4.2 Weighing Coefficient of Earthquake and Cyclone/Wind

Source: JICA Project Team

# 2) Agglomerate Industrial Areas and Regional Infrastructure

Similar to the 1st PRA, the agglomerate industrial area and the regional infrastructure for the local government are checked to know whether their locations are within 10 km/20 km buffer from the municipality center. The weighing score is given by the combination of the location of facilities with respect to the distance from a city center and the number of facilities. Table 2.4.3 indicates the scores considering the conditions (i.e., distance and number) of agglomerate industrial areas and regional infrastructure (i.e., seaport and airport).

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

Source: JICA Project Team

(4) Assessment Result of Exposure for Middle List Cities

The calculated results for the vulnerability assessment of each city in AMS are shown in Table 2.4.4 (for earthquake and tsunami) and Table 2.4.5 (for flood, cyclone/wind and cyclone/surge).

Table 2.4.4	Result of	Vulnerability	Assessment	of Exposures	against	Earthauake	and Tsunami
1 a D IC 2. T.T	IXCSUIT OI	vunner ability.	Assessment	of Exposures	agamst	L'ai inquari	and isunami

					Earthquake			Tsunami	Tsunami			
ID	Country	City Name	Population	Ex-Pop*	Pop- Rate **	Ex- GDP ***	Ex-Pop	Pop- Rate	Ex- GDP	AIA ****	RI ****	
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	

				E	arthquake			Tsunami			
ID	Country	City Name	Population	Ex-Pop*	Pop- Rate **	Ex- GDP ***	Ex-Pop	Pop- Rate	Ex- GDP	AIA ****	RI ****
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 City	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

				Flood			Cy	clone/Wi	nd	Cyclone/Surge		
ID	Country	City Name	Population	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	Mrauk-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

# Table 2.4.5 Result of Vulnerability Assessment of Exposure against Flood, Cyclone/Wind, and<br/>Cyclone/Surge

					Flood		Сус	clone/Wi	nd	Cyclone/Surge		
ID	Country	City Name	Population	Ex-Pop	Pop-Rate	Ex-GDP	Ex-Pop	Pop- Rate	Ex- GDP	Ex- Pop	Pop- Rate	Ex- GDP
40	PHL	Mandaue City	331,320	0	0%	0	331,320	100%	6,657	0	0%	0
41	PHL	Meycauayan City	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 Cities

(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 the city can be assessed by obtaining quantitative information and data from questionnaire surveys conducted in each AMS by a subcontract team under the JICA Project Team. Table 2.4.6 shows the contents and the number of questionnaire items collected in the survey.

Attachment No.	Contents	Number of Questionnaire Items
Attachment 3 (Earthquake)		60
Attachment 3 (Flood and others)	Vulnerability related to hazard	63
Attachment 4	Capacities for disaster response	34
Attachment 5	Attachment 5 Land use and development plan on cities	
Attachment 6	Attachment 6 Infrastructure and building facilities for disaster prevention	
Attachment 7         Institutional system for disaster prevention		26

Table 2.4.6 Contents and Number of Questionnaire Items for Middle List Cities

Source: JICA Project Team

For the capacity assessment, the questionnaire items related to capacity are extracted from the survey items and divided into two categories, namely; Prevention and Mitigation and Preparedness. Table 2.4.7 illustrates the part of questionnaire items categorized for the assessment. The total number of items for the assessment is indicated in Table 2.4.8.

Attachment No.	Contents	Category	
a) Organization/institution of local government	- Organizational chart of city government		
	- Roles of each department of city government		
	- Organizational chart of disaster prevention related department		
	- Roles of each section of the disaster prevention related department		
	- Organizational chart of urban planning department	Duouonodu ogo	
	- Roles of each section of urban planning department		
	- Number of CBOs in the city		
b) Community based	- Organizational chart of one CBO		
organization (CBO)	- Roles of each organization in the CBO		
	- Main activities of CBOs in relation to disaster risk reduction		
	- Organization in charge of education on disaster risk reduction		
c) Education for disaster	- Textbook or reference used in education	Prevention and	
risk reduction	- Curriculum of education on disaster risk reduction	Mitigation	
	- Level of understanding of students		
	- Organization in charge of evacuation drill		
	- Content of activities in evacuation drill	Preparedness	
d) Evacuation drill	- Target groups of evacuation drill		
	- Annual schedule of evacuation drill	Prevention and Mitigation	
	- Effect of evacuation drill		
	- Any systems of forecasting and warning	- December 19	
e) Forecasting and warning including emergency alert system	- Outline of the systems showing information flow diagram		
	- Performance of the system		
	- Organization in charge of forecasting and warning		
	- Any evacuation plans in the city	Prevention and Mitigation	
f) Evacuation plan	- Organization in charge of formulating evacuation plan		
	- Organization in charge of implementing evacuation plan		

 Table 2.4.7 Categorized Questionnaire Items (extract)

Source: JICA Project Team

Table 2.4.8	Total Number of	Questionnaire Items	for the Capacity A	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 Middle List Cities

Capacity Point and Lack of Capacity Point are evaluated by their achievement ratio. Each element score is calculated by summing each box objective in an aggregated manner. In addition, Capacity Point is adjusted to a 100-point scale, with 50 points for Prevention and Mitigation and 50 points for Preparedness.

Finally, Lack of Capacity Point is calculated by subtracting Capacity Point from 100 points. That is, a higher Lack of Capacity Point indicates lower capacity of the city against disasters. Table 2.4.9 shows an example of calculating Capacity Point and Lack of Capacity Point.
Category	The number of "YES"	Total number of items	Capacity Point	Lack of Capacity Point	
Prevention and Mitigation	10	45	11 $(=10 \div 45 \times 50)$	26	74
Preparedness	30	102	15 $(=30 \div 102 \times 50)$	20	/4

Table 2.4.9 Example of Calculating Capacity Point and Lack of Capacity Point

Source: JICA Project Team

#### (3) Assessment result of capacity

The calculation results for each middle list city are provided in Table 2.4.10. The frequency distribution of Lack of Capacity Point is illustrated in Figure 2.4.4, which indicates a normal (Gaussian) distribution. In addition, the relationship between the Prevention and Mitigation and Preparedness categories are indicated in Figure 2.4.5, which shows the correlation between these two categories. The average score of the Prevention and Mitigation category (i.e., 27.2) is higher than that of the Preparedness category (i.e., 22.1), which indicates that middle list cities are more prepared rather than adopt for prevention and mitigation of disasters.

 Table 2.4.10
 Calculation Result of Capacity and Lack of Capacity Point

				Capao	Capacity Point			Lack of Capacity Point		
No	Country	City Name	Population	Prevention& Mitigation	Prepar edness	Total	Prevention& Mitigation	Prepare dness	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	20	
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	
23	MMR	Hakha	48,352	23	23	46	27	27	54	
24	MMR	Kale	348,573	19	22	41	31	28	59	
25	MMR	Kyaukpyu	165,352	23	35	58	27	15	42	

Final Report

				Capao	city Point		Lack of Capacity Point		
No	Country	City Name	Population	Prevention& Mitigation	Prepar edness	Total	Prevention& Mitigation	Prepare dness	Total
26	MMR	Kyimyindaing-WY	111,514	13	27	40	37	23	60
27	MMR	Manaung	56,966	19	32	51	31	18	49
28	MMR	Mrauk-U	189,630	15	33	48	35	17	52
29	MMR	Myingyan	276,096	19	15	34	31	35	66
30	MMR	Nyaung-U	239,947	17	27	44	33	23	56
31	MMR	Pwintbyu	163,692	23	28	51	27	22	49
32	MMR	Rathedaung	111,974	14	30	44	36	20	56
33	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 City	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
44	THA	Pathum Thani	84,727	19	28	47	31	22	53
45	THA	Ranot	62,220	19	33	52	31	17	48
46	THA	Rayong	56,010	26	39	65	24	11	35
47	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	H <b>ạ</b> 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 Nhơn	255,463	21	24	45	29	26	55
56	VNM	Sơn La	56,848	15	18	33	35	32	67



Source: JICA Project Team

Figure 2.4.4 Frequency Distribution of Lack of Capacity Point



Source: JICA Project Team

Figure 2.4.5 Correlation between "Prevention & Mitigation" and "Preparedness"

#### 2.4.4 Shortlisted Cities and Candidate Cities for the Demonstration Project

There are 56 cities in the middle list. From these cities, 19 are selected for shortlisting and eight cities from each country except Brunei Darussalam and Singapore are selected as candidate cities for the demonstration project. The number of cities are given in Table 2.4.11.

Country	Earthquake	Tsunami	Flood	Cyclone	Total
Brunei Darussalam	-	-	-	-	-
Cambodia	-	-	3(1)	-	3(1)
Indonesia	3(1)	3(1)	3(1)	-	9(3)
Lao PDR	-		3(1)	-	3(1)
Malaysia	-	3(1)	3(1)	-	6(2)
Myanmar	3(1)	3(1)	3(1)	3(1)	12(4)
Philippines	3(1)	-	3(1)	3(1)	9(3)
Singapore	-	-	-	-	-
Thailand	-	-	3→(1/2)*1	2→(0/1)*1	5(2)
Viet Nam	-	3(1)	3(1)	3(1)	9(3)
	9(3)	12(4)	24(8/9)	11(3/4)	56(19)

Table 2.4.11 Number of Cities in Short List

Note: The figure in parentheses is the number of shortlisted cities.

\*1: If there is no candidate city from cyclone disasters, two candidate cites from flood disasters are selected. Source: JICA Project Team

Based on the 2<sup>nd</sup> PRA, the following procedure is applied in the selection of shortlisted cites:

Step 1: Exclude cities which have relatively low exposure risk.

Due to limited information used in the 2<sup>nd</sup> PRA, some low risk cities are selected based on detailed information from the NPC. Considering that they are not likely to be candidate cities for the demonstration project, these cities were intentionally excluded by the JICA Project Team.

Step 2: Evaluate high exposure GDP

The relationship between the index of GDP and the index of population are done with correlation; however, GDP is evaluated prior to population due to the characteristic of this project.

Step 3: Evaluate exposure population

As described in Step 2, the index of population is the secondary index.

Step 4: Evaluate high Lack of Capacity Point

Compared with the other assessments, Capacity Point as the indicator of capacity assessment is not equally but partially arbitrary due to the hearing survey. Capacity Point is used for reference.

Through these steps, the JICA Project Team prepared the priority cities for shortlisting from the middle list cities for each country. Based on consultations with NPC, the final shortlisted cities were selected.

Furthermore, there were some instances wherein more than two cities were shortlisted. At the time of discussion on the shortlisted cites with NPC, the JICA Project Team carried out the selection of the candidate cities for the demonstration project.

One of the primary characteristics of the demonstration project is for broad utilization in their countries. It is also important to consider the national policy/strategy. A candidate city is basically referred to its intent.

The short list cities were selected as a result of the 2<sup>nd</sup> PRA. The candidate cities were also selected through the discussion between NPC and JICA Project Team members in accordance with the principles of the demonstration project as the decision criteria (e.g., representativeness, replicability, sustainability and preparedness, etc.) and with the final approval by the Project Coordination Committee (PCC). The following table shows the shortlisted cities and candidate cities for the demonstration project.

	Short Listed Cities	Candidate Cities		
Country	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)	2	Kyimyindaing (C)	1
Philippines	Butuan (F), Meycauayan (E)	2	Butuan (F)	1
Thailand	Pathumthani (F), Rayong (F)	2	Pathumthani (F)	1
Viet Nam	Qui Nhon (C,T), Hue(F), Ha Long (T)	3	Qui Nhon (C),	1
	Total	16	Total	8

Table 2.4.12Shortlisted Cities and Candidate Cities

Note: ( ) shows the main disaster type for the cities. (C): Cyclone, (E): Earthquake, (F): Flood, (T): Tsunami Source: JICA Project Team

(1) Cambodia

There are three middle list cities in Cambodia: Phnom Penh, Battambang, and Kampong Cham. The results of each index are shown in Table 2.4.13. Phnom Penh is most likely to be selected for shortlisting; however, it is the capital city, and it has already implemented several projects under development partners including an ongoing project.

Considering the Second East-West Economic Corridor from Bangkok to Ho Chi Minh, Battambang is located along this corridor, and this city will be developed in future. Thus, Battambang is selected for shortlisting. In Cambodia's case, Battambang is also nominated as the candidate city for the demonstration project.

	Exposure	Total	Exposure	Exposure	(5) Lack of
	Population	Population	Rate	GDP	Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Phnom Penh	1,229,819	1,242,992	99%	5,531	68
Battambang	140,533	140,533	100%	473	62
Kampong Cham	47,300	47,300	100%	223	60

Table 2.4.13Main Indicator in Cambodia

Source: JICA Project Team

#### (2) Indonesia

There are nine middle list cities in Indonesia:

Three cities with flood hazard: Semarang, Samarinda, Gorontaro; Three cities with earthquake hazard: Ambon, Bitung, Bima; and Three cities with tsunami hazard: Bandar Lampung, Denpasar, Banda Ache.

The results of each index are shown in Table 2.4.14 to Table 2.4.16. Based on the discussion with Badan Nasional Penanggulangan Bencana (BNPB), Kota Semarang (for flood), Denpasar (for tsunami) and Kota Bima (for earthquake) are selected as short list cities. Kota Semarang frequently suffers from inundation both inside the levee and by river water. Denpasar has a lot of potential for future development but few surveys have been implemented. Kota Bima has suffered from an earthquake with a magnitude of 6.5 in 2007, and their mayor has a good understanding of resilience and of this project.

From the three shortlisted cities, Denpasar was selected as the candidate city for the pilot project since many tourists gather in Denpasar, and damages from disasters in Denpasar will affect the economy in other parts of Indonesia.

	ExposureTotalExposurePopulationPopulationRate		Exposure GDP	(5) Lack of Capacity	
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Samarinda*	709,164	797,006	89%	9,136	38
Gorontalo	169,810	197,970	86%	3,876	51
Banda Aceh	217,095	249,499	87%	3,405	53

Table 2.4.14Main Indicator based on Flood in Indonesia

Source: JICA Project Team

Table 2.4.15Main Indicator based on Earthquake in Indonesia									
	Exposure Population	Total Population	Exposure Exposure Rate GDP		(5) Lack of Capacity				
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)				
Bandar Lampung	233,441	1,167,101	20%	2,961	28				
Ambon	197,712	395,423	50%	875	32				
Denpasar	176,120	880,600	20%	871	41				
Banda Aceh	49,900	249,499	20%	783	53				
Bima	30,906	156,400	20%	572	16				
Bandar Lampung	233,441	1,167,101	20%	2,961	28				

Source: JICA Project Team

Table 2.4.16Main Indicator based on Tsunami in	1 Indonesia
--	-------------

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Bandar Lampung	438,239	1,167,101	38%	5,520	28
Banda Aceh	185,414	249,499	74%	2,908	53
Ambon	384,192	395,423	97%	1,708	32
Denpasar	288,601	880,600	33%	1,427	41
Bima	59,995	156,400	38%	1,320	16
Bitung	169,907	202,204	84%	838	33

Source: JICA Project Team

#### (3) Lao PDR

In Lao PDR, there are three middle list cities: Pakxane, Thakhek, and Luang Prabang. The results of each index are shown in Table 2.4.17. Thakhek is the most probable city for shortlisting; however, its figures are similar to other cities and are not critical.

Through the study of Output 3, a trial checklist workshop was conducted in Luang Parbang. This city has an understanding of the project and has the motivation to implement the project. Through consultations with NPC, Luang Parbang was selected for shortlisting. In the case of Lao PDR, Luang Prabang is also nominated as the candidate city for the demonstration project.

		-			
	Exposure	Total	Exposure	Exposure	(5) Lack of
	Population	Population	Rate	GDP	Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Pakxane	44,937	45,000	99.9%	2,185	89
Thakhek*	90,446	90,800	99.6%	2,471	94
Luang Prabang	82,976	90,300	91.9%	1,113	94

Table 2.4.17Main Indicator in Lao PDR

Source: JICA Project Team

#### (4) Malaysia

In Malaysia, there are six middle list cities:

Three cities with flood hazard: Kuala Terengganu, Kuala Muda (Sugai Petani), Sibu; and Three cities with tsunami hazard: Kota Setar (Alor Setar), Langkawi kedha, Timur Laut (George Town)

The results of each index are shown in Table 2.4.18 and Table 2.4.19. Based on the discussion with National Disaster Management Agency of Malaysia, Kuala Terengganu (for flood) and George Town (for tsunami) were selected as short list cities. This is because the east coast, including Kuala Terengganu, has been frequently affected by flood, and Malaysia is currently focusing on the flood disaster mitigation in the east coast area.

In addition, Kuala Terengganu was selected as the candidate city for the pilot project, considering and expecting the dissemination to other cities in the east coast.

Table 2.4.18	<b>Main Indicator</b>	based on	Flood in	Malaysia

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Kota Setar (Alor Setar)	354,883	366,787	97%	12,502	21
Kuala Muda (Sugai Petani)	87,470	456,605	19%	2,436	24
Kuala Terengganu	65,154	343,284	19%	2,123	38
Sibu	35,099	247,995	14%	1,389	44

Source: JICA Project Team

Table 2.4.19Main Indicator	based on	Earthquake in	Malaysia
----------------------------	----------	---------------	----------

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Timur Laut (George Town)	453,042	520,242	87%	29,832	36
Kuala Terengganu	236,596	343,284	69%	8,385	38
Langkawi kedha	81,571	94,777	86%	1,976	27

#### (5) Myanmar

In Myanmar, there are 12 middle list cities:

Three cities with flood hazard: Kale, Kyimyindaing-WY, Nyaung-U; Three cities with earthquake hazard: Amarapura, Myingyan, Pwintbyu; Three cities with tsunami hazard: Kyaukpyu, Manaung, Toungup; and Three cities with cyclones/typhoon surge hazard: Hakha, Mrauk-U, Rathedaung.

The results of each index are shown in Table 2.4.20 to Table 2.4.24. Based on these results, Amarapura (for earthquake and flood) and Rathedaung (for tsunami and cyclones) are candidates for the short list. However, due to capacity limitation and security problems in Rathedaung, Amarapura (for earthquake and flood) and Kyimyindaing (for tsunami and cyclones) were selected as short list cities. In addition, from these two shortlisted cities, Myanmar selected Kyimyindaing as the candidate city for the pilot project.

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Amarapura	216,678	237,618	91%	1,543	62
Myingyan	178,089	276,096	65%	1,345	66
Kale	315,297	348,573	90%	1,128	59
Mrauk-U	178,450	189,630	94%	780	52
Nyaung-U	113,865	239,947	47%	763	56
Pwinbyu	132,003	163,692	81%	730	49
Rathedaung	40,544	111,974	36%	421	56
Taungup	132,467	158,341	84%	387	55
Hakha	11,200	48,352	23%	51	54

Table 2.4.20Main Indicator based on Flood in Myanmar

Source: JICA Project Team

#### Table 2.4.21Main Indicator based on Earthquake in Myanmar

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Amarapura	172,608	237,618	73%	1,253	62
Kale	278,860	348,573	80%	998	59
Myingyan	138,048	276,096	50%	964	66
Nyaung-U	66,854	239,947	28%	424	56
Pwinbyu	37,980	163,692	23%	210	49
Rathedaung	16,779	111,974	15%	174	56
Mrauk-U	37,926	189,630	20%	166	52
Hakha	26,390	48,352	55%	120	54
Kyimyindaing	0	111,514	0%	0	60

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Rathedaung	72,195	111,974	64%	750	56
Kyaukpyu	134,800	165,352	82%	540	42
Kyimyindaing	12,324	111,514	11%	389	60
Manaung	34,629	56,966	61%	186	49
Taungup	63,374	158,341	40%	185	55
Mrauk-U	15,220	189,630	8%	67	52

Table 2.4.22	Main In	ndicator	based	on '	Tsunami	in M	lyanmar
				-			•/ · · ·

Source: JICA Project Team

#### Table 2.4.23Main Indicator based on Cyclone/Surge in Myanmar

	Exposure	Total Population	Exposure	Exposure GDP	(5) Lack of
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Kyimyindaing	111,514	111,514	100%	3,826	60
Rathedaung	101,961	111,974	91%	1,059	56
Kyaukpyu	165,351	165,352	100%	668	42
Taungup	156,238	158,341	99%	456	55
Mrauk-U	99,303	189,630	52%	434	52
Manaung	51,158	56,966	90%	275	49

Source: JICA Project Team

<b>Table 2.4.24</b>	Main Indicator based on Cyclone/Wind in Myanmar							
	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity			
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)			
Rathedaung	67,208	111,974	60%	698	56			
Nyaung-U	92,239	239,947	38%	579	56			
Pwinbyu	81,846	163,692	50%	452	49			
Mrauk-U	94,815	189,630	50%	415	52			
Kyaukpyu	82,676	165,352	50%	334	42			
Taungup	79,171	158,341	50%	231	55			
Manaung	28,805	56,966	51%	155	49			
Hakha	18,157	48,352	38%	83	54			

Source: JICA Project Team

#### (6) Philippines

In the Philippines, there are nine middle list cities:

Three cities with flood hazard: Butuan City, Meycauayan City, Cavite City; Three cities with earthquake hazard: Mandaue City, Batangas City, Olongapo City; and Three cities with cyclones/typhoon surge hazard: Iloilo City, Dagupan City, Laoag City.

The results of each index are shown in Table 2.4.25 to Table 2.4.27. Based on these results, Butuan City and Meycauayan City were selected as shortlisted cities. In addition, Butuan City was selected as the candidate city for the pilot project since it has a high risk of disaster and is currently considered as one of the important cities in the Mindanao island.

				11	
	Exposure	Total	Exposure	Exposure	(5) Lack of
	Population	Population	Rate	GDP	Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Butuan City	251,969	309,709	81%	4,515	31
Laoag City	96,954	104,904	92%	1,350	52
Dagupan City	53,663	163,676	33%	783	26

**Table 2.4.25** Main Indicator based on Flood in the Philippines

Source: JICA Project Team

<b>Table 2.4.26</b>	Main Indicator based on Earthquake in the Philippines						
	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity		
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)		
Meycauayan City	99,577	199,154	50%	7,158	55		
Butuan City	244,745	309,709	79%	4,007	31		
Mandaue City	66,264	331,320	20%	1,331	20		
Dagupan City	79,860	163,676	49%	1,240	26		
Iloilo City	57,783	424,619	14%	1,008	51		
Laoag City	49,677	104,904	47%	664	52		
Batangas City	120,484	305,607	39%	553	22		

Source: JICA Project Team

Main Indicator based on Cyclones/Surge in the Philippines **Table 2.4.27** 

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Butuan City	183,197	309,709	59%	3,563	31
Dagupan City	163,676	163,676	100%	2,540	26
Laoag City	80,276	104,904	77%	1,200	52

Source: JICA Project Team

#### (7)Thailand

There are five middle list cities in Thailand: Pathum Thani, Rayong, Wiang Sa (Nan), Pak Phanang (Nakhon Si Thammarat), and Ranot (Songkla). The first three cities are selected because of the flood hazard and the last two cities are selected because of the cyclones/typhoon surge hazard.

Two cities are selected because of the cyclones/typhoon surge hazard; however, those cities are also affected by the flood hazard. The results of each index based on flood hazard are shown in Table 2.4.28. Pak Phanang (Nakhon Si Thammarat) and Rayong are most likely selected for shortlisting. However, considering the latest flood disaster in Pathum Thani, this city is the most significant.

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Pak Phanang (Nakhon Si Thammarat)	85,407	85,487	100%	3,535	58
Rayong	20,389	56,010	36%	3,213	35
Wiang Sa (Nan)	46,771	67,861	69%	783	54
Ranot (Songkla)	15,917	62,220	26%	626	48
Pathum Thani	0	154,412	0%	0	53

Tabla 7 1 78	Main	Indicator	in	Thailand
1 able 2.4.20	Main	Indicator	ш	т папапа

Source: JICA Project Team

Similar to Lao PDR, the trail checklist workshop was conducted in Pathum Thani. This city is nominated as the candidate city.

#### (8) Viet Nam

In Viet Nam, there are nine middle list cities:

Three cities with flood hazard: Hoi An, Hue, and Anh Khe;

- Three cities with tsunami hazard (which occurred near the west side of the Philippines):
  - Ha Tinh, Dong Hoi, and Ha Long; and
- Three cities with cyclones/typhoon surge hazard: Bac Lieu, Qui Nhon, and Son La.

The results of each index are shown in Table 2.4.29 to Table 2.4.32. Qui Nhon and Hue are most likely to be selected as the candidate cities in terms of the tsunami hazard and the flood hazard, respectively. Based on the following tables, some cities are given high scores in different hazards (e.g., Hue is scored high in flood and cyclone hazards). This is because coastal areas are prone to flood, cyclones/typhoon surge, and tsunami. To avoid duplication, Ha Long is selected for the short list.

In the course of discussions with NPC, Qui Nhon is the candidate city for the demonstration project, considering the recent disaster and the economic development potential.

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Qui Nhon	203,954	255,463	80%	1,855	55
Ha Long	193,708	201,990	96%	450	46
Hoi An	48,921	69,222	71%	363	65

Table 2.4.29Main Indicator based on Tsunami in Viet Nam

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Hue	302,983	302,983	100%	1,137	63
Ha Tinh	63,415	63,415	100%	759	65
Qui Nhon	87,596	255,463	34%	675	55
Hoi An	61,278	69,222	89%	442	65
Bac Lieu	109,529	109,529	100%	308	52
Anh Khe	51,692	63,118	82%	160	70
Dong Hoi	13,635	76,058	18%	30	59
Son La	5,153	56,848	9%	8	67
Ha Long	0	201,990	0%	0	46

Table 2.4.30Main Indicator based on Flood in Viet Nam

Source: JICA Project Team

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Qui Nhon	191,597	255,463	75%	1,720	55
Hue	227,237	302,983	75%	853	63
Ha Tinh	47,561	63,415	75%	569	65
Hoi An	51,917	69,222	75%	376	65
Ha Long	151,493	201,990	75%	352	46
Dong Hoi	57,044	76,058	75%	215	59
Son La	28,424	56,848	50%	193	67
Anh Khe	47,339	63,118	75%	144	70
Bac Lieu	0	109,529	0%	0	52

Source: JICA Project Team

	Exposure Population	Total Population	Exposure Rate	Exposure GDP	(5) Lack of Capacity
City Name	(1)	(2)	(=(1)/(2))	(4)	(5)
Hue	263,781	302,983	87%	1,016	63
Ha Tinh	63,415	63,415	100%	759	65
Hoi An	69,217	69,222	100%	502	65
Ha Long	197,701	201,990	98%	459	46
Dong Hoi	64,518	76,058	85%	246	59
Qui Nhon	18,402	255,463	7%	52	55
Anh Khe	0	63,118	0%	0	70
Bac Lieu	0	109,529	0%	0	52
Son La	0	56,848	0%	0	67

# 2.5 Development of Database

#### (1) Objective of GIS Database

The JICA Project Team compiled collected and analyzed data in the project to the GIS database. The GIS database was combined with the existing database of the AHA Center, and was prepared with consideration that each ASEAN country can utilize it effectively. In addition, to enhance the capacity of the AHA Center, the JICA Project Team proposed the utilization and update of the GIS database, and expanded the GIS software at the AHA Center.

#### (2) Abstract of GIS Database

Table 2.5.1 shows the process of developing the GIS database. Data included in the GIS database were collected from existing JICA study's database, open website, and subcontract survey conducted in each country, except for some data compiled by the JICA Project Team.

Items	Points of Work		
Confirmation of existing database	- The JICA Project Team comprehended component and contents of the existing GIS database in the AHA Center.		
Proposal of draft database component	- The JICA Project Team proposed a draft database component that all concerned facilities can use easily and that have general versatility data types.		
Utilization of existing documents and data	<ul> <li>Obtaining data with digital spatial information was expected to be difficult, and data has a lot of differences in accuracy, range, and density of information by country.</li> <li>Therefore, the JICA Project Team positively utilized existing reports of past JICA studies and available open source databases of some international authorities, such as GAR and GRDP, to prevent the problems mentioned above.</li> </ul>		
Collection and arrangement of information	- The local subcontract collected detailed information in the middle list cities.		
Formulation of GIS database	<ul> <li>The JICA Project Team compiled existing study's databases, open source database and subcontract survey's outputs of collected and arranged data on the project to integrated GIS database.</li> <li>In the GIS database, vector data is mainly stored in shape file format and raster d is mainly stored in GeoTiff format as a versatile data format.</li> </ul>		
Utilization for analysis	- The JICA Project Team positively utilized GIS database for mapping of disaster location, evaluation of disaster risk, and the JICA Project Team also stored results of analysis and mapping to the GIS database.		

Fable 2.5.1	Process	for	Developing	GIS	Database
1 auto 2.3.1	1100033	101	Developing	UID	Databast

Source: JICA Project Team

#### (3) Structure of GIS Database

Figure 2.5.1 shows the structure of the GIS database. The JICA Project Team divided the GIS database into two main contents as follows:

- Risk Assessment Data: including city location, administrative boundary, infrastructure location, natural hazard (earthquake, tsunami, flood, cyclones/typhoon wind/surge), and exposure data which were used for the 1<sup>st</sup> and 2<sup>nd</sup> PRAs, including results of risk assessment and capacity evaluation, the whole map, and the hazard map of each middle list cities by hazard type.
- 2) Existing and Additional Data: including data from former JICA studies, data collected in this study such as population and digital elevation model (DEM) data, and data from the subcontract survey done in each country.

\*Hazard data 'IDN\_lev2' can use for district level boundary

The JICA Project Team prepared Excel files to explain each folder's content, overall data list, data list of each main component (e.g., 'Risk assessment data' and 'Existing and additional data'), and data list of each country and the whole ASEAN under the 'Existing and additional data'. For example, a file named "Explanation of GIS files 2" includes detailed explanations of attributions of GIS files and an outline of administrative boundary data as shown in Table 2.5.2.

Constant	ISO		Former JICA Study				Other Sources				
Country	Code	Adm0	Adm1	Adm2	Adm3	Adm4	Adm0	Adm1	Adm2	Adm3	Adm4
Brunei	BRN	1	1	1							
Darussalam	Bidi	Country	District	Mukim							
Cambodia	кнм	1	1	1	1	1	1	1	✓	✓	
Cumoculu		Country	Province	District	Commune	Village	Country	Province	District	Commune	
Indonesia	IDN	1	1	1						✓	
muonesia	IDIN	Country	Province	Regency						District*	
I ad PDP	LAO	~	1	1							
Lad I DK	LAO	Country	Province	District							
Malaysia	MVS	1	1	<ul> <li>✓</li> </ul>							
Ivialay sia	WI I S	Country	State	District							
Myanmar	MMR	~	1	1	1		~	1	1	1	1
iviyannai	witwite	Country	Region/State	District	Township		Country	Region/State	District	Township	Village
Philippines	рні	~	1	1	1			1	1	1	
1 mippines	TIL	Country	Province	Municipality	Barangay			Region	Province	Municipality	
Singapore	SGP	~									
Singapore	501	Country									
Thailand	тна	~	1	1	1						
Thanana	IIIA	Country	Changwat	Amphoe	Tambon						
Viet Nam	VNM	1	1	1	1	1		1	1	1	
viet INalli		Country	Region	Province	District	Commune		Province	District	Commune	

Table 2.5.2 Outline of Collected Administrative Boundary GIS Data

Source: JICA Project Team

#### (4) Data List

The JICA Project Team compiled the detailed contents and list of contained files in each database and folder as 'Collected Data in GIS Database' in Appendix 3.8. The JICA Project Team also compiled attributions of each collected GIS data as 'Attributions of Collected GIS Data' in Appendix 3.9.





Source: JICA Project Team







(5) Utilization Examples of GIS Database

Source: JICA Project Team based on GRDP





Source: JICA Project Team based on GAR (Supposed flood depth in 50 years return period)

Figure 2.5.32<sup>nd</sup> Preliminary Risk Assessment of Flood around Luang Prabang City in Lao PDR



Source: JICA Project Team based on WorldPop (2015)

Figure 2.5.41-Square-Kilometer Mesh Population Distribution Map in Thailand

## 2.6 Development of Draft TOR for the 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" as mentioned in the beginning of Chapter 2, the draft TOR for the demonstration project is developed and formulated based on certain policies and directions through discussions toward appropriate formulation of the demonstration project in order to effectively build "disaster and climate resilient cities" in ASEAN. This section contains the proposed structure and contents of the draft TOR, including some considerations in conjunction with directions and implementation of the demonstration project.

#### 2.6.2 Objectives of the Demonstration Project

The demonstration project, in line with CN18, aims at promoting and enhancing the administrative capacity at small-scale and medium-scale cities in AMS in terms of planning for urban resilience, particularly in the area of risk-sensitive urban development, land use management plans, and investment programs by building the most cost-effective disaster risk reduction (DRR) and climate change adaptation (CCA) measures.

#### 2.6.3 Framework and Approaches for Formulating the Demonstration Project

#### (1) Framework of the Demonstration Project

The priority actions<sup>3</sup> and the fifth global target of the Sendai Framework for Disaster Risk Reduction (SFDRR), which is to "substantially increase the number of countries with national and local disaster risk reduction strategies by 2020", are essential in formulating the demonstration project. Accordingly, through the following elements, the demonstration project is considered as the framework to achieve and contribute to the four priority actions of SFDRR:

- To understand disaster risk by conducting disaster risk assessment in line with Priority 1 of SFDRR priority actions
- To enhance disaster preparedness for an effective response by formulating a contingency plan in line with Priority 4 of SFDRR priority actions
- To prepare for investing in disaster risk reduction by formulating an action plan for mainstreaming disaster risk reduction in urban planning responding to Priority 3 of SFDRR priority actions
- To strengthen disaster risk governance to manage disaster risk by developing the capacity for disaster risk assessment, formulating of contingency plan, risk-sensitive urban planning, and strengthening cooperation among the concerned government organizations responding to Priority 2 of SFDRR priority actions

On the other hand, best practices and exchanging lessons learned in formulating and implementing the demonstration project to establish resilient cities are another considerable target of CN18. The element shown below is another framework of the demonstration project:

- To share acquired knowledge, skills, and lessons learned from the implementation of the demonstration project involving the four elements with other ASEAN cities.
- (2) Strategic Approaches for Demonstration Project Formulation

In line with the framework and according to the priority actions in association with the purposes of CN18, the demonstration project will play an important role not only in enhancing DRR in local governments, but also in disseminating desirable activities for DRR through demonstration effects among local governments in AMS. In consideration of these roles, the demonstration project needs to take the following strategic approaches for successful implementation:

<sup>&</sup>lt;sup>3</sup> Priority Actions of SFDRR: "Priority 1: Understanding disaster risk., Priority 2: Strengthening disaster risk governance to manage disaster risk., Priority 3: Investing in disaster risk reduction for resilience, Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

#### 1) Strengthening stakeholder's governance for urban resilience at the local and central level

Although each country in ASEAN has made vigorous efforts to strengthen the capacity for DRR under the SFDRR framework, there are still considerable gaps between the required management and the actual operation for expected activities among relevant stakeholders for DRR, especially at the local level. In particular, the urban planning sector, which has essential roles in prevention and mitigation of DRR, still has a lot of remaining work to be mainstreamed by effective governance among other administrative sectors and private sectors. The following are considerable elements to be incorporated into the demonstration project:

- Consolidation of local governance of DRR through the formulation of effective coordination and cooperation mechanisms among relevant stakeholders, especially the urban planning and development sector and the disaster risk management sector
- Enhancement of governance at the national level for which institutional and financial supporting mechanism for local governments need to be formulated
- 2) Enhancing scientific approach to relevant planning and decision-making for urban resilience

In line with the priority actions of SFDRR, understanding the interaction of natural hazards, exposure (i.e., potential losses by hazards), and vulnerability is crucial to effective disaster prevention and mitigation measures for urban resilience. Risk assessments, known as one of the considerable scientific approaches to gauge and estimate quantitative future risks, are fundamental to relevant planning for urban resilience.

Land use and urban planning, one of the effective long-term measures to control natural hazards, inevitably requires this risk assessment wherein quantitative analyses enable planners and decision-makers to determine appropriate long-term plans and programs. The following elements are essential parts of the demonstration project:

- Acquiring of knowledge and understandings on the overall process and basic techniques of natural disaster risk assessment consisting of natural hazard identification, exposure analysis, vulnerability analysis, and integrated risk assessment
- Enhancement of effective sharing and utilization of the result of risk assessments among all relevant sectors into their planning and programming (e.g., disaster risk management, urban planning, infrastructure, health and education, etc.)

#### 3) Formulating sustainable project mechanism

The demonstration project is expected to involve sustainable mechanism internally and externally in order to contribute to the continuation of activities for urban resilience after the demonstration project. According to their purpose, these internal and external mechanisms should be promoted and enhanced through the project implementation utilizing the outcomes of the CN18 project. The following are expected activities to formulate a sustainable mechanism for the demonstration project:

• The plan-do-check-act (PDCA) as an internal mechanism for the project is a considerable concept for local governments to be applied to sustainable project implementation. The tools of the CN18 project, such as checklist and risk assessment, would also play essential roles in achieving the PDCA cycle for the demonstration project.

• The ASEAN Urban Resilient Forum for the regional cross-sector collaboration and partnership is also expected to be one of the important platforms for AMS as an external sustainable mechanism through sharing knowledge and lessons learned from the implementation of the demonstration project.

#### 4) Applicable measures to other cities in ASEAN for urban resilience

Cities in ASEAN show a various range of characteristics in terms of geographic setting with natural hazard type, socio-economic conditions, and population size. The demonstration project for the target cities represented by key hazard types should consider replicability and applicability to other cities in ASEAN, where measures for urban resilience could be produced by a common approach coping with cross-cutting issues and local solutions addressing thematic issues for ASEAN urban resilience.

- Coping capacity enhancement as a common applicable measure for urban resilience addressing cross-cutting issues among cities of ASEAN for effective and efficient planning formulation, including risk assessment and implementation, although there are some minor differences in the institutional system in each AMS.
- Methodology and technique, including available data utilization of risk assessments and planning formulation taking into account local thematic issues that could become not only local solutions but also good practices for cities in ASEAN.
- (3) Target Cities in Association with Disaster Type in AMS

The eight candidate cities with small-scale and medium-scale populations were selected and set through discussions with the NPCs of each AMS, implementation of the workshop, and the Project Steering Committee (PSC) based on the result of the preliminary risk assessment process for the long list cities (817 cities), the middle list cities (56 cities), and the short list cities (16 cities).

The candidate cities also considered four disaster types, namely; flood, earthquake, and tsunami, and cyclone/typhoon surge, which the demonstration project will cope with as targeted types of hazard in ASEAN. Table 2.6.1 shows the eight candidate cities from each of the eight AMS with their representative disaster.

Although further discussions and clarification of the expected demonstration project are required, several cities need to be narrowed down and selected from the eight candidate cities by certain criteria for the demonstration project, taking into account the scale of the project funding and donor, the implementation body or bodies and relevant stakeholders.

	8	J
Country	Candidate City/District	Target Type of Disaster
1. Cambodia	Battambang	Flood
2. Indonesia	Denpasar	Earthquake/Tsunami
3. Lao PDR	Luang Prabang	Flood
4. Malaysia	Kuala Terengganu	Flood
5. Myanmar	Kyimyindaing	Cyclone/Typhoon Surge
6. Philippines	Butuan	Flood
7. Thailand	Pathum Thani	Flood
8. Viet Nam	Qui Nhon	Cyclone/Typhoon Surge

 Table 2.6.1 Target Cities for Demonstration Project in AMS

#### (4) Type of Project Implementation

The demonstration project may allow a wide range of scope of works from technical assistance to physical development by loan project, although the range depends on budget and funding. Two options for the types of demonstration project are listed as follows:

#### 1) Technical assistance project:

This type aims at enhancing the administrative capacity of local governments for building disaster and climate resilient cities in ASEAN. The project may focus on capacity development programs for relevant organizations and staff of the local government in order to integrate sectors in planning and programming given the weight to DRR through technical transfer programs.

#### 2) Loan project for physical development in combination with technical assistance:

This type aims to implement an integrated urban resilience project package consisting of physical interventions to contribute to actual prevention and mitigation, in association with technical assistance mainly through capacity development programs for local governments and relevant stakeholders.

Considering suitability and adaptability to the concept of CN18 and the objectives of the demonstration project, it is proposed that the type of project would be fit as a technical assistance project involving practical and applicable activities to other cities in AMS, to be verified toward building urban resilience.

# 2.6.4 First Workshop for the Demonstration Project Formulation in Combination with Risk Assessment Workshop

The first of four workshops took place in order to incorporate the stakeholders' opinion as participants from AMS into the formulation of the draft TOR. Meanwhile, the workshop also aimed to develop the capacity of participants for the risk assessment and examination of applicable measures for urban resilience.

Table 2.6.2 briefs the contents and activities of the workshop held in December 2016 in Vientiane by relevant officers' participants from the DRR sector and the urban sector of national governments and local governments.

Item	Description	Reference	
Date:	8/9 December 2016	Themes in 8 <sup>th</sup> December's Workshop for Demonstration Project with Risk Assessment and Demonstration Project	
Venue:	Vientiane, LaoPDR	Lao Plaza Hotel	
Participants	45 participants (8 AMS)	KHM (4), IDN (4), LAO (19), MYS (4), MMR (3), PHL (3), THA (4), VNM (4)	
Duration	7 hours (9:00 ~ 16:00)	Including one-hour lunch time	
	Disaster risk assessment	Morning session as an introductory guide	
Sessions	Group Work - 1	Examination of desirable demonstration project utilized by risk assessment by AMS	
	Group Work - 2	Discussion with examinations of AMS	

#### Table 2.6.2 1st Workshop for the Demonstration Project in Combination with Risk Assessment

Note: Cambodia (KHM), Indonesia (IDN), Lao PDR (LAO), Malaysia (MYS) Myanmar (MMR), Philippines (PHL), Thailand (THA), Viet Nam (VNM)

#### 1) Method of workshop for the formulation of the demonstration project

The group work method was carried out to let participants from each AMS examine possible and applicable measures and programs for urban resilience on a worksheet. This was done through general reviews of necessary actions of risk assessment by each candidate city in each AMS for the demonstration project.

#### 2) Implication from the results of the workshop

Regarding the desirable components of the demonstration projects, the majority of group works of each AMS resulted to projects and programs listed under the "preparedness for response" category according to the definition of UNISDR. These included early warning systems, evacuation shelters, and both structural and non-structural measures, rather than programs under the "prevention and mitigation" category such as land use planning. However, they also included planning work for disaster risk management plan and large-scale infrastructure such as river banks.

On the other hand, they identified implementation issues of the demonstration project, which are summarized as follows:

- Coordination and cooperation among relevant stakeholders for project implementation was listed as a major issue among the AMS groups, followed by necessary resources of skilled experts and financing.
- Reference: almost of all AMS groups described the desirable execution agency as multiagencies which included relevant authorities from the DRR sector, urban sector, and infrastructure sector, or an integrated committee for disaster risk management at local and upper-administrative (e.g., provincial) levels.
- Risk assessment as a core element of the demonstration project was also an issue in terms of availability of the appropriate scale of data to fit with the planning area at the city level.

The results of the workshop imply that effective governance for the demonstration project by local government and other relevant stakeholders would be one of the essential themes for the successful implementation of the project, while the level of risk assessment of available data needs to be considered.

#### 2.6.5 Proposed Framework for the Draft TOR

(1) Proposed Technical Assistance Project for the Demonstration Project

Although there are several uncertain factors in the project framework for the draft TOR, the technical assistance project for the demonstration project is proposed as follows:

#### *1) Theme of the project*

Technical assistance for the capacity development of the cities to be selected in AMS to build disaster risk and climate resilient cities in ASEAN, taking into account effective impacts on other cities' governance and institutional arrangement for AMS.

#### 2) Sector

Primary sector: Urban planning and disaster risk reduction management

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

#### 3) Impacts and outcomes

The impact will be enhanced on the resilience of AMS cities from disaster risks and climate change, leading to improved governance especially for land use planning, urban development, and disaster prevention and mitigation activities. It will also be positively influenced by national institutional arrangements in association with other cities' governance. Expected outcomes are listed below:

- Outcome 1: The methodology of the natural disaster risk assessment will be understood and acquired among relevant organizations in the city.
- Outcome 2: Issues in planning and implementation to be improved or developed based on the risk assessment result will be identified and clarified through a consensus among relevant stakeholders of the city.
- Outcome 3: The action plan for improvement or development in land use, planning, control with regulations and contingency plan, and activities for the city and relevant national organizations will be formulated.
- Outcome 4: Practices and lessons learned for building disaster and climate change resilient cities will be reflected to the national government and shared to other cities of AMS mainly through the ASEAN Urban Resilience Forum (temporal).

#### 4) Expected outputs of the project

To achieve the outcomes above, the following outputs will be prepared:

- <u>Disaster risk assessment report</u> utilizing existing available hazard assessment including open source data;
- <u>An action plan</u> for the improvement of an existing contingency plan, taking into account the coping capacity of target local government and DRR activities to be improved or enhanced, or for identifying basic concerns and directions to formulate a contingency plan in case there is no existing plan yet;
- <u>An action plan</u> for the improvement of existing land use and development plans, and development control and regulations in consideration of institutional arrangement, human resource development, and budgeting of local government, or for identifying basic concerns and directions to formulate the land use and urban development plan in case there is no existing plan yet; and
- <u>Activity reports</u> for the results of the project.
- 5) Beneficiaries of the project

The following are expected beneficiaries of the project, including expected project counterparts (C/P):

- <u>Local government</u>: urban planning agency C/P, development control and regulation agency C/P, disaster risk management agency C/P, infrastructure including transportation sector agency, energy and telecommunication, and economic development agency, education sector agency, health sector agency, and cultural historical heritages
- <u>National government</u>: urban planning agency C/P, development control and regulation agency C/P, and disaster risk management agency C/P
- Relevant organizations and stakeholders with their assets in the project area

#### (2) Implementation Arrangement

#### 1) Terms of the project (tentative)

From at least half of a year to one year, this technical assistance project is expected to have assuring fruitful capacity development programs for the local and national governments 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 the national (e.g., ministry) and local government levels as essential counterparts in each candidate country and its selected city are expected to be the implementing agencies. However, there is a necessary consideration for some candidate cities that the upper administration organization, such as the provincial government, as an implementation body may have relevant responsibility for urban planning and disaster risk management instead of local governments.

The project director for each country at the national level will chair the project coordination, while the project manager will supervise each project. The PCC at the regional level (i.e., ASEAN) will be formed to review and advice each demonstration project, while the technical working groups will be also formed to discuss technical issues and orientation. Table 2.6.3 illustrates a tentative proposal for the executing agencies. In the case of the project funded by donors, consultants will be procured and will facilitate and support those agencies.

Name of Executing Agencies	Expected Member	Role and Function
1. Project Director for each candidate country	• A responsible officer from a relevant agency for urban planning or disaster management sector <u>at the national level</u> in each candidate country	• A relevant agency in each candidate country will be responsible for overall administration and implementation of the project.
2. Project Manager in each candidate city or province	• A responsible officer from an agency for urban planning or disaster management sector <u>at local government level</u>	• A relevant agency will be responsible for the smooth implementation and coordination of the project in each candidate city.
3. Project Coordination Committee (PCC)	<ul> <li>Each national project director</li> <li>Each local government project manager</li> <li>ASEAN Secretariat</li> <li>Funding donor</li> </ul>	<ul> <li>PCC will have a role in advising required arrangement for 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> <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> <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 project implementation.</li> </ul>

Table 2.6.3 Proposal for Executing Agencies of the Project

Source: JICA Project Team

## 2.7 Issues and Way Forward on Output 2

#### (1) Implementation of Demonstration Project

The demonstration project was implemented as the phase 2 of this project in Denpasar, Indonesia, and Luang Prabang, Lao PDR. The demonstration project should be implemented step by step in the other six candidate cities in ASEAN with following up implementation of action plan in two cities covered in this project. Co-chairs of ACDM WG on P&M should examine the implementation of the demonstration project in the other six candidate cities with other WG members and discuss with development partners in case external assistance is needed. In addition, Co-chairs should finalize the TOR by utilizing the draft TOR for each AMS, which was developed in the workshop of the project.

#### (2) Development of Database

The GIS database established by the JICA Project Team mentioned in Section 2.5 is utilized for the 1<sup>st</sup> and 2<sup>nd</sup> PRAs and contributes to the analyses of natural hazards and population and GDP exposures in AMS. To further analyze and to enrich the GIS database in the future, Co-chairs and AHA Centre should continue data collection through the site introduced in the project, such as GAR and GRDP, and to collect more detailed data at the city level. Based on the discussion with the AHA Centre, the JICA Project Team established the GIS database as a simple tree structure and stored most of the data by familiar and versatile file formats such as shape files and GeoTiff files. In addition, the JICA Project Team provided two licenses of ArcGIS Basic Single Use to expand the GIS software of the AHA Centre. JICA Project Team also held basic training on GIS to AHA Centre staff, so AHA Centre should update the database by utilizing skills acquired in the training.

# 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 called CN18) as the framework of the ASEAN Cooperation Project (hereinafter called the Project) by the Japan International Cooperation Agency (JICA) 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 ten ASEAN Member States (hereinafter AMS). In conjunction with Output 3, the following notes illustrated in CN18 are referred as background of Output 3.

- Stocktaking of existing tools on integrating Disaster Risk Reduction (DRR) and Climate Change Adaptation (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; and
- Development of guidance note on urban risk financing and insurance.
- (2) Scope of Works for Output 3

According to the project proposal by JICA for the project framework, activities of Output 3 that are to be implemented are stipulated in the scope of works as follows:

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

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

The ASEAN countries are participating in international activities towards the purpose of development of disaster prevention planning and information gathering on natural disasters. Related activities are the following:

- i) Resilient Cities Campain (United Nations Office for Disaster Risk Reduction :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 and examined and would be included in the contents of the guidebook to be created in this project.

#### 3.2.1 Resilient Cities Campaign (UNISDR)

Resilient Cities Campaign (RCC) is supported by the United Nations Office for Disaster Risk Reduction (UNISDR). Throughout 2010-2020 and beyond, the UNISDR held a 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 the city's commitment toward improving their "Essential Eight: Increase Infrastructure Resilience Informations about RCC" as shown in the following table and topics.

Title		Resilient Cities Campaign	Organization	UNISDR
About	the	UNISDR campaigns together with its partners	s to support susta	inable urban development by promoting
campaign		resilience activities and increasing local leve	l understanding o	of disaster risk. A ten-point checklist of
		essentials for making cities resilient serves as	a guide for a ci	ty's commitment toward improving their
		resilience and is the organizing principle for re-	porting and monit	oring during the campaign.
		< Checklist of essentials >		
		1) Organise for disaster resilience		
		2) Identify, understand and use current and futu	ire riskscenarios	
		3) Strengthen financial capacity for resilience		
		4) Pursue resilient urban development and desi	gn	
		5) Safeguard natural buffers to enhance ecosyst	tems' protective f	unctions
		6) Strengthen institutional capacity for resilien	ce	
		7) Understand and strengthen societal capacity	for resilience	
		8) Increase infrastructure resilience		
		9) Ensure effective disaster response		
		10) Expedite recovery and build back better		

 Table 3.2.1 Fundamental Information of RCC

Title	Pagiliant Citi	es Compaign	(	Proprintion		UNISDP	
The	Keshielit Citi	es Campaign		Jiganization		UNISDK	
	< Flow (How to Enter)	R(')>					
		1.0		(LINIIS	וחח		
	(Loca	ll Governments)		(UNI:	SDR)		
	Acce	ss UNISDR HP					
		↓ ↓					
	Pr	ovide details					
	Uplo	ad confirmation	Submi	t Ver	ification	]	
		ſ	vominatio	del	★	-	
	Role	e model action		Create of	online profile		
			J	< Toolki	t for local gove	ernments >	
	< Results of	participation >		1) Guida	nce documents	5	
	1) Understan	ding disaster risk		2) Asses	sment tools		
	2) Knowledg	e of disaster prev	ention	4) Plann	napping ing for resilien	ce	
	3) Constructi	on resilience citie	s	(Resil	ient cities conr	nect)	
	connect			5) Latest	city reports	,	
Participants	3.098 cities	(20 April 2016)	ASEAN	1	127	Japan	3
	- )	Numbers of					
ASEAN Memb	ers	Local	Name o	f Local Gover	nment		
		Government					
Negara Brunei	Darussalam	0	Kingdo	m of Cambodi	a	0	
Republic Indon	esia	7	Lao Peo	ople's Democra	atic Republic	1	
Malaysia		1	Republi	ic of the Unior	of Myanmar	0	
Republic of the	Philippines	105	Republi	c of Singapore	2	0	
Kingdom of Thailand		8	Socialis	t Republic of	Viet Nam	5	

#### 3.2.2 100 Resilient Cities (Rockefeller Foundation)

The project "100 Resilient Cities" (100 RC), pioneered by the Rockefeller Foundation, 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 21<sup>st</sup> century. 100 RC supports the adoption and incorporation of a view of resilience that includes not just earthquakes, fires, floods, but also the stresses that weaken the fabric of a city on a day to day or cyclical basis.

Title		100 Resilient Citi	es		Organization	Rockefelle	r Foundation	
About 1	00	100 RC supports	the adoption and in	corporatio	n of a view of res	silience that i	includes not ju	ust earthquakes,
RC		fires, and floods,	but also the stresse	s that weak	en the fabric of a	city on a day	y to day or cy	clical basis.
		Cities in the 100	) RC network are	provided	with the resour	ces necessar	ry to develop	a roadmap to
		resilience along for	our main pathways	:				
		1. Financial and l	ogistical guidance	for establis	shing an innovativ	ve and new p	osition in the	city
		government, a	chief resilience off	icer, who v	vill lead the city's	resilience et	fforts.	
		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 deve	lop and implement	their resil	ience strategies.			
		4. Membership of a global network of member cities who can learn from and help each other. Through						
		these action	s, 100 RC aims not	t only to he	elp individual cition	es to become	e more resilien	it, but also to
		facilitate the	e building of a glob	al practice	of resilience amo	ong governm	ents, NGOs, t	he private
		sector, and individual citizens. (From Rockefeller Foundation HP)						
Participants	pants 65 cities (20 April 2016) ASEAN 6 Japan 1							
ASEAN M	embe	ers	Bangkok, Da Nar	ng, Mandal	ay, Phnom Penh,	Semarang, S	Singapore	
Menu of	Suj	pport	Support for	Support	to create a resilie	ence plan, al	ong with the	tools, technical
Activity	(wi	inning city will	making a	support,	and resources	for implem	nentation is	provided. The
	rec	eive three forms	resilience plan	Rockefel	ler Foundation	will deploy	its expertise	in innovative
	of	support)		finance to	o help cities lever	age billions	of dollars of p	otential private
				sector fin	nancial support a	is well as p	ublic dollars	to realize their
				plans.				
			Membership of	The Roc	kefeller Foundat	ion is creati	ing a member	rship in a new
			new network	network,	the 100 Resilie	ent Cities n	etwork, whic	h will provide
				support t	o member cities	and share no	ew knowledge	e and resilience
				best prac	tices.			
			Support to hire	Support	to hire a Chief R	esilience Of	ficer (CRO).	The creation of
			a Chief	this new role is an innovation that will ensure resilience-building				
			Resilience	and coordination. This is the specific responsibility of one person in				
			Officer (CRO)	a city go	vernment. The Cl	ROs can also	o oversee the	development of
				a resilien	ce strategy for the	e city and be	part of a learn	ning network of
				other CR	Os as representat	ives to the 10	00 Resilient C	ities network.

Table 3.2.2	Fundamental	Information	of 100 RC
1 aute 3.2.2	Funuamentai	IIII0I IIIauon	01 100 NC

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

The International Council for Local Environmental Initiatives (ICLEI) is a growing association of cities, local and metropolitan governments leading the way of sustainable development with worldwide presence which connects leaders in strategic alliances, prepares cities for the future, whose voice is heard. It is attractive to be a member, to work for and partner with ICLEI.

Title	R	esilient Cities Series	organization ICLEI				
About ICLEI	ICLEI's work	k is centered around ten	agendas	and is designed	to help cities	and local go	vernments to
	become sus	tainable, resilient, reso	urce-effi	cient, biodiverse	e and low-ca	rbon; to bu	ild a smart
	infrastructure	e; and to develop an inc	lusive, g	green urban econ	omy with the	ultimate aim	of achieving
	healthy and h	appy communities. (Fron	n ICLEI	HP)			
Menu of	Resilience	ICLEI's adaptation	ICLE's	s adaptation is	formed by t	wo tool gro	ups (Global
Activity	resource	work	Resour	rces (GR) and Re	gional Resour	ces(RR)). Eac	h tool group
	points		is form	ned by several rep	orts and books		
			(Exam	ple)			
			GR:'S	ubnational Clima	te Compatible	Development	t': Learning
			from C	DKN's experienc	e, 'Resilient C	ities', etc.)	
			RR:'ACCCRN Process Workbook', 'Building Adaptive and				
			Resilie	ent Cities (BARC)	Program and 7	Tool', etc.	
		Resilience library	Overview, resilience planning, urban adaptation, huma development, cost and finance, risk reduction, food systems methodologies and tools				ion, human ood systems,
		Glossary of key terms	methodologies and tools ms This glossary has been compiled and adapted by ICLEI (20 from several authoritative sources including the IPCC, UNISI UNFCCC, the World Bank, and Arup as well as from ICI publications. It is also adapted the input from the Durl Adaptation Charter Secretariat				CLEI (2016) C, UNISDR, from ICLEI the Durban
		Web resources and	Webin	ar series and co	ontinuing disc	ussions initia	ted between
		networks	experts and practitioners in urban adaptation and resilience at the resilient cities congress. This resource has check sheet "Resilience Cities Webinar Series 2014 Feedback Form", and each city car check there activities for the series				ilience at the eet "Resilient each city can
		Congress presentation	ICLEI	opens a congress	presentation e	verv vear. For	example, the
		congress presentation	2015 program comprised the opening plenary, finance forum and				
			urban	food forum. Diffe	rent cities can	participate in	this series as
			well as	s present its acut	ibities and pl	lans for makin	ng a resilient
Participants	53	36 cities (20 April 2016)	ASEA	N	47	Japan	17

Table 3.2.3	Fundamental Information of RCS	ACLED
1 abic 5.2.5	Tunuamental Information of Keb	

#### 3.2.4 City Resilience Profiling Program (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.

Title	City Resilience Pro	City Resilience Profiling Programme(CRPP) Organization UN-Habitat				
Contents	The tools and guid	delines developed under the program	will be tested and	refined in: Ba	langoda (Sri	
	Lanka), Barcelona	(Spain), Beirut (Lebanon), Dagupan (P	hilippines), Dar es	Salaam (Tanza	ania), Lokoja	
	(Nigeria), Portmor	e (Jamaica), Concepcion/Talcahuano (	Chile), Tehran (Ir	an), and Well	ington (New	
	Zealand). These cit	ties were selected based on the proposa	als submitted to UN	N-Habitat in re	sponse to its	
	call for proposals la	ast November 2012. The countries repr	esent a balance of	geographical a	nd economic	
	distribution, popula	tion size, hazard profiles, and commitm	ent to the resilience	agenda.		
Participants	9 Cities (20 April 2016)	ASEAN	1 (Dagupan)	Japan	0	
Menu of	System of entry	Step-1				
Activity		Cities interested in becoming an asso	ciate city of the pr	ogramme shou	ld send their	
-		expressions of interest (EoI) to be eval	luated for the CRPF	secretariat.		
		Step-2				
		Provide completely filled "City Index	Card".			
		"Index Card" is formed of seven s	sheets (location, p	opulation, gov	vernance and	
		policies, economy, build env. and infra	a., partnerships and	other relevant	information.	
		The city must fill this card.				
		Step-3				
		Submit a letter of commitment signed	l by the Mayor of	the city or som	ne authorized	
		representative of the municipality.		-		
	Brochures	In the website, ten brochures for "City	Resilience Profilir	ng Programme'	" are inserted	
		and cities interested in this action can	access it easily.			
	Associated Cities	This program shares four criteria for the	he association.			
	Selection Criteria	1) Willingness to participate				
		2) Availability of data				
		3) Promotional impact (indicators:	large-scale disast	er events, da	tabase:major	
		reconstruction programmes complet	te or underway,	UN-Habitat V	Vorld Urban	
		Campaign, associated cities, etc.				
		4) Network linkages cities already	inter-linked throug	gh city-to-city	dialogue or	
		partnerships, and with a commitmen	nt to expand their	engagement v	with the city	
		resilience profiling programme will be	e preferred.			
		(indicators: city-to-city agreements	in place; members	ship in one c	or more city	
		networks (UCLG, metropolis, etc.))				

<b>Table 3.2.4</b>	<b>City Resilience</b>	Profiling	Program	(UN-Habitat)
--------------------	------------------------	-----------	---------	--------------

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

The concept of Integrated Water Resources Management (IWRM) has attracted the attention of the following 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 program 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.

Title	Associated Prog	gram on Flood Management	Organization	WMO	
Contents	To support cour	To support countries in the implementation of Integrated Flood Management (IFM) within the overall			
	framework of Ir	ntegrated Water Resources Manage	ement (IWRM) to max	imize net benefits from the use of	
	their floodplains	s and minimize loss of life and imp	bacts.		
Participants		25 Cities for Capacity Building	ASEAN	4	
	8	counties and region for projects	Jakarta, Vangvieng, N	Jakhon Pathom, Hanoi	
		(20 April 2016)			
Menu of	APFM Tools	The flood management tools ser	ies is composed of sho	ort technical publications intended	
Activity	Series	to give quick guidance on releva	int material about spec	cific aspects of flood management	
		to flood management practitione	rs.		
		This tools are formed 24 item	s (public perception	of flood risk and social impact	
		assessment, technical assistance	for the preparation of	an advocacy strategy etc.)	
	Training	Three documents are ready to us	se for training. These	include urban flood management,	
	Manuals	IWRM as a tool for adaptation to	o climate change train	ing manual and facilitator's guide	
		in intergrated urban flood ma	nagement. It is easy	v to get this document through	
		download.			
	Case Studies	A number of case studies on flo	ood management wer	e collected from various regions,	
		based on the experiences of orga	nizations active in flo	od management.	
Community	Support Base	1) Advice and advocacy for floo	d management policy	and strategy formulation	
	Partners	2) Technical advice on the intern	ational, regional and l	local level	
		3) Facilitation of workshops an	d training supporting	the integrated approach of flood	
		management			
		4) Development and provision	n of flood managem	ent tools and capacity building	
		materials; and			
		5) Formulation of objectives and	l scoping for flood ma	nagement proposals.	
	Global Water	GWP advocates for the impler	mentation of integrat	ed water resources management	
	Partnership	(IWRM) the coordinated devel	opment and manager	ment of water, land, and related	
		resources in order to maximise of	economic and social v	velfare without compromising the	
		sustainability of vital environme	ntal systems.		

Table 3 2 5	Associated	Program on	Flood N	Managamant (	
Table 5.2.5	Associated	r rogram on	<b>LIOOR</b> 1	vianagement	

Source: JICA Project Team

#### 3.2.6 Asia Pacific Adaption Network: APAN

The mission of Asia Pacific Adaptation Network (APAN) is to build a 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.

Title	Asia Pacific Adaption Network : APAN					
Contents	Mobilising knowledge and building capacities for climate resilience					
	"apan" has 14 the	an" has 14 themes. "Disaster Risk Reduction" is our main target. In this study, the JICA				
	Project Team focused on this theme.					
Partners	16 organisations (2016)		ADB, Ministry of the Environment Goverment of Japan,			
(Participants)			USAID, UNEP, SEI, IGES, AIT, carec, KEIO (Japan),			
			SPREP PROE, CANSA, ICLEI, GWP, ICIMOD, SEARCA			
Menu of Activity	Publications	109 publications of "Disaster Risk Reduction" can be searched in this system.				
(Reference System)						
	Technology	42 technologies of disaster prevention can be searched in this system. For				
	database	example, "Flood Disaster Preparedness Indices (FDPI) is included in this				
	s is a questionnaire for flood disaster.					
		By answering an online questionnaires based on the Flood Disaste Preparedness Indices (FDPI), users can do a self-diagnosis of the degree of				
		preparedness for flood disaster based on the individual situation in eac				
		community. The questionnaire can also provide the opportunity to lear				
	about measures that could be taken to improve the disaster preparednes					
		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.				

Table 3.2.6	Asia	Pacific	Adaption	Network:	APAN
10010 01210	1 10 100				

Source: JICA Project Team

#### **3.2.7** Effects of Related Activities

Effects of related activities for making a resilient city is based on six case studies and are listed in the following items. The effects will be categorized in two viewpoints. One is the participant city and another is the international organization.

#### <Participant City>

- 1) It is easy to attend the campaign of "Resilient City" or infomation of disaster prevention by the international organization HP. About 3,000 cities attended the Resilient City Campaign (UNISDR) from 2000 to 2016.
- 2) It is easy to access the information of city level statistics data, records of disaster and plans for disaster prevention of each participating city. Cities that are interested in disaster prevention can get information of the same class city's activity of disaster prevention and mitigation. (Same class means same population, location, and records of disaster.)
- 3) Participating cities understood their level of disaster prevention with the entry of check sheet of activities.
- 4) According to participants of the activities of the campaign, the city gets a chance to gain the support of an international organization.

#### <International Organization>

1) It is easy to make a relationship with many city or regional governments on resilient city campaign without a national level negotiation.

- 2) International organizations can send information about disaster prevention to participating cities (in the case of UNISDR Resilient City Campaign, about 3,000 cities and regions can get new information on disaster prevention.)
- 3) Some organizations create a step up system. If a participating city tries to do several assignments, the city will step up. (For example, in the UNISDR Resilient City Campaign a participating city can step up to a "Role Model City" and or a "Municipality of the Month Description".) International organization can select enthusiastic cities about disaster prevention.

The related activities are grouped into three types. The first type is called "Easy Entry and Step Up", and the second type is called "Select and Support with Fund" and lastly, "Entry and Support with Technical Support".





Figure 3.2.1 Structure of Resilient Cities Campaign and City Resilience Profiling Program

Upper right figure



Figure 3.2.2 Structure of Associated Programs on Flood

#### 3.2.8 Output Image

In this project, the JICA Project Team made a tool or guidebook that include 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, the JICA Project Team made a check list for disaster response and measures and data collection (harard risk, exposure vulnerability, etc). After this study, the JICA Project Team hopes that these tools and data will be used by the cities of ASEAN countries and would help them become resilient.

In the six case studies, the JICA Project Team selected the "Resilience Cities Campaign (RCC): UNISDR " type because of the following reasons.

- 1) RCC type is simple and easy to enter the campaign. The most important objective is understanding the risk hazard of the participant city. It is effective that every city of the ASEAN can access and understand its condition of risk hazard and disaster response.
- 2) Over 3,100 cities are participating in the RCC. The new network (city to city) will be constructed with this campaign. For example, if Phuket (Thailand) and Langkawi (Malaysia) will use the tool and make a new network, they will share their information about disaster prevention.
- 3) "100 Resilient Cities" (Rockefeller Foundation) and "City Resilience Profiling Programme" (UN-Habitat) have incentive such as enhancing presence of the selected cities and possibility to obtain subsidy from national government.
- 4) WMO and APAN activities are two-way system, which does not end the communication from provider to user.

CN18 established ASEAN Urban Resilience Forum to encourage the cencerned government officials self-sustained evaluation and judgement in sustainable urban development strategy without depending on incentives and two-way system mentioned in the above 3) and 4) respectively.

## **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 can be grouped under several fields. Urban planning (zoning system, land use plan and height control districts etc.) and the Building Code are the processes for enhancing resilience in the field of architecture. Earthquake-resistance of public facilities is also important. Activities of existing organizations such as neighborhood councils for natural disaster reduction and disaster prevention are very important too. Designation of emergency evacuation roads and creation of a hazard map through community participation are effective for enhancing the resilience of urban cities. In this section, good practices found 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

The JICA Project Team has collected information of natural disasters mainly from websites such as floodlist (http://floodlist.com/), ADRC (Asia Disaster Reduction Center) (http://www.adrc.asia/top\_j.php) and AHA Center (http://www.ahacentre.org/). As of July 2016, the JICA Project Team has collected the following data and information listed in Table 3.3.1. The team will continue to collect data and information and analyze the features causing damage by focusing on natural disasters. All collected information at this stage are shown in Appendix 8.

Name of	Disaster	Number of	Collected	Main Features of Damage	
Country	Туре	Collected Reports	Ierm		
Brunei Darussalam	The JICA Project Team could not find any reports for Brunei Darussalam.				
Cambodia	Flood	13	Aug. 1999 to Oct. 2014	Damage caused by flood is large along the Mekong River and Tonle Sap Lake. Damage to rice paddy fields was found in 2013 floods. Especially in August 1999, the flash floods triggered by torrential rains during the first week 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 destroyed.	
	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 the 99 cases are related with the disaster in Jakarta or its surrounding area. Floods in Feb. 2015 affected an area in front of the presidential palace.	
	Storm surge, cyclone	2	June. 2008 to June. 2012	Cyclone Iggy killed 14 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 last 27 October 2008.	
	Earthquake/ tsunami	55	Nov. 1963 to Jun. 2016	A tsunami attack triggered by an Indian Ocean earthquake on Dec. 26, 2004 caused the most significant damage in history. Earthquakes were observed mainly in Sumatra, Papua, Central Java, Flores, according to the collected reports.	
Lao PDR	Flood	6	Aug. 2008 to Sep. 2015	Flashfloods and landslides occurred in the northern parts of Lao PDR in Sep. 2015.	
	Tropical storm, monsoon rain	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 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 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	On 24 March, big earthquake occured not only in Myanmar but also the northern part of Thailand and southern part of China. One bridge was reported to have collapsed in Myanmar. At least 90 people were killed in Myanmar by a tsunami that wreaked death and destruction along the coasts of the Indian Ocean.	

Table 3.3.1 Summary of Collected Information on Natural Disasters in AMS
		Number		
Name of	Disaster	of	Collected	Main Fastures of Domago
Country	Туре	Collected	Term	Main reatures of Damage
		Reports		
Malaysia	Flood	46	Nov. 2000 to Feb. 2016	Floods are observed both in the Malay Peninsula and Borneo. Massive flooding in Dec. 2013 was the most serious disaster happened in Johor and affected the displacement of 66,000 people among the recent floods.
	Earthquake/ tsunami	2	Dec. 2004 to Jun. 2015	A 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 during the landslides. At least 68 people were killed, 6 people were 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 typhoons and tropical storms are remakable in the Philippines. Damages caused by Typhoon Yolanda in early Nov. 2013 as well as Tropical Storm Fung Wong in Sep. 2014 are remarkable.
	Typhoon, tropical cyclone, tidal waves	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	The most recent earthquake occurred in Oct. 2013 in Bohol. A total of PHP 2.25 billion worth of damage to public buildings, roads and bridges, was reported in Bohol and Cebu. For tsunamis, the Moro Gulf Tsunami that occured in Aug. 1976 caused the death of 8,000 people.
Singapore	Flood	1	Sep. 2013	Flooding 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 all parts of Thailand.
	Tropical Storm, typhoon	4	Apr. 2002 to Jul. 2014	Tropical Storm Nock Ten has caused continuous rainfall 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, damage caused by floods in Sep. 2014 and July 2015 are more seirous than other floods. Floods 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 after killing hundreds in the neighboring countries. 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.

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

## (1) Category of Good Practices and Lessons Learned

## 1) Method of categorization of good practices and lessons learned

Good practices and lessons learned are categorized into the theme of the Sendai framework "The Four Priorities for Action's 4 priorities". Furthermore the JICA Project Team focuses on good practices and lessons learned on prevention, mitigation and and reduction. The sturucture of is formed following Table 3.3.2.

Table 3.3.2	Categorizing G	ood Practio	ce and Less	ons earned	with the Se	ndai Fram	ework

Priority	Priority Actions (SENDAI Framework)	Prevention	Mitigation	Preparedness	Response	Recovery	Reinforcement (Retrofitting Reconstruction)
1	Understanding disaster risk.	0	0	0			
2	Strengthening disaster risk governance to manage disaster risk.	0	Ο	Ο	0	0	0
3	Investing in disaster risk reduction for resilience.	0	0	0	0	0	0
4	Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.			0	0	0	0

Source: JICA Project Team

Г

## (2) Comprehension of Risk Hazard

For understanding the disaster risk of own city or country, each country and city should classify records of natural disasters, and understand the risks to natural disasters. It is important to visualize the hazard risk contained in their own city based on scientific evidence, to manage and utilize residents information, prepare evacuation drills on the basis of the hazard risk and predict the risk of the damage in advance. The JICA Project Team summarizes the following good practices and lessons learned on understanding of the natural disaster risk.

## 1) 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 on. A comprehensive risk assessment does not only evaluate the magnitude and likelihood of potential losses but also provides full understanding of the causes and impact of the losses. Risk assessment, therefore, is an integral part of decision and policy-making processes and

requires close collaboration among various parts of the society. Good practices and lessons of risk assessment are the following:

City Name Title		Contents
UNISDR		
Whole World	Prevention Web	UNISDR informs several items and one of them is "prevention web". The contents of the web is the following: Find and share information and connect with the disaster risk reduction community on the prevention web - a project of UNISDR launched in 2007 to serve the information needs of the community. http://www.preventionweb.net/english/
USGS (United Stat	es Geological Survey)	
Whole World	Earthquake Hazards Program	The United States Geological Survey (USGS) Earthquake Hazards Program is part of the National Earthquake Hazards Reduction Program (NEHRP), established by congress in 1977. The program monitors and reports earthquakes, assesses earthquake impacts and hazards, and researches the causes and effects of earthquakes. http://earthquake.usgs.gov/
IFNet (Internationa	l Flood Network)	
Whole World	Flood Information	The International Flood Network (IFNet) was created on the flooding days of the 3 <sup>rd</sup> World Water Form in 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. http://www.internationalfloodnetwork.org/index.html
ADRC (Asian Disa	ster Reduction Center)	
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. http://www.glidenumber.net/glide/public/search/search.jsp
CLIMATE CENTRAL		
Whole World	Climate Services	An independent organization led by scientists and journalists researching and reporting the facts on climate change and its impact on the public. Climate central surveys and conducts scientific research on climate change and informs the public of key findings.
Practices and lessons of this case <u>Easy to understand the risk of natural</u> <u>disaster is important.</u>		<ul> <li>i) Ease of access the information of risk</li> <li>A participant or a person who is interested about risk assessment can access these information easily. It is also easy to understand the situation of the area that they want to know.</li> </ul>
		<ul><li>ii) Understanding of the broad-based risk</li><li>A participant can understand the broad risk beyond city, state and country boundary.</li><li>iii) Opportunity to understand the need for disaster-prevention measures</li><li>The opportunity to develop a disaster prevention plan requires knowing the risks of the natural disasters to the city or region.</li></ul>

## Table 3.3.3 Risk Assessment

## Table 3.3.4 Disaster Risk Assessment

Title: Flood Hazard Risk Map (Philippines)				
The Philippine government has made geo-hazard maps that outline areas prone to natural disasters, publicly available in a bid to reduce vulnerability at a community level. Eleven kinds of maps (utilizing open data like Google map, etc.) are arranged for expression of disaster risk assessment as well as the ability to share the data and information of disaster risk in Twitter and Facebook. http://www.nababaha.com/	FLOCH HAZARD MAP OF METRO MANLA			
The Flood Hazard Risk Map of the Philippines is completed and this map Region 1 to Region 13 and ARMM). The contents of each hazard map are information from the website. Games such as assembling the puzzle hazard n very user friendly. In the case of a high density area, the government made a 1/1,000 scale floo flood risk. This hazard map is updated every year.	is formed by several pieces (Metro Manila, easy to understand, as well as accessing the maps are included in the hazard map kit. It is od hazard map, and shared the information of			
Source: Department of Environment and Natural Resources (DENR), Philippine Government				
Title: Earthquake Hazard Risk Map (California State USA)				
This is a hazard map for earthquakes in California State. The hazard map for earthquakes is a map that geologists and seismologists prepared showing the danger of earthquakes that may occur in California. In this analysis, the strength of shaking is installed for each location of the state.				
(Good Point) In California State, a citizen can access the information of hazard risk of disa of earthquake hazard, but also the knowledge and method of disaster prevention	aster to the website. Not only the information on are filed.			

Source: http://www.conservation.ca.gov/cgs/rghm/psha

## 2) Early Warning System

A system that predicts typhoon and cyclone attacks using weather radar is important. It is also important for the early warning system of the risk of earthquake disasters as well as the system to detect and warn of major earthquakes immediately. For more details, refer to the typhoon, cyclone and early warning system of earthquake shown below.

## Table 3.3.5 Early Warning System-1

 Title: Redevelopment of Meteorological Radar (Myanmar)

 The cyclone forecast radar for Myanmar was built from the lessons learned from Cyclone. Nargis which landed in Myanmar in 2008.

 Image: Comparison of Meteorological Radar (Myanmar)

 Image: Comparison of Myanmar (Myanmar)</t

(Good Point)

The weather radar system of Myanmar was stopped due to aging. For this reason, it is impossible to directly monitor a cyclone. Reduction of damage caused by meteorological disasters contributes to the economic development of Myanmar. It is effective that such projects were prepared with the help of foreign and international organizations and stability and acceleration were given to economic development.

Common	httm://libomoo		in line a anal	non out/D100000012 html
Source.	mup.//moopac	.jica.go.j	p/mages/	1cp01/1 1000000942.110111

Table 3.3.6 Early	<sup>•</sup> Warning	System-2
-------------------	----------------------	----------

City Name	Title	Contents
World		
Whole World	Pacific Tsunami	The Pacific Tsunami Warning Center (PTWC) is one of two tsunami warning
	Warning Center	centers that is operated by the National Oceanic and Atmospheric Administration,
	(NOAA's National	United States Department of Commerce (NOAA) in the United States.
	Weather Service)	http://ptwc.weather.gov/
Whole World	Northwest Pacific	Information bulletins provided by the Northwest Pacific Tsunami Advisory
	Tsunami Advisory	Center (NWPTAC) should not be construed as official warnings or evacuation
	(Japan Meterological	notices for the areas concerned. The issuance of actual evacuation notices is the
	Agency)	responsibility of individual local authorities.
		http://www.jma.go.jp/en/distant_tsunami/WEPA40/indexo.html
Indonesia		
All area	Indonesia Tsunami	The Indian Ocean Tsunami Warning System is a tsunami warning system set up
	Early Warning	to provide warning to inhabitants of nations bordering the Indian Ocean of
	System	approaching tsunamis.
		https://inatews.bmkg.go.id/new/
Jakarta	Flood Early Warning	Flood Early Warning Early Action System is now under construction. Twitter
	Early Action System	Service (flood information sharing ) is currently supplying information on
	(FEWEAS)	flooding in Jakarta.
	Provinsi DKI	Twitter user name
	Jakarta(BPBD)	(https://twitter.com/BPBDJakarta?ref_src=twsrc%5Etfw)
		BPBD DKI Jakarta
		http://bpbd.jakarta.go.id/

City Name	Title	Contents
Thailand	•	
Chao Phraya River	Hydrometeorological conditions in Chao Phraya River basin	JICA launched a flood-control project following a massive flooding. JICA joined the project through the integrated study on hydro-meteological prediction and adaptation to climate change in the Thailand project. The aim of this study was to determine the water-balance characteristics in the upper Chao Phrya River basin using a hydrological model. http://impact-www.eng.ku.ac.th/chaophraya-auto/
Malaysia		
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 urbanization 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 program. http://jmgeohazard.cs.usm.my/
Practices and lessons of this case <u>Knowledge is power. It is effective</u> <u>to let people know the advent of</u> <u>natural disasters early to minimize</u> <u>disaster risks.</u>		Most of the countries of the ASEAN are often damaged by flood every year. To understand the mechanism of floods, it is important to be informed on the situation of the lower reaches early. It is possible to make the early warning system without using high technology.

Source: JICA Project Team

(3) Strengthening Disaster Risk Governance to Manage Disaster Risk

All sections of the national and local governments made plans mainstreaming disaster prevention and integrating it to their urban plan and development plan. Public sectors and private sectors should coordinate to make disaster prevention plan, evacuation plan, and others. Public-private parties need to collaborate for disaster prevention, responsibility and authority to be delegated.



 Title: Buffer Zone (India)

 In India, a defined width for major rivers is controlled in an urbanized area. The main purpose is to conserve water resources and disaster prevention.



(Good Point)

There are many major rivers in India and it is difficult to conduct renovation projects in all rivers. For this reason, buffer zones are provided to prevent flood damage and securing farmland. Regulation does not require much money like infrastructure investment.

Source: Karnataka State Master Plan (Urban Planning)



#### Table 3.3.8 Urban Planning (Land Use)

Source: JICA Project Team

# 1) Government Plan (Disaster Prevention Plan, Evacuation Plan), practices and coordination

The disaster prevention plan and evacuation plan are planned by the 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 evacuate and plan of warehouses for storage of supplies for evacuation, etc., are made and discussed for resiliency at the time of disaster. The regional government held emergency drills with the regional community and the 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). Good practices and lessons of the government plan are the following items:

City Name Title		Contents
UNDP DRR		
ASEAN Eight Countries and ASEAN	Disaster Management Reference Handbook	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. The handbooks also provide basic country background information, including cultural, demographic, geographic, infrastructure and other basic country data. 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.
Practices and lessons of this case <u>It is important that a country knows</u> <u>the ability to respond to natural</u> <u>disasters as well as to respond to</u> <u>neighboring countries.</u>		It is important that a nation is deepen with mutual understanding about disaster prevention with each other. These handbooks from eight countries belonging to the ASEAN and ASEAN Report. Each country checks itself and in the next step, they understand how to cooperate with each other during a natural disaster.

## Table 3.3.9 Government Plan

City Name Title		Contents
Philippines		
All areas	National Disaster Risk Reduction and Management Plan (NDRRMP) 2011-2028 NDRRMC	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). http://ndrrmc.gov.ph/
All areas	National Disaster Response Plan 2014 NDRRMC	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 to 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. http://ndrrmc.gov.ph/
All areas	OCD Education and Training Division	<ul> <li>Formulates, supervises and monitors the implementation of National DRRM and Civil Defense training policies, plans and programs.</li> <li>Specific Functions: <ol> <li>Formulate civil defense career development training program for OCD organic personnel and other DRRM professionals;</li> <li>Develop and establish a comprehensive monitoring system to ensure the effective implementation of DRRM and civil defense training;</li> <li>Evaluate the training conducted to determine the effectiveness of the program;</li> <li>Conduct researches for the development of courses on civil defense and DRRM;</li> </ol> </li> <li>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>Coordinate with the network of local and foreign DRRM, civil defense and climate change institutions for training opportunities, partnerships and cooperation; and</li> <li>Supervise the implementation of national DRRM training policies, plans and programs.</li> </ul>
Practices and lessons of this case <u>PDCA cycle is important for disaster</u> <u>prevention. Not utilizing disaster</u> <u>prevention plan is a waste</u>		NDRRMC made plans and system for disaster prevention and mitigation, disaster preparedness, disaster response and disaster rehabilitation and recovery. NDRRMC has done capacity development, trainning and evacuation drill. The results (information) of activities are opened.

(4) Investing in Disaster Risk Reduction for Resilience

It is necessary that national or local governments and private companies should invest in public facilities with the concept of mainstreaming disaster risk reduction in urban planning and development planning.

#### Table 3.3.10Master Plan

Title: Open spaces (Kathmandu Nepal) Flagship 2 of the NRRC, coordinated by the Ministry of Home Affairs and UN OCHA, is focused on strengthening emergency preparedness and response. It is an ambitious attempt to build the 'in-house' capacity of the government to coordinate, prepare, and respond to disaster.

Under this flagship, the identification, allocation and planning of open spaces have been the priority. Open spaces refer to areas in Kathmandu Valley of identified free space that can be used for humanitarian response (camps for displaced persons, logistics centers, distribution centers, security and incoming military coordination sites, etc.).



#### (Good Point)

It is effective that existing open spaces, grounds (public facilities), etc., should be registered, and it is important that the data of open spaces (location, volume, and function emergency) should be opened by HP. The plan of emergency transportation road network is based on the location of open spaces.

Source: https://sites.google.com/site/kathmanduopenspaces/

Source: JICA Development

#### Table 3.3.11Urban Planning

#### Title: Park, Greenbelt (Urban facilities)

The Japanese system of park and green space construction through public 2001 works (city planning decision, building restrictions, budget for construction of park, function of emergency) is an effective method to make an open space in high density urbanized area. For example, OOTORI-Park (city park) planning was planned as an open space for high density urbanized area near a station as well as adding some functions for 2004 evacuations after the Han-Shin Awaji Earthquake disaster. 2015

#### (Good Point)

When big natural disasters happen in high density urbanized areas, it can be expected that the area will suffer great damage. It is effective that the urban planning park will be located in a high density urbanized area. Furthermore, it is effective to develop urban planning park as part of urban redevelopment project. By strengthening the disaster prevention function of this city planning park, it is possible to create a safer urban area.

#### Source: JICA Project Team

#### Table 3.3.12Building Code



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 five 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 the 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, 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 <u>It is effective</u> <u>prevention activitie</u> <u>of the region-specifi</u>	s of this case <u>that disaster</u> <u>s take advantage</u> <u>ic materials.</u>	<ul> <li>The issue of vulnerbility of the Badakhshan mountainous territory was desertification caused by two sets of hazards, i.e.: natural and anthropogenic.</li> <li>The anthropogenic factors are mostly caused or affected by poverty including over-grazing, excessive wood cutting, inadequate water management, tilling and watering unstable slopes, neglecting proven mitigation investments.</li> <li>i) Additional strength for vulnerable slopes = tree planting (common tree species, poplar and fruit tree )</li> <li>ii) Grown trees = housing material</li> <li>iii) Village people work to plant trees on slopes and construct a house.</li> </ul>		
Tajikistan (The World Bank and MoECD)	Reducing Poverty in High Mountain Environments around Lake Sarez in the Republic of Tajikistan	Several project components, including road rehabilitation and various small mitigation and income generation projects, were designed (a) to alleviate poverty by reducing 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 by 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. About 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 <u>It is important</u> <u>development that</u> <u>manpower for dis</u> <u>are supplied from lessons</u>	of this case <u>for sustainable</u> <u>materials and</u> <u>aster prevention</u> <u>ocal source.</u>	<ul> <li>i) To implement disaster prevention action with local residents manpower.</li> <li>ii) The rehabilitation of 120 km of the Rushan - Barchadiv Road required all types of road and bridge construction skills. To construct roads and bridges, local residents needed to learn techniques on road repairing.</li> <li>iii) Gabion-production workshop was effective for this area's road repairing. Because the material of gabion was supplied from the same area, it is easy to get the materials making this scheme sustainable for future use.</li> </ul>		

Table 3.3.13	Sustainable Development
14010 010110	

## 2) National Disaster Memorial Park

A memorial park may be either a public park dedicated in memorial to an event or cemetery. For the case of a memorial park, it may be for natural disasters, destroyed buildings, the maximum water level of flood, and ship destroyed by tsunami. Good practices and lessons of national disaster memorial parks are the following:

City Name	Title	Contents		
Indonesia				
Banda Aceh City	Tsunami Memorial Park	The 2004 Indian Ocean Earthquake occurred on 26 December with the epicenter off the west coast of Sumatra, Indonesia. According to the U.S. Geological Survey, a total of 227,898 people died. 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 in Apr. 2005. Right photo is the existing condition. The area around this ship became a memorial park for tsunami.		
		Power Generation Plant Ship (Apr. 2005)       Memorial Park of Tsunami (2016)		
Japan	Japan			
Miyako City Taro District	Tsunami Memorial Building	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. The 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 in Taro District of Miyako City Iwate Pref. This hotel was destroyed by the tsunami. Government decided to preserve the hotel remains. Tourist Hotel TARO (Remains)		
Practices and lessons of this case <u>A disaster strikes when people do</u> <u>not expect it. To share and tell the</u> <u>experience of suffering is</u> important. By the construction of the memorial park, citizens could not forget disaster. Moreover, large spaces such as parks will be effective for the as well.		By the construction of the memorial park, citizens could not forget the natural disaster. Moreover, large spaces such as parks will be effective for the buffer zone as well.		

(5) Enhancing Disaster Preparedness for Effective Response and to "Build Back Better" in Recovery, Rehabilitation, and Reconstruction

Construction of early warning system, business continuity planning (BCP), shelter, warehouse and enforcement of evacuation drills are important. Furthermore, it is necessary to consider the rules and regulations at the reconstruction and/or restoration stage, the study of the land use plan that can respond to the disaster, and so on.

#### Table 3.3.15Bhada City Redevelopment Plan

 Title: Bhada (Bhuj Area Development Authority) India

 The unprecedented earthquake of 26 January 2001 left Bhuj absolutely shattered, the worst ever disaster, in the last 50 years. Almost the entire state reeled under its catastrophic impact. Bhada had planned a reconstruction plan. According to the plan, the relocation project of urban areas is progressing.

 Image: the plan, the relocation project of urban areas is progressing.

 Image: the plan, the relocation project of urban areas is progressing.

 Image: the plan, the relocation project of urban areas is progressing.

 Image: the plan, the relocation project of urban areas is progressing.

 Image: the plan, the relocation project of urban areas is progressing.

 Image: the plan, the relocation project of urban areas is progressing.

 Image: the plan, the relocation project of urban areas is progressing.

 Image: the plan, the relocation project of urban areas is progressing.

 Image: the plan, the relocation project of urban areas is progressing.

 Image: the plan, the relocation plan areas is progressing.

 Image: the plan, the relocation plan and implemented it through land readjustment. This is a good

 Image: the powernment led and formulated a relocation plan and implemented it through land readjustment. This is a good

The government led and formulated a relocation plan and implemented it through land readjustment. This is a good practice of "Build Back Better".

Source: http://bhujada.com/



Table 3.3.16Relocation Plan (Urban Plan)

(Good Point)

The Jondera site located in the mountain area incurred serious damage during the Chuetsu Earthquake. Destruction of access road to the site, collapse of public infrastructure and electrical supplies, water supplies and communication facility were stopped. Resident gave up on reconstruction at the current site and decided to relocate to a safe district.

Source: http://www.bousai.go.jp/kaigirep/houkokusho/hukkousesaku/saigaitaiou/output\_html\_1/case200406.html

## 1) Regulations and rules

The Building Code (specially seismic code), development permission criteria and zoning system (urban planning) all belong to this group.

City Name	Title	Contents
Building Code		
Almaty City (Kazakhstan)	Building Control of Almaty City	This zoning code contains information on the location of active faults and soft ground area. If a land owner constructs a new building on soft ground area, he must pay attention to the regulation of earthquake resistant strength. Construction work is also limited on active faults. The point of good practices is the connection of the zoning code and the geologic map. (Refer to Appendix 5)
Regulation for deve	lopment	
Kobe City (Japan)	Kobe City Development Guidelines	<ul><li>The purpose of this guidelines are the following.</li><li>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 and to thereby contribute to citizen welfare.</li><li>ii) To attain the purpose stated in the construction of public facilities municipal infrastructures.</li></ul>
Slope Engineering Branch, Public Works Department Malaysia	Guidelines for Slope Design	<ul> <li>The main objectives for formulating these guidelines are the following items:</li> <li>i) To stipulate guiding principles to JKR and other engineers involve in slope design;</li> <li>ii) To minimise risks in slope failure disasters;</li> <li>iii) To increase stability of slope;</li> <li>iv) To create awareness of the risks involved in slope design; and</li> <li>v) To further enhance existing geotechnical requirements in slope design.</li> </ul>
Zoning System		
Indonesia	Spatial Planning	Spatial planning in Indonesia began in 1926 when the nuisance ordinance was introduced. The ordinance regulated certain industrial installations 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 <u>In order to construct a disaster resilient</u> <u>city, there is a need for building strong</u> <u>infrastructure resistant to disaster</u>		Building control (Almaty City) is based on geology analysis. The 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 in a 10 year interval. The newest data and technology are introduced with the revision of rules for disaster prevention.

Table 3 3 17	<b>Regulation and Rule</b>
1 abit 5.5.17	Regulation and Rule

Source: JICA Project Team

## 2) Evacuation Drill

Evacuation drills are an element of disaster risk reduction. Evacuation drills are a method of practicing how a building would be evacuated in the event of fire or other emergency with an evacuation plan. For example, "KIZUNA Project (Republic of Chile)", a project where the JICA supported an evacuation drill and early warning system were formed. When Chile

Earthquake happened (Sep. 2015), damage to people and stock was restrained. Good practices and lessons of the evacuation drills are as follows:

City Name	Title	Contents	
Papua New Guinea			
Aitape (ADRC)	PNG Tsunami Awareness Raising Literature Project	In 1998, a tsunami (tidal wave) struck the west coast in Sandaun Province of 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 a number of major community awareness and education in the 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.	
Philippines / Indones	sia		
Evacuation Drill	NDRRMC / NDMA	The Philippines and Indonesia have a high level evacuation drill system. The national government (NDRRMC, NDMA) linkages local government and local communities, schools, hospitals, private companies, etc., to cooperate to carry out evacuation drills. After the drills, the local government and community must make a record of actions and insert it to the website of NDRRMC, NDMA. Any person who is interested in such action can access this information easily.	
Practices and lessons of this case <u>New Ireland earthquakes. Knowledge</u> <u>is power</u>		In 2000 during the new Ireland earthquakes, a tsunami came to Aitape Beach. Aitape villagers took refuge from the tsunami on a hilltop. There were no victims for this tsunami. This is the effect of the ADRC's activities.	

Table 3.3.18	<b>Evacuation Drill</b>
14010 0.0.10	L'acuation Dim

Source: JICA Project Team

## 3.4 Guidebook for Building Resilient Cities

## 3.4.1 Development Concept of the Guidebook

(1) Targets and Objectives of the Guidebook

Target groups of this guidebook are the national and local government officials working on urban planning, disaster risk reductions, finance department, and top government like "Mayor" or "Governor".

- 1) To understand disaster risk of their city.
- 2) To understand how to address issues and weak points for disaster reduction.
- 3) To mainstream disaster risk reduction in urban planning and development plan.
- 4) To learn good practices and lessons learned from other city cases.
- (2) Contents of Guidebook

The guidebook is formed by seven chapters and appendices (checklist, guidance of checklist and references for more information on urban resilience).

		Main Items
1.	Introduction	Objectives of guidebook, scope of the guidebook
2.	Definition	Definition of key words on urban resilience
3.	Why we need the mainstreaming of DRR into urban planning?	<ol> <li>Vulnerability at the urban areas (chronic flood areas, congested areas, old wooden houses, etc.,)</li> <li>Expected effect of urban planning in disaster risk reduction (controlled urbanization area for chronic flood areas, etc.,)</li> </ol>
4.	Who will do what?	<ol> <li>Who manages the latest disaster information?</li> <li>Who knows the disaster risk of the city?</li> <li>Who are involved in risk sensitive urban planning?</li> </ol>
5.	Process for risk-sensitive land use and urban development planning	Addressing points of mainstreaming DRR in urban planning
6.	Disaster risk assessment	Methodology of disaster risk assessment by disaster type
7.	Applicable tools for resilient cities	Introduction of checklist, risk curve, hazard map, contingency plan, BCP (Business Continuity Plan)

Table 3.4.1 Contents of Guidebook

Source: JICA Project Team

(3) How to Use the Guidebook

The guidebook would help the user in the following:

- > To understand the method of hazard risk assessment;
- > To understand effective tools for urban resilience;
- > To understand effective tools for urban planning;
- To understand the organization structure for mainstreaming disaster risk reduction in urban planning;
- To understand the risk of their own city or district by implementing the checklist (it is published in Chapter 7);
- > To understand the grade of maturity of the administration response to natural disaster risk by implementing the checklist;
- > To understand the grade of maturity of administration response of urban planning system; and
- > To understand good practices and good lessons learned about disaster prevention.
- (4) Plan-Do-Check-Action (PDCA) Cycle using the Guidebook

How to utilize the guidebook is shown in Figure 3.3.1.



Source: JICA Project Team



## 3.4.2 Workshops

This section briefs the workshops for Output 3 that took place in the project. The workshops aimed to show and share proposed approaches and ideas of Output 3 mainly for the guidebook formulation covering several themes of introducing urban resilience in general, understanding risk assessment and formulating the checklist with active involvement in a series of group works by participants of each AMS, and to reflect their responses and opinions as well. On the other hand, these serial workshops

are aimed also at developing the capacity of participants for the general methodology and measures for urban resilience in conjunction with Output 3.

## (1) 1<sup>st</sup> Workshop on Risk Assessment (including Demonstration Project)

This workshop in combination with the theme for the formulation of draft Terms of Reference (TOR) of the demonstration project took place in order to understand the basic knowledge and methodologies of risk assessment, while the workshop itself also aimed at developing the capacity of participants through some practices.

## 1) Brief of the workshop

Table 3.4.2 summarizes the contents and activities of the workshop in Vientiane in December 2016 for relevant officers from the DRR sector and urban sector of the national governments and local governments. Although the JICA Project Team requested desirable participants composed of the equal portion between DRR sector and urban sector participants, 70% of the total participants were from the DRR sector. The workshop for the demonstration project is described in Section 2.6.4.

Item	Description	Reference
Date:	8/9 December 2016	Themes on 8 December, Workshop for Risk Assessment and Demonstration Project
Venue:	Vientiane, Lao PDR	Lao Plaza Hotel
Participants	45 participants (8 AMS)	KHM (4), IDN (4), LAO (19), MYS (4), MMR (3), PHL (3), THA (4), VNM (4)
Duration:	7 hours (9:00 ~ 16:00)	Including one hour lunch time
	Role and measures of land use/development planning in DRR	Morning session as introduction and methodologies for natural disaster risk assessment
Sessions:	Group Work – 1	Examination of risk assessment worksheet
	Group Work – 2	Presentation of the results of examinations and plenary discussion with examinations of AMS

 Table 3.4.2
 1<sup>st</sup> Workshop for Risk Assessment (including the Demonstration Project)

Note: Cambodia (KHM), Indonesia (IDN), Lao PDR (LAO), Malaysia (MYS) Myanmar (MMR), Philippines (PHL), Thailand (THA), Viet Nam (VNM) Source: JICA Project Team



Presentation by the JICA Project Team for the methodology of Natural Disaster Risk Assessment



Group Work -1 for the Excel worksheet examination of the group work by AMS (Philippines) for risk assessment



Group Work -2 for presentation of the group work of AMS (Myanmar) for risk assessment

Source: JICA Project Team

#### Figure 3.4.2 Photographs of 1st Workshop for Risk Assessment

#### 2) Method of workshop for the risk assessment

The group work method for each AMS participant was done to let them review issues and examine necessary actions listed in the worksheet form. The form for disaster risk assessment for the focused natural hazard type in each AMS was done in order to understand and embody a whole process and role of the risk assessment in development planning rather than theoretical practice of the risk assessment. After their examinations, plenary discussions were held including their presentation of the results of their worksheet examinations. The questionnaire survey was also done to collect the participants' impressions and opinions at the end of the workshop.

## *3) Implication from the results of the workshop*

Although participants appreciated the introductory presentation for the natural hazard risk assessment in its role and function, the questionnaire result shows their needs to enhance the basic knowledge and technical capacity for the risk assessment. On the other hand, the participants described several common issues of risk assessment implementation in local governments of AMS such as lack of skilled expert procurement or their capacity development and budget provision for the assessment (see Appendix 5.6 Questionnaire Surveys).

The results of the workshop including the questionnaire survey responses implied that basic capacity of local governments for handling the risk assessment would be one of the considerable challenges to be disseminated and well-utilized. Therefore, more active government supports for financial capacity development program training are needed to promote risk assessment and its effective utilization in local governments.

## (2) Workshop for Trial Implementation of Draft Checklist

The three workshops were organized in order to incorporate the participants' opinion in cooperation with three local governments in each AMS through the trial implementation of the draft checklist. The draft checklist would be improved and would be consisting of two checklists of 1) disaster risk management and 2) resilient urban development.

## 1) Brief of the workshop

Table 3.4.3 summarizes the contents and activities of the workshops in three cities of Bima in Indonesia, Luang Prabang in Lao PDR, Pathum Thani in Thailand. This was held during November and December 2016 for relevant officers from DRR sector and urban sector of local governments in three AMS.

Item	Description	Reference
Date:	11/15 November and 1 December 2016	Trial implementation of draft checklist in three cities
Venue:	Three cities of three AMSs	Bima/Indonesia, Luang Prabang/Lao PDR, Pathum Thani/Thailand
Participants	126 participants (3 AMS)	IDN (46 p), LAO (38 p), THA (42 p)
Duration	3.5 hours (9:00 ~ 12:30)	Including presentation time
	Introduction of CN18/checklist	CN18 project introduction and checklist (purpose, how to use)
Sessions	Practice of checklist	Actual use of the checklist as trial tests to improve it.
	Discussion	Discussion for improvement of checklist

<b>Table 3.4.3</b>	Workshop fo	r Trial Imp	lementation	of Draft	Checklist
--------------------	-------------	-------------	-------------	----------	-----------

Note: Indonesia (IDN), Lao PDR (LAO), Thailand (THA) Source: JICA Project Team



Luang Prabang Workshop/LaoPDR Pathum Thani Workshop/Thailand Source: JICA Project Team



Bima Workshop/Indonesia

## Figure 3.4.3 Photographs of the Workshops for Trial Implementation of the Draft Checklist

## 2) Method of workshop for the trial implementation of draft checklist

The same workshop method applied to each city of the three AMS was implemented to let all participants go through the draft checklists and discuss necessary improvement points in terms of content, composition, the way of answers of the checklist, and desirable utilization of the checklist. The questionnaire survey was also done to collect the participants' impressions and opinions at the end of the workshop.

## *3) Implication from the results of the workshop*

The participants gave comments mainly on the three areas of the draft checklist by a) definitions and meaning of questions, b) appropriate range or level of prepared answers in the scroll lists, and c) utilization of the checklist. The following key comments to be referred to

further improvement of the draft checklist are itemized. And the majority of the participants of the three workshops commented that numbers of questions were of appropriate volume as the number was not too much and too less (see Appendix 5.6 Questionnaire Surveys).

- Definition of the questions: As the range of questions covering a wide sector including technical and specific terms (e.g., natural hazard assessment, risk curve, etc.), the participants at every workshop commented the necessity of careful explanation of questions by providing certain definition of terms.
- The range of prepared answers: Each question of the checklist has prepared answers to be selected either "yes" or "no" through a depth of activity levels in consideration of capacity gaps among AMS. The participants indicated that some own activities were beyond the range of prepared answers, so they could not respond to the question.
- Utilization of checklist: They also commented that some questions were difficult to answer because it was out of range and capacity due to a specific question which other sector experts could answer. They gave suggestions on the importance of a respondent who should answer the checklist and there was an important element of utilization in terms of incentives for utilization. And almost all of the participants commented that the frequency of checklist utilization could be at least once a year.

The workshops for the trial implementation of the draft checklist were effective in assessing the usability of the checklist by the participants of the three cities. The issues for improvement of the checklist were identified by the comments of the participants, especially on the technical improvements of the definitions and ranges of questions. However, the issues on the utilization of the checklist would require further discussions among relevant stakeholders to direct desirable utilization.

(3) 2nd Workshop for Urban Resilience in the ASEAN

## 1) Brief of the workshop

Table 3.4.4 briefs the contents and activities of the 2<sup>nd</sup> workshop held in Vientiane in December 2016 for relevant officers from the DRR sector and urban sector of the national governments and local governments as a consecutive workshop to the 1<sup>st</sup> Workshop. Although the JICA Project Team requested desirable participants be composed of equal portion between DRR side and urban side in consideration with the purpose of the workshop for urban planning, as a result, 80% of the total participants were from DRR sides.

Item	Description	Reference
Date:	8 and 9 December 2016	Theme on 9 December, Workshop for Urban Resilience in ASEAN
Venue:	Vientiane, Lao PDR	Lao Plaza Hotel
Participants	45 participants (8 AMS)	KHM (4), IDN (4), LAO (19), MYS (4), MMR (3), PHL (3), THA (4), VNM (4)
Duration:	7 hours (9:00 ~ 16:00)	Including one hour lunch time
	Role and measures of land use/development planning in DRR	Morning session as an introductory guide for urban resilience in ASEAN
Sessions:	Group Work - 1	Examination of issues and priority actions to be taken for risk-sensitive land use and urban development planning
	Group Work - 2	Discussion with examinations of AMS

<b>Table 3.4.4</b>	2 <sup>nd</sup> Workshop	for Urban	Resilience	in ASEAN
--------------------	--------------------------	-----------	------------	----------

Note: Cambodia (KHM), Indonesia (IDN), Lao PDR (LAO), Malaysia (MYS) Myanmar (MMR), Philippines (PHL), Thailand (THA), Viet Nam (VNM) Source: JICA Project Team

Group Work -1 for examination of issues and priority actions for risk-sensitive land use and urban development planning (Cambodia)



Group Work -1 for examination of issues and priority actions for risk-sensitive land use and urban development planning (LaoPDR)



Group Work -2 for plenary discussions with presentation of each examination of AMS

## Source: JICA Project Team

## Figure 3.4.4 Photographs of the 2<sup>nd</sup> Workshop for Urban Resilience in ASEAN

## 2) Method of workshop for the urban resilience

The group work method for each AMS participant was taken to let them review issues and examine priority actions for risk-sensitive land use and urban development planning on a worksheet. Based on their examination, plenary discussions were held including their presentation of the worksheet examinations. The questionnaire survey was also done to collect participants' impressions and opinions at the end of the workshop.

## *3) Implication from the results of the workshop*

Regarding considerable issues on risk-sensitive land use and urban development planning, the work groups of each AMS tended to list their issues on the implementation plan and program as their first priority among eight issues listed in the worksheet. This was selected even though every other issue including hazard data collection, land use planning with risk assessment, and

building regulation were selected dispersedly as the first priority issue by the participants of each AMS. It is envisaged that each AMS with different administrative environment has faced different issues in order to promote risk-sensitive planning system in various levels of each administrative development status from basic data availability to building regulations (see Appendix 5.6.3 Questionnaire Surveys).

On the other hand, the participants described several common priority actions addressing their issues of risk-sensitive land use and urban development planning. The following issues are summarized.

- Capacity development for technical knowledge and skill on data analyses and assessment is listed as common actions in their priority actions. This is true especially for natural hazard analyses in conjunction with the necessary backbone through funding and budgeting.
- As common supporting measures, participants of each AMS also described the necessary institutional arrangements such as the establishment of a data management system, guidelines, rules and regulations to be introduced.

The results of the workshop including questionnaire survey responses implied that basic capacity of local governments for scientific approach to risk-sensitive land use and urban planning with risk assessment would be one of the considerable issues to be addressed by a sufficient capacity development program, while the provision of data for it would be also fundamental.

## (4) 3<sup>rd</sup>/4<sup>th</sup> Workshop for the Proposed Checklist and Guidebook Formulation

The two workshops for the proposed checklists and guidebook formulation were done in order to incorporate the participants' opinion of the AMS into the clarification of both thematic outputs. The two checklists were proposed at this workshop as final draft versions through revisions and modifications based on the feedbacks from the trial implementation workshops in the three cities aforementioned and other comments from relevant stakeholders of the PSC and JICA.

On the other hand, the workshop for the formulation of the guidebook aimed at reflecting the participants' opinions to the proposed contents of guidebook presented by the JICA Project Team through a structured questionnaire on the contents of the proposed guidebook and the representation of them by the participants.

## 1) Brief of the workshops

Table 3.4.5 briefs the contents and activities of the 3<sup>rd</sup>/4<sup>th</sup> workshops in Bangkok, Thailand for the proposed checklist, and the proposed contents and structure of the guidebook last March 2017 where relevant officers from DRR sector and urban sector of the national and local governments of nine AMS participated in the workshops.

Item	Description	Reference
Date:	3 <sup>rd</sup> March, 2017	Proposed checklist on the 3 <sup>rd</sup> /4 <sup>th</sup> Workshop
Venue:	Bangkok, Thailand	Pullman Bangkok Grande Sukhumvit
Participants	44 participants (9 AMS)	KHM (4), IDN (4), LAO (4), MYS (5), MMR (4), PHL (2), SGP (2), THA (15), VNM (4)
Duration	7.5 hours (9:00 ~ 16:30)	Including lunch time
	Introduction of CN18/Checklist	CN18 project introduction and checklist (purpose, how to use)
Sessions	Group Work-1	Actual use of the proposed checklist to improve it.
	Contents of Guidebook	Introduction of the contents of guidebook and good practice
	Group Work-2	Presentation of the project as good practice in each AMS

Table 3.4.5	3rd /4th Wor	kshop for Propos	ed Checklist and	Guidebook	Formulation
-------------	--------------	------------------	------------------	-----------	-------------

Note: Cambodia (KHM), Indonesia (IDN), Lao PDR (LAO), Malaysia (MYS) Myanmar (MMR), Philippines (PHL), Singapore (SGP), Thailand (THA), Viet Nam (VNM) Source: JICA Project Team



Introductory presentation by the JICA Project Team

Source: JICA Project Team



Group Work-2: Working checklist by PC by the group of AMS



Group Work -2: Presentation of each examination of AMS

## Figure 3.4.5 Photographs of 3<sup>rd</sup> /4<sup>th</sup> Workshop for Proposed Checklist and Guidebook Formulation

## 2) Method of workshops

## For the clarification of proposed checklists

The proposed checklists are the results of feedback from the workshops of trial implementation of the draft checklist as well as the comments and suggestions from the members of PSC and the JICA advisor (Dr. Baba). Two checklists of the "disaster risk management" and "resilient urban development" were compiled in the two excel packages with some automated output sheet generating graphs and lists as indicators for implementation tools.

The workshop method for the participants of the nine AMS was taken to let all of the participants go through the proposed checklist and clarify necessary improvement points in terms of content, composition and the way to answers the proposed checklist and desirable utilization of the checklist. The questionnaire survey was also done to collect the participants' impressions and opinions at the end of the workshop.

## For the guidebook formulation

The proposed contents of the guidebook for the practitioners of local governments in the ASEAN are composed of the overall approach for urban resilience with applicable tools focusing on risk assessment, checklist, and good practices. This workshop aimed at collecting opinions and suggestions on the proposed contents to be incorporated into the guidebook through group works of the nine AMS by filling up each of the worksheets.

## 3) Implication from the results of the workshop

## Proposed checklists

The participants gave favorable comments on the proposed checklist such as automated file system by excel sheet, which was easy to manipulate. The workshop for the proposed checklist was effective in adjusting and finalizing the proposed checklist through the actual works of the participants. The issues for improvement of the checklist were identified through the comments of the participants, especially on the improvement of the definition and range of questions. The issues on the utilization of the checklist would require further discussions among relevant stakeholders to direct desirable utilization of the checklist as follows: (see Appendix 5.6 Questionnaire Surveys)

- Responsible organization or officer at both levels of the national and local government who would handle in an organized manner covering multi-sector stakeholders and commit the checklist as one of the official tools.
- Responsible organization at the ASEAN level who would commit the checklist as a common platform for tools of DRR.

## Guidebook formulation

The result workgroup activities for reviewing, assessing the contents of the guidebook, and suggesting the participants' opinions and ideas gave some common theme for improvements of the guidebook. The following are the representative opinions.

- The definitions of technical or planning terminology in the guidebook have to be dealt carefully, because the definitions are the essential bases to share the ways and ideas of planning.
- The urban planning sector should be strengthened for DRR and/or the DRR should be enhanced by the spatial planning techniques and tools.

## 3.4.3 Main Points of Guidebook

Based on the results of the 3rd/4th workshop and the results of the examination of PSC and other meetings so far, the main points of the guidebook are as follows:

(1) Easy to understand the knowledge of disaster prevention and urban planning

The main target users for the guidebook are the staff of urban planning and disaster prevention sectors of the local government. However, they are too busy to include additional work about disaster prevention and it is not easy for them to access the internet and gather the heavy data base of national disaster and GIS data. In this guidebook, the basic contents and outlines of disaster prevention and urban planning is included, and this in turn would enable them to install some information on HP address of disaster prevention and/or urban planning. The guidebook's targets are not professionals, experts or researchers. The main targets are local public staff.

(2) Main theme is to mainstream disaster risk reduction in urban planning and development planning

The main theme of the guidebook is to mainstream disaster risk reduction in urban planning and development planning. By reading the guidebook, the government staff can learn about the organizational structure for urban planning on mainstreaming disaster risk reduction. Moreover, the staff can understand the effects of urban planning tools for disaster prevention. It is possible to learn the best practices and lessons learned around the world and mainly in the ASEAN. Contents to be published in the guidebook are limited, and response, recovery, and reinforcement are out of the scope in the guidebook.

(3) Guidebook for sustainable development

The guidebook is not a book for getting knowledge. The guidebook and checklist are tools for stepping up the level of quality of the disaster prevention plan using urban planning tools. In the guidebook, several links and introductions of websites about urban planning and disaster prevention are inserted. Guidebook must answer requests of various levels of staffs concerning disaster prevention and urban planning sections.

(4) Network for sharing information and cooperation between cities using the guidebook

In the guidebook, there are several good practices and lessons learned of ASEAN countries listed, and some cases of hazard map information belonging to ASEAN countries. The JICA Project Team expects that questions and interactions about the guidebook will be conducted between middle cities of the ASEAN countries and established new network for disaster prevention.

## **3.4.4** Development of Guidebook

By addressing the main points as mentioned in Section 3.4.4, the JICA Project Team developed the guidebook including the checklist to be mentioned in Section 3.4.5. Table 3.4.6 shows the outline of the guidebook.

Items	Contents	
Title	Guidebook for Urban Resilience	
Target/User Groups	National and local government officials of AMS working for i) urban planning, ii) disaster risk reduction, and other relevant stakeholders	
	The guidebook aims to assist the users for mainstreaming DRR in urban planning and development plans through;	
Purpose	Understanding disaster risks of urban natural disasters	
•	Providing approaches and methods for planning and assessment	
	Sharing good practices and lessons learned from other cities	
	Guidebook for ASEAN Practitioners	
	• Giving overall pictures on planning and management activities to mainstream DRR into urban planning and development for small-medium cities in ASEAN	
	• Guiding users in understanding required measures for the risk assessment and the planning for developments	
Features	<ul> <li>Introducing applicable tools for improving the activities for DRR in association with urban planning and management</li> </ul>	
	In association with checklists as a practical tool	
	• Using the checklist to identify the issues of activities on planning and management for DRR, urban planning, and development	
	• Determining the actions through the checklist as an effective tool of the PDCA cycle	
	1. Introduction	
	2. Definition	
	3. Why we need mainstreaming DRR into urban planning?	
Contents	4. Who will do what?	
	5. Process of Resilient City Planning,	
	6. Disaster Risk Assessment,	
	7. Applicable Tools for Building Resilient Cities,	
	Checklist	
Volume	132 Pages (Guidebook: 97 pages, Checklist: 35 pages)	

Table 3.4.6 Outline of the Guidebook

Source: JICA Project Team

The draft of the guidebook as a tool on building resilient cities is shown in Appendix 7. The draft guidebook was developed with a streamlined design to attract readers. The cover page of the designed guidebook is shown in Figure 3.4.6.



Source: JICA Project Team

## Figure 3.4.6 Cover Page of the Designed Guidebook

## 3.4.4 Risk Assessment for Building Resilient Cities

(1) Overview of Risk Assessment

Appropriate structural and non-structural measures have to be identified by risk assessment for building resilient cities. In Figure 3.4.7, the planning flow of building resilient cities in Japan is shown.



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

## Figure 3.4.7 Planning Flow of Building Resilient Cities in Japan

In steps 2 to 4 in the above figure, accurate and precise risk assessment can identify the vulnerability of a target area and would lead to more effective measures. Figure 3.4.8 shows the flow of risk assessment for earthquake and tsunami.



Source: JICA Project Team

## Figure 3.4.8 Flow of Risk Assessment of Earthquake and Tsunami

## (2) Fragility Function

During the risk assessment, the 1) fragility function/curve and the 2) loss exceedance curve are important. The former shows the relationship between external force and damage scale/rate on houses, bridges, human life, etc., and is mainly used for risk assessment. On the other hand, the latter shows the relationship between external force and probabilistic loss, which is mainly used for the evaluation of effectiveness of measures. Figure 3.4.9 shows the procedure for measure planning for resilience by fragility curve and loss exceedance curve. Table 3.4.7 shows the role of the fragility curve and loss exceedance curve. Figure 3.4.10 shows an example of these two curves.



Source: JICA Project Team

## Figure 3.4.9 Procedure for Measure Planning for Resilience by Fragility Curve and Loss Exceedance Curve

Curve	Definition	Purpose	Methodology	Study in this Project
Fragility Curve	Relationship between external force and damage scale/rate on house, bridge, human life, etc.	Risk assessment	<ol> <li>Empirical</li> <li>Analytical (simulation)</li> <li>Hybrid</li> <li>Expert opinion-based</li> </ol>	<ol> <li>Literature review</li> <li>Identification on key issues and explanation of opinion on output and results of</li> </ol>
Loss Exceedance Curve	Relationships between external force and probabilistic loss	Evaluation of effectiveness of measures, insurance, etc	<ol> <li>Empirical</li> <li>Analytical (simulation)</li> </ol>	survey in the workshop 3) Preparation of draft TOR

 Table 3.4.7
 Role of Fragility Curve and Loss Exceedance Curve

Source: JICA Project Team





In this project, the fragility function of an a) earthquake, and a b) water hazard (tsunami, storm surge, strong wind and flood) were studied through 1) literature review of the fragility function and a 2) study on relationship between disaster scale and damage.



## 1) Literature review of the fragility function

The literature review of the fragility function for earthquake was done as follows:

a) Cabinet Office, Government of Japan

The risk assessment implemented by the Cabinet Office is one of the standards in Japan. 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 earthquake risk assessment in Japan and summarizes the risk assessment method and fragility curve.

c) 12th 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 the fragility curve are submitted.

The literature review of the fragility function for a typical flood was made as follows:

a) Time Series Variation of Flood Exposure Induced by Flood Prevention Projects

The fragility curves in every five years from 1975 to 2005 were developed and compared with the 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 the 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 the flood risk characteristics and the effect on damage reduction measures using risk analysis framework and flood risk curve. Twenty rivers in Japan were evaluated with the potential damage scenarios, worst damage scenarios, and range of potential flood damage.

The titles of collected literature are listed in Appendix 6.

#### 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:

Type of Disaster	Disaster Scale 【Horizontal Axis】	Damage 【Vertical Axis】
Taunami or Storm	• Wave height	• Human damage (nos. of death, affected eople, etc.)
Surge	• Inundation depth, duration and	• Building and structure damage (damaged houses, financial
	Flow velocity	damage, inundated farm land, and so on)
	Runoff and rainfall	• Interruption period of public service (electricity, gas, water
Flood	• Inundation depth, duration, and	service, and so on)
	overflow velocity	• Restoration period (road, railway, and so on)
Earthquake	Magnitude/seismic intensity	

<b>Table 3.4.8</b>	Data on	Disaster	Scale	and	Damage
14010 0.110	Data on	Disaster	Scult	unu	Damage

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 the legislative system in ASEAN were collected.

## 4) Draft fragility function in ASEAN and recommendation for further improvement

The draft fragility function with the proposed variables is presented in the following table:

Туре	Hazard	Fragility Function	Prospected Variables
Building	Earthquake	Damage Ratio by Seismic Motion	Seismic Intensity
Dunung			Structure Type
			Seismic Code
		Damage Ratio by Liquefaction	<ul> <li>Liquefaction Possibility</li> </ul>
			Structure Type
	Flood, Tsunami and	Damage Ratio by Tsunami and Storm	<ul> <li>Inundation Depth</li> </ul>
	Storm Surge	Surge	Structure Type
		Damage Ratio by Flood	<ul> <li>Inundation Depth</li> </ul>
			Ground Gradient
Casualty	Earthquake	Casualty Rate by Building Collapse	Structure Type
Custanty			Time Period
	Flood, Tsunami and	Casualty Rate by Inundation	<ul> <li>Inundation Depth</li> </ul>
	Storm Surge		<ul> <li>Evacuation Activity</li> </ul>
Infrastructure	Earthquake	Damage of Bridge	Seismic Intensity
			Bridge Span
			Seismic Code
			Retrofit / Reinforcement
	Flood, Tsunami and	Damage of Infrastructure	<ul> <li>Inundation Depth</li> </ul>
	Storm Surge		<ul> <li>Inundation Duration</li> </ul>

Table 3.4.9 Draft Fragility Function in ASEAN



An example of a 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 a Tsunami: (a) Inundation Depth and Death Ratio (b) Inundation Depth and Death Ratio (Banda Aceh)

#### Figure 3.4.12 Examples of Fragility Curve

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

5) Development and proposal of a disaster risk assessment method by the fragility function in building resilient cities

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

Type of fragility curve	Related Measures on Building Resilience
Building Damage (by Type of Structure)	<ul> <li>Earthquake Resistance</li> <li>Reinforcement of Building Standard</li> <li>Insurance</li> </ul>
Flood Damage (Inundation Depth)	<ul> <li>Land Use Regulation</li> <li>Improvement of Flood and Drainage Facilities</li> </ul>
Ratio of Death People (Evacuation people)	<ul> <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 through the use of the fragility curve since the situation in each ASEAN country/city is different.

## 6) Explanation of opinion on output and results of survey in the workshop

In the workshop scheduled last December 2016, opinion on the output and results of the survey shall be explained.

## 3.4.5 Checklist for Building Disaster Risk Resilient Cities

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

(1) Rationale of Formulation of Checklist

The scope of works of this project stipulates the checklist formulation contributing to the enhancement of the activities and their capacity of disaster risk reduction for local governments in association with the national government involvement through effective and practical utilization of the checklist in the ASEAN. This checklist is also positioned as one of the practical tools to materialize the four priority actions of Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR).

The checklist in general is utilized by two types of function mainly administrative performance measure and indicators for process guidance of required activities. Current products of the checklist by international organizations such as "Disaster Resilience Scorecard for Cities Version 2.2" and "Local Government Self-Assessment" by UNISDR have been made as a common performance measurement tool for the assessment of activities for disaster risk reduction applicable to all local governments in the world.

Taking account of locality and geographical conditions of ASEAN countries, this tailor-made checklist for the local government of ASEAN attempts to formulate a practical, sustainable, and systematic tool involving both levels of governments at the local and national level in each AMS.

(2) Approaches to Checklist Formulation

The checklist has been formulated through a participatory planning manner by conducting trial implementation of the draft checklist on the three cities in AMS and proposed in consideration JICA advisor's comments. The JICA Project Team has also conducted the workshop for the proposed checklist to gather opinions and comments for the improvement of it. The following steps have been implemented to formulate the checklist for building disaster risk resilient cities.

- STEP-1: Formulating the draft checklists
- STEP-2: Conducting workshops for trial implementation of the draft checklists in three local governments to get feedback from users (relevant officers)
- STEP-3: Reviewing and reflecting the draft checklist for improvement taking into account the JICA advisor's comments
- STEP-4: Formulating utilization mechanism at both levels of the local and national governments in association with the checklist guidance production
- STEP-5: Finalizing the proposed checklist through the plenary workshops (3<sup>rd</sup>/4<sup>th</sup>) and the ASEAN Urban Resilience Forum for clarification by relevant AMS members and approved Project Steering Committees (PSCs)
- STEP-6: Incorporating the checklists as one of the tools for building disaster and climate resilient cities into the guidebook as the final integrated product

## (3) Formulation of the Proposed Checklist

The following briefly describes the draft checklist including its objectives, composition, and method of the proposed checklist.

## 1) Objectives of the Checklist

Taking into account the considerable DRR activities in local governments against current disaster risks in the ASEAN, the checklist could play an effective role in assisting their activities to be improved, this is also one of the administrative performance measurement tools coupled with awareness function that can cope with the weak capacity of local governments requiring the necessary support and assistance by the national government. The objectives for the local and national governments are set as follows:

## For local governments

- To understand the current status of DRR of a local government and identify its weaknesses in DRR and urban resilience through the checklist; and
- To utilize the checklist as a benchmark and monitoring tool for DRR activities.

## For national government

- To understand and assess the situation of local governments for DRR and urban resilience in the country, taking into account the identification and examination of weak areas and further policies for the improvement of local governments; and
- To utilize the checklist as a tool to stimulate DRR and urban resilience activities in a comparative manner among local governments in the country through the dissemination of assessments of all local governments.

## 2) Considerations of structure design of checklist

## Framework of the proposed checklist

The four priority actions of SFDRR are the essential framework to formulate the composition of the checklist. Accordingly, the structure of checklist is based on the elements of the four priority actions of SFDRR for both of the two checklists, "Checklist A: Disaster Risk Management" and "Checklist B: Resilient Urban Development". However, the order of elements of the four priority actions is adjusted by the ordinal planning process as a common order of activities such as "data collection – analysis – planning – implementation". Therefore, the priority action 2 of strengthening the disaster risk governance to manage disaster risk is adjusted at the last part of the checklist.



Source: JICA Project Team

## Figure 3.4.13 Four Priority Actions as a Framework for the Proposed Checklist

## Two checklists as cross-interactive

One of the issues on mainstreaming DRR into land use and urban development planning is observed by inefficient coordination and interaction of the two key sectors of disaster risk management and the urban sector including infrastructure in the ASEAN. It is essential for the checklist to enhance effective coordination and interaction among two sectors in order to promote mainstreaming DRR in local governments.

In this context, the checklist is proposed to compose of two parts of "Checklist A for Disaster Risk Management" and "Checklist B for Resilient Urban Development". The two checklists automatically requires their assessment to be promoted by interactive and cooperative activities such as data sharing, common analyses, and planning coordination with decision making between the two sectors. The following figure illustrates the interactive planning activities between the disaster risk management and land use and urban development planning to be referred by the two checklists.






#### Checklists for practitioners

These two checklists are designed to be used by certain officials working in disaster risk management and land use and urban development planning. The contents are attempted to be practical checklists utilizing daily working activities in their administrations. The checklists aim to provide the users with a simple tool to assess the existing capacities of a target DRR and urban resilience keeping in mind the capacities that local governments actually need in order to achieve effective DRR and urban resilience. The following four aspects are considered for formulating the checklists:

- **Quantitative assessment:** The checklist plays a key role in enabling users to assess the DRR and urban resilience activities quantitatively and visually for prioritizing improvements effectively and efficiently.
- **Promoting actions:** The checklist plays an important role in promoting required actions through association of weak items with prioritized actions for enhancement of DRR and urban resilience.
- **Compact form:** The checklist aims to be full of substance taking account the frequent use for daily activities of DRR and urban resilience.
- **Three essential aspects:** The questions of the checklist are considered by three key elements of "technique", "planning" and "organizational" aspects as inevitable fields for DRR and urban resilience enhancement.

#### Checklists as a part of PDCA cycle for DRR and urban resilience activities

Monitoring and review of DRR and urban resilience activities need to be improved daily and have to be handled with unexpected circumstances due to natural hazards. The plan-do-check-action (PDCA) cycle is one of the essential activities expected to secure and enhance these activities. The checklist would play a considerable role in promoting this PDCA cycle as one of the pivotal parts of activities toward further improvement of activities.



Source: JICA Project Team



From the abovementioned point of view, the checklist is considered to materialize as a part of this PDCA cycle through Excel worksheets to guide the series of works for 1) checking activities, 2) scoring sheet for their answers, 3) identifying issues of activities, 4) listing priority actions and reference sheet linking to worksheet 1 as explanatory notes with definitions. However, it should be noted that worksheets 2 to 4 linked to worksheet 1 by an automated program with some criteria aiming to show the desirable works as practical utilization of the checklist that have criteria for listing items for issues and priority actions linking to the checklist which require further elaborations.



Source: JICA Project Team

Figure 3.4.16 Checking Activities as a Part of PDCA Cycle

#### (4) Proposed Contents of the Two Checklists

According to the principles of structure design in the previous section, the contents of the checklist are proposed for the two types of Checklists A for "disaster risk management" and Checklist B for "resilient urban development". The contents are composed of questions to relevant respondents of local government as indicators or criteria to measure activities for disaster risk reduction.

### 1) Contents of checklist A for disaster risk management

The Checklist A aims at assessing the capacities of local governments in disaster risk management in the prevention, mitigation and preparedness stages and how their activities and measures are or have been achieved by DRR activities in line with the priority actions of SFDRR. These activities are covered by a broad range of activities to prepare the actions for planning, human resource development, and institutional arrangements to physical interventions.

The questions composed of 125 questions are considered comprehensive activities to encourage activities for DRR in the local government. Although it important to note that there are some similar questions as common aspects between checklists A and B exist. Table 3.4.11 shows the proposed contents of Checklist A for disaster risk management.

Final Report

Priority Actions (SFDRR)	Head Title of Questions	No. of Questions	
	A11. Identifying probable hazard that may affect the local society		
Al Un de note u din e	A12. Analyzing local vulnerabilities		
Disaster Risks	A13. Assessing local disaster risks	13	
	A14. Sharing hazard and risk information	3	
A2 Investing in	A21. Formulating strategies and plans for disaster risk reduction	7	
Disaster Risk	A22. Investment in DRR measures on key facilities	9	
Reduction	A23. Backup or alternatives of key facilities	4	
	A31. Formulating effective disaster response system and administrative management		
A3 Enhancing	A32. Formulating effective emergency relief and resilient medical care system		
Disaster	A33. Formulating effective evacuation system	5	
Preparedness	A34. Formulating effective recovery plan and program in advance before disaster event	7	
	A35. Formulating effective reconstruction plan and program in advance before disaster event	2	
	A41. Overall mechanism of improving urban resilience	10	
A4 Strengthening Disaster Risk Governance	A42. Enhancing capacity of local community for improving societal resilience		
	A43. Participation of private sector in the local society for improving urban resilience	7	
Total Questions 125			

Table 3.4.11Contents of Checklist A for Disaster Risk Management

Source: JICA Project Team

#### 2) Contents of Checklist B for resilient urban development

Checklist B aims at assessing capacities of local governments in land use planning, urban development planning, and relevant infrastructure planning and how these activities and measures are or have been considered in light of DRR. The planning process in each stage could become one of the important factors when DRR is adapted to the planning stage in each process such as data collection, analysis to planning, and programming.

Natural disaster risk assessment becomes one of the essential measures to give not only spatial solution but also a priority for programming in the planning when DRR is mainstreamed. The questions are also considered on how a plan is materialized by concrete measures such as development control, building regulations, and physical interventions assured by certain budget programs as actions for prevention and mitigation of disaster risks.

Table 3.4.12 shows the contents of the proposed checklist consisting of 116 questions for land use and urban development planning.

Final Report

Priority Actions (SFDRR)	Head Title of Questions			
B1 Understanding	B11. Basic socio-economic data provision for probable exposure against hazards			
Disaster Risks	B12. Fundamentals of hazard and vulnerability analysis	15		
	B21. Incorporating disaster risk reduction into land use strategies and framework	6		
	B22. Land use planning reflecting the strategy and the development scenario	12		
B2 Investing	B23. Implementing development control and land use regulations	11		
in Disaster	B24. Strengthening building regulation in combination with zoning system	5		
Risk Reduction	B25. Enhancing infrastructure investment reflecting the strategy and the development scenario	14		
	B26. Enhancing public facilities investment reflecting the strategy and the development scenario	12		
	B27. Improving vulnerable urban block / area	6		
B3 Enhancing Disaster Preparedness	B31. Effective recovery and reconstruction mechanism in land use planning			
B4 Strengthening Disaster Risk Governance	B41. Inclusive, transparent and collective management and activities for urban planning and development			
	B42. Efficient administration of resilient urban planning and development	8		
Total questions 116				

Table 3.4.12Contents of Checklist B for Resilient Urban Development

Source: JICA Project Team

#### (5) Proposed Elements of Checklists by Automated Outputs (Excel Sheets)

Taking in to account the efficient and effective use of both checklists A and B, the sequential process by the automated sheets of excel for checking is adopted, producing an output-oriented compilation of the checklist in terms of the process of "checking work – visualization of the result – issues list based on the results – action lists". Although this automated process of the checklist would not be guaranteed directly by correct conclusions (e.g., action list) due to other factors to be considered, this process would be helpful greatly to understand the process of utilization of the checklists. The checklist composes of the following elements and steps for the automated process shown in below Figure 3.4.17 and Figure 3.4.18. The proposed checklists A and B are referred to in Appendix 6.

#### 1) Sequential process for checking and outputting

The following steps are the sequential process by the automated sheets of excel. Checking is adopted in the proposed checklist. On the other hand, quantitative elements are also incorporated into the questions and answers by scoring points in order to quantify the result of the checklist.

- STEP-1: Confirm the questions organized according to the priority actions of SFDRR
- STEP-2: Select answers in the scroll list of a cell of the excel sheet with scores given as 0~4 points for each answer

Reference: Reconfirm the built-in relevant sectors (main and sub-sectors) in relation to the question (e.g., resource, responsibility, etc.) and revise them if necessary

- STEP-3: Confirm the "resilience score" through the radar chart in another sheet made automatically
- STEP-4: Formulate an "issues list" by inputting the priority order from A to C according to the result of lower points of answers/criteria
- STEP-5: Formulate an "action list" automatically based on the priority list by order (A~C)



Source: JICA Project Team

Figure 3.4.17



Final Report

# STEP 4 Low-scored Activities in "Issue List" to be Prioritized

No.	To do list for Urban Resilience		
1	12.1.2	Population, sex, age, disability, etc.	Α
2	12.1.5	Important public facilities such as schools and hospitals	Α
3	14.1.1	Contents of Hazard map	В
4	14.1.2	Sharing hazard map	В
5	14.2.1	14.2.1 Utilization of and participation to the Open Data initiative	
6	21.1.1	1.1.1 Flood and storm-water management strategies and programs by infrastructure facilities	
7	21.1.2	Seismic risk management programs for building regulation	
8	21.1.3	Administration of design or building code implementation	
9	22.1.1	22.1.1 Public buildings	
10	22.1.2	22.1.2 Water supply facilities	
11	22.1.3	Sewage facilities	С
12	32.1.1	Formulation of an disaster risk management plan / program for medical support network system	А

	Priority Order					
No.		Action item list - Priority A				
1	12.1	2 F	Popul	ation, se:	x, age, disability, etc.	
2	No.			1	Action item list - Priority B	
4	1	12.	1.2	Populat	tion, sex, age, disability, etc.	
5	2	No		Action item list - Priority C		
7	4		1	12.1.2 Population, sex, age, disability, etc.		
8	5		2	12.1.5 Important public facilities such as schools and hospitals		
9	6		3 :	14.1.1	Contents of Hazard map	
10	7		4 :	14.1.2	Sharing hazard map	
	8		5	14.2.1 Utilization of and participation to the Open Data initiative		
	9		6	21.1.1	Flood and storm-water management strategies and programs by	
	10		7	21.1.2 Seismic risk management programs for building regulation		
			8 21.1.3 Administration of design or building code implementation			
			9	22.1.1	Public buildings	
		1	0	22.1.2	Water supply facilities	

Activities Sorted by "Action Lists" by

Source: JICA Project Team

#### Figure 3.4.18 Elements of STEP 4 and STEP 5 in the Proposed Checklists

#### 2) Gauging activities as assessment criteria of answers for the checklist

When the scored criteria are developed, activities for assessment are considered and tiered in five grade levels. The activities for DRR are spread through various aspects including technical, time-frame, coverage, organization, etc. The assessment of activities sometimes requires multiple aspects in combination with the criteria of time factor and other factors such as "activities by the thematic target to be achieved" and "activities of frequency".

STEP 5

Table 3.4.13 indicates a typical scoring criteria as the referential basis of grading. This includes five (5) grades for an answer to the prepared question in the checklist with zero (0) point to four (4) points.

#### Five (5) Grades for Criteria as Answer to be Selected Items for Assessment Criteria 0 4 1 2 3 1. Achievement Level of Development of Activities 1-1 Technical Under Under research Demonstration Application and Do nothing development development standardization preparation stage Formulation and Implemention and 1-2 Planning Data gathering Do nothing Analyzing stage establishment development monitoring stage plan By individual Ad hoc A few standing 1-3 Organizational Do Frequent standing communication/ communication/ meeting/ development nothing meeting discussion discussion discussion 2. Level of Available but a Ad hoc base Not Available Availability of Available available by few or with availability/not regularly by Activities / Source / regularly all mean condition routine update always Data 3. Level of Regularly do by Regularly do with Rarely do/with Sometimes do Frequency of Do nothing long interval by ad hoc base long interval short period Activities 4. Level of All target Coverage by Coverage by Coverage of Do nothing A few coverage areas/fields 30%~50% 50%~70% Activities $(80\% \sim 100\%)$

# Table 3.4.13 Typical Scoring Criteria by Level of Activity Type and Grade for Questions of<br/>Checklists A and B

Source: JICA Project Team

(6) Utilization of Checklist in terms of Sustainable Operation and Management

Although the checklist by the project of CN 18 targets primarily local governments in ASEAN countries, some ideas or direction for desirable utilization of the proposed checklist were examined in the workshops. There would be several considerations to be clarified on how the checklist can be utilized effectively in terms of sustainable operation and management. Operational principles may affect the contents of the checklist in the framework. The following direction as optional ideas are examined.

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

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

• Case 1: <u>One representative officer or organization.</u> This case aims at collecting all the responses in the relevant organization by a representative officer who gathers and edits the answers especially in cases of quantitative questions among organizations and questions including specific themes to which relevant experts can respond. This case requires also initiatives for discussions and policy making with all relevant authorities in an integrated manner.

As a reference, majority of the participants of the checklist workshops mentioned that the DRR committee as an integrated responsible organization was suitable, and the checklist involving various sectors might not enable single organizations or officers to respond to it.

• Case 2: <u>Multi-respondents for relevant questions.</u> This case aims at letting several relevant officers or organizations to be responsible to respond separately to relevant questions, issue identification, and policy making although two coordination officers or organizations should be assigned to coordinate and adjust the checklist of "A: disaster risk management" and "B: resilient urban development". The participants of the workshop did not give their opinion on "who should respond", although a local government should aggregate and evaluate them as a whole in an integrated manner.

In consideration of the relevant opinions by AMS participants of the workshops and rational reasoning, Case 1 could be practical for the character of the checklist necessary to involve various relevant stakeholders. A single authority (e.g., committee) should have the responsibility to manage the checklist, while execution bodies in cooperative manner may be both sectors of disaster risk management and urban sector at both levels of the local and national government.

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

There may be two roles in checking the performance of local government through the checklist. One of them is to assess the capacity of activity results and their achievement through appropriate timing with a few year interval. Another role is to utilize the checklists as a monitoring tool for activities of DRR without much consideration of the assessment of results. The frequency of the checklist utilization with different roles is shown as follows:

• Case 1: A <u>three-year interval</u> may be adequate to re-assess the performance of local government with expected progress. This frequency aims not only at assessing themselves internally, but also evaluating local governments at the national level as a whole in each AMS in order to consider support and assistance by the central government based on the result of evaluations.

As a reference, the opinion on long interval frequency was a minority, and some participants of the checklist workshops mentioned that the frequency of checklist is needed when considering and fitting it with the budgetary or planning interval of DRR in the three to five years interval case.

• Case 2: A <u>one-year interval</u> case aims at monitoring their activities rather than an assessment of performance due to its short-time for improvement of activities. However, it would still remain for appropriate timing of evaluation of activities.

As a reference, the majority of participants of the workshops mentioned that the frequency of checklist needed is once a year because of considerations of change of natural disaster in every year.

Although there are considerations on the relevant opinions by the AMS participants of the workshops, it is necessary to modify and fix the frequency of checklist as it is the most effective cycle for assessment and reflection through some trial implementation.

3) Evaluation and feedback system at the local, national, and regional (ASEAN)levels

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

And after this utilization, it is necessary to clarify how to utilize the checklist as a common tool at the national or even at the ASEAN level. When the checklists are utilized at the national or ASEAN level, contents of the checklist are required to consider the applicability to all cities in ASEAN as a standard checklist or tailor-made checklist formulation to fit with each AMS condition. The directions of checklist utilization with different ways are described at each level as follows:

At the local level:

- Although the two checklists which fit with that standardized platform in ASEAN can be utilized in general as part of PDCA cycle for DRR activities in a local government, there are some necessary modifications to localize the questions and their composition.
- The checklist would be useful obviously for the capacity development program of DRR activities in terms of personnel knowledge, skills, and organizational capacity based on the performance assessment by the checklist with quantitative assessment methodology through excel function.

#### At the national level:

• The national government of AMS would have the responsibility to diffuse the system of the checklists to every local government in order to enhance the capacity of DRR through necessary institutional arrangements, if this system is not familiarized to each local government in the country. In the case, where the country has developed its own checklist, the way of improvement and modification becomes issues to be incorporated.

• After dissemination of the checklist, the government can utilize the result of the checklist for nationwide assessment of local governments to examine further government policies and measures to support or stimulate weak local governments for DRR enhancement.

At the regional level (ASEAN):

- The checklist is expected to be utilized as a common or standardized tool among AMS through promotion and dissemination activities by relevant organizations such as the AHA Center through website distribution.
- The checklist would be a useful tool for DRR activities among AMS taking into account the sharing and exchanging of results of the performance assessment at the same platform level, enabling AMS to compare with each other easily and effectively.

#### 4) Legitimacy of checklist and incentives

The checklist is expected to be endorsed by the national government as one of the legitimate systems in order to diffuse it to all local governments in the country by certain institutional arrangements. This endorsement is expected to function as a kind of incentive to let local governments utilize the checklist.

On the other hand, an award system based on results of the checklist at the national level would become another incentive mechanism to stimulate local government activities. As an example, the Philippines' National Disaster Risk Reduction Management Council has an award system since 1998, called "Gawad KALASAG (*KAlamidad at Sakuna LAbanan SAriling Galing ang Kaligtasan*)" for good practices which is given annually to local governments and all other relevant organizations including the private sector in recognition for DRR activities.

This legitimacy may involve another issue in cases that some countries of ASEAN have made and implemented their own checklist. There would be a lot of discussions on how this is proposed. The checklist could be incorporated or be replaced by it. A better concept or system of this proposed checklist can be introduced hopefully by each AMS based on their discussions and examinations.

#### 3.5 Issues and Way Forward on Output 3

The JICA Project Team developed a guidebook and checklist as tools on building Output 3. These were achieved in Phase 1 of the project. The issue is how to ensure the sustainability of developed tools. For both the guidebook and checklist, dissemination with proper guidance and training for trainers to other cities of ASEAN is the next step after the project is completed. The tools were used in the demonstration project in Phase 2. The issues and next actions identified through the demonstration project are delineated in Chapters 5 and 6.

## **PHASE 2: IMPLEMENTATION OF DEMONSTRATION PROJECT**

# **CHAPTER 4 OVERVIEW OF DEMONSTRATION PROJECT**

### 4.1 Background

Due to their climatic environment and geological property, disaster risk in the Association of Southeast Asian Nations (ASEAN) area is high and it brings a number of disasters to ASEAN countries. By 2050, it is expected that 68% of the world's population would live in urban areas<sup>1</sup>. This unprecedented growth of cities, particularly in countries in the ASEAN Region, causes problems in resource management and land use management and poses a huge challenge to disaster risk management and sustainable development. In addition, cities are highly interconnected to the global economic system. When disasters strike in economic centers, the ripple effects can be felt for thousands of miles and years to come.

Based on Concept Note 18 (CN 18) "Building Disaster and Climate Changes in ASEAN Cities" of ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme Phase 2 (2011-2015) under the ASEAN Committee on Disaster Management (ACDM) Working Group (WG) on Prevention and Mitigation (P&M), the implementation framework for CN 18 has been developed with the assistance by the Japan International Cooperation Agency (JICA). One of the outputs in CN18 is the Evaluation of Candidate Cities and Partnership and Commitment Building for Demonstration Project on Risk Assessment of Priority Cities in the ASEAN Member-States (AMS). Both ASEAN and JICA identified eight candidate cities for the demonstration project through the preliminary disaster risk assessment as shown in Section 2.4.4. They conducted workshops for disaster risk assessment and mainstreaming of disaster risk reduction into urban planning. The ideas on demonstration project were discussed in the workshops.

The objective of AADMER Work Programme (2016-2020) Priority Programme 2 Build Safely is to build resilience into essential infrastructures and essential services for the ASEAN community to thrive and operate despite disasters and climate impacts.

Including implementation of demonstration project as Phase 2 of the project was agreed in the 7th PSC meeting in order to test the outputs of Phase 1 through the demonstration project and set the outputs in place in ASEAN. The PSC members noted that capacity development through the demonstration project as well as sharing knowledge and experiences through the ASEAN Urban Resilience Forum would meet the above objectives of AADMER Work Programme (2016-2020) Priority Programme 2 Build Safely.

<sup>&</sup>lt;sup>1</sup> World Urbanization Prospects (The 2018 Revision) by the United Nations

# 4.2 **Outline of Demonstration Project**

(1) Objectives of Demonstration Project

The demonstration project aims at materializing the priority actions of Sendai Framework for Disaster Risk Reduction and developing capacity for counterpart officials of the target cities on building urban resilience through:

- 1) to understand disaster risk by conducting disaster risk assessment;
- 2) to prepare for investing in disaster risk reduction by developing action plan for improving contingency plan and land use plan;
- 3) to strengthen disaster risk governance to manage disaster risk by developing capacity for disaster risk assessment, formulating of contingency plan, resilient city planning, and strengthening cooperation among the concerned government organizations; and
- 4) to share acquired knowledge and skills for the above objectives 1) to 3) with other ASEAN cities.

Through implementing the demonstration project, dissemination to other ASEAN cities and ensuring sustainability of CN 18 products are also to be expected.

(2) Expected Outputs

The following are the outputs of the demonstration project:

<u>Output 1:</u> The concerned organizations at the local level of the target cities understand the significance of disaster risk reduction and disaster risks through preliminary disaster risk assessment.

<u>Output 2:</u> The counterparts identify the issues to develop contingency plan and land use plan based on the results of the disaster risk assessment and implementing the checklists.

<u>Output 3:</u> The counterparts share the experiences and lessons learned from the demonstration project with other ASEAN cities.

(3) Project Area

Two cities, Luang Prabang (Lao PDR) and Denpasar (Indonesia), out of the candidate cities in ASEAN were identified in the CN18 project.

(Eight candidate cities have been listed from November 2015 to August 2017, and final two cities: Luang Prabang (Lao PDR) and Denpasar (Indonesia) were selected at the 8th ACDM WG meeting on P&M in September 2017)

(4) Project Period

The demonstration projects were conducted from November 2017 to July 2018.

Luang Prabang, Lao PDR: November 10, 2017 to July 18, 2018

Denpasar, Indonesia: November 27, 2017 to July 18, 2018

(5) Coordinating/Implementing Agency

Regional Level: Co-chairs of ACDM Working Group on Prevention and Mitigation (Lao PDR, Thailand), ASEAN Secretariat, AHA Centre

National Level and Local Level: National Disaster Management Organization of Target AMSs and Local Government of Target Cities

(6) Main Tasks

There are six main tasks in the demonstration projects as follows: The activities were taken for each task. The activities are delineated in Chapters 5 and 6.

Task 1: Establishment of Implementation System for the Demonstration Project

Task 2: Data Collection and Review of Current Conditions

Task 3: Preliminary Disaster Risk Assessment

Task 4: Formulation of Action Plans

Task 5: National Workshop

Task 6: 3<sup>rd</sup> ASEAN Urban Resilience Forum

### 4.3 Achievement of Demonstration Project

Through implementing the demonstration project, three outputs mentioned in Section 4.2 were achieved. In addition, the following were achieved. More details including the procedure of the demonstration project are delineated in Chapters 5 and 6.

<u>Output 1:</u> The concerned organizations at the local level of the target cities understand the significance of disaster risk reduction and disaster risks through preliminary disaster risk assessment.

- For both cities of Luang Prabang and Denpasar, the counterpart members understand the significance of disaster risk reduction (DRR) and disaster risks. They assessed the status of their capacity on building resilient cities by using the checklist for the ASEAN Urban Resilience. They understand not only the importance of DRR but also the involvements of other concerned stakeholders in DRR. Actually, they invited members from the other concerned organizations in the process of using the checklist.
- They also learned the process of the preliminary disaster risk assessment and how to see the results of the assessment. The analytic work of the assessment was a challenge for the members since GIS mapping skills and some analytic knowledge on hydrology and seismology were required to fully understand the procedure of the analysis.

<u>Output 2:</u> The counterparts identify the issues to develop contingency plan and land use plan based on the results of the disaster risk assessment and implementing the checklists.

• Through the checklists, the counterparts understand their strengths and weaknesses of the required works for building urban resilience. Weaknesses were identified as the issues. The issues were reflected to the action plans for developing contingency plan and land use plan.

<u>Output 3:</u> The counterparts share the experiences and lessons learned from the demonstration project with other ASEAN cities.

• The counterparts shared the experienced and lessons learned from the demonstration project with other cities in the National Workshop and the 3<sup>rd</sup> ASEAN Urban Resilience Forum. The participants of the workshops in both Lao PDR and Indonesia pointed out the importance of collaboration among the concerned agencies especially between the disaster management organization and planning organization and commitment of the top level of the local government such as mayor or governor. The participants from other cities in Lao PDR and Indonesia would like to have chances to implement this kind of demonstration project for mainstreaming DRR into land use plan.

Besides the achievements corresponding to the expected outputs, the JICA Project Team found the following additional points as the achievements of the demonstration projects:

(1) Practice in line with Sendai Framework for Disaster Risk Reduction

The counterparts practiced the four priority actions of Sendai Framework for Disaster Risk Reduction (SFDRR) through implementing the demonstration project. By using the checklist, action plans for prevention and mitigation rather than response and rehabilitation were formulated.

(2) Practices in line with AADMER Work Programme (2016-2020)

The counterparts practiced the activities in line with Priority Programme 2 "Build Safely" of AADMER Work Programme (2016-2020). The counterparts took part in capacity development activities such as checklist workshop, Q-GIS training, and action plan workshop of the demonstration project. Both local level counterparts and national level counterparts also participated in the 3rd ASEAN Urban Resilience Forum, which will be integrated with the ASEAN Urban Planners Forum. They presented what they learned from the implementation of the demonstration project.

(3) Willingness to Sustain Outputs

Action plans for disaster risk reduction plan (contingency plan) and land use plan were formulated in the demonstration project. The Denpasar City government expressed that they would revise spatial plan based on the action plan. Luang Prabang Provincial Government expressed that they would explain the action plans to the provincial governor for realization of the action plans. As such, the two target cities expressed the willingness to sustain the outputs of the demonstration project.

(4) Impact to Other Cities

Through the national workshops in Luang Prabang and Denpasar, the other cities also thought that changing the mindset from investing to respond to DRR was important. Especially, mainstreaming DRR into land use plan/spatial plan is the issue for the cities. They expressed that they would learn more about the good practices of the demonstration project to reflect to their daily works. As such, the demonstration projects gave impacts to other cities and enhanced opportunities to build urban resilience in other cities of ASEAN.

(5) Effectiveness of Tools

Tools for building urban resilience were developed in the Phase 1 activities of CN18 project. Among the tools, checklists for ASEAN Urban Resilience were fully utilized in the demonstration project. The JICA Project Team assumed that the checklists would be useful tools for assessing the capacity for building urban resilience. The checklist was useful in assessing capacity of building urban resilience, but the JICA Project Team also found that the checklist was useful as a planning tool for action plans. Although the checklists still have some points to be improved, both the counterparts and the JICA Project Team confirmed the effectiveness of the checklists as capacity assessment tool and planning tool in the demonstration project.

(6) Utilization Local Resources

The demonstration project in Denpasar, Indonesia, showed the possibility of utilizing local resources. Local universities supported the JICA Project Team for GIS training. Denpasar City has established an online geo-portal, which is publicly accessible, and developed phone apps such as "Pro Denpasar" app. Moreover, the city has taken initiatives to sign a Memorandum of Understanding (MOU) with a number of tall hotels near the coastal line. In the event of tsunami disaster, those hotels will open for the public to evacuate to and temporality stay in their properties. This practice of utilizing local resources will be a good practice for the other ASEAN cities.

(7) Extracting Lessons for Other ASEAN Cities

Through the demonstration projects, both issues as weakness and good practices as strength were extracted. The issues of the checklist such as "who answers what" and localization such as revision to meet the local contest will be encountered in other cities of ASEAN. The good practices of planning with the checklists and preliminary disaster risk assessment as well as utilization of local resources will be beneficial for building urban resilience in other cities of ASEAN. Wide variety of issues and good practices could be identified in the demonstration projects.

# CHAPTER 5: DEMONSTRATION PROJECT IN LUANG PRABANG, LAO PDR

## 5.1 Activities

(1) Establishment of Implementation System for the Demonstration Project in Luang Prabang (DP-LP)

#### 1) Activity 1-1: Establishment of Project Coordination Unit (PCU) at the National Level

In order to supervise, coordinate, and monitor the Demonstration Project in Luang Prabang (DP-LP), the Project Coordination Unit (PCU) was established at the national level, composed of five members, namely: two officials coming from the Ministry of Labor and Social Welfare (MLSW), one official from the Ministry of Public Works and Transportation (MPWT), one representative official from Luang Prabang Province/Department of Labor and Social Welfare (DLSW), and lastly, one official as the national project coordinator and co-chair of CN18 project representative from MLSW which is also assigned to monitor DP-LP and report to the ACDM Working Group on Prevention and Mitigation. The following Table 5.1 shows the list of PCU members.

The officials from the Department and Division of Disaster Management under Social Welfare Department of MLSW were assigned to coordinate the activities in disaster risk management at the national level for DP-LP, while another official from the Department of Housing and Urban Planning of MPWT was assigned to coordinate activities in urban planning for DP-LP.

	Position	Assigned Position for the Project
1	Deputy Director General of Social Welfare Department, Ministry of Labour and Social Welfare	National Project Coordinator
2	Deputy Director of Luang Prabang Provincial Department of Labour and Social Welfare	National Project Member
3	Deputy Division Head of Ministry of Public Works and Transportation, Department of Housing and Urban Planning	National Project Member
4	Deputy Director, Disaster Management Division, Social Welfare Department, Ministry of Labour and Social Welfare	National Project Member
5	Senior Cooperation Officer Ministry of Labour and Social Welfare	National Project Member

#### Table 5.1.1 Project Coordination Unit (PCU) and Members for the Demonstration Project in Luang Prabang

Source: JICA Project Team

#### 2) Activity 1-2: Establishment of Project Implementation Unit (PIU) at the Local Level

After the establishment of PCU, the Project Implementation Unit (PIU) was established at the local level (Luang Prabang Provincial Government) in order to execute and coordinate the Demonstration Project (DP-LP). This is composed of three members, i.e., two officials from the

Department of Labor and Social Welfare (DLSW) of the Provincial Government and one official from the Department of Public Works and Transportation (DPWT). The following Table 5.1 shows the list of PIU members.

The officials from DLSW are in-charge of disaster risk management in DP-LP, while another official from DPWT is in-charge of urban planning in DP-LP.

# Table 5.1.2 Project Implementation Unit (PIU) and Members for the Demonstration Project in Luang Prabang

	Position	Assigned Position for the Project
1	Chief of Project Implementation Unit from the Provincial Department of the Ministry of Labour and Social Welfare	Head of Project Implementation Unit
2	An official of the Provincial Department of Labour and Social Welfare	Provincial Project Member
3	An official of the Provincial Department of Public Works and Transportation	Provincial Project Member

Source: JICA Project Team



Meeting for PCU Establishment, 10 November 2017 Source: JICA Project Team



Meeting for PIU Establishment, 21 November 2017

#### Photo 5.1.1 Meetings for Establishing Implementation Organizations (PCU, PIU)

(2) Data Collection and Review of Current Conditions

#### 1) Activity 2-1: Data Collection and Review of Current Conditions

The PIU members, in accordance with the request of the JICA Project Team, collected local data and information in Luang Prabang Province, while the JICA Project Team collected necessary information and data from "open-source (website mainly)" as well as data from relevant ministries and agencies in Vientiane in cooperation with PCU members. The data and information collected composed of three categories as follows:

*i)* Statistical data

Socioeconomic statistical data such as population and economic activities (e.g., Gross Regional Domestic Product, development indicators) were collected mainly from the provincial office and relevant websites of the Lao government and international organizations.

ii) Hazard and climate-related data

The primary data in connection with flood or inundation in Luang Prabang Province were collected from relevant offices of the provincial government (Department of Natural Resource

and Environment, Meteorological Office) while the secondary data, such as research projects or studies, were from relevant international organizations through their websites. For the preliminary flood hazard risk assessment, key information and data were collected from open sources or accessible public resources shown in Table 5.1.3.

 Table 5.1.3 Key Data Information from Open Source and Semi-open Source Data Collection for

 Hazard Assessment

Title of Data and Information	Type of Data/Information	Data Source
General topographic information of two districts of Luang Prabang and Chomphet	GIS database	National Geographic Department
Detailed topographic data by Global Digital Surface Model data file of ALOS	GeoTIFF	Japan Aerospace Exploration Agency (JAXA)
iRIC version2.3 for river flow modeling	Software	International River Interface Cooperative Project

Source: JICA Project Team

#### iii) Spatial data and GIS data

In order to analyze the preliminary flood risk assessment including exposure analysis, spatial data and building data (2012) using geographic information system (GIS) were collected from the World Heritage Office, where spatial geodatabase for the conservation of the world heritage of Luang Prabang has been formulated.

#### iv) Plans, programs, and relevant information

Taking account the reviews of existing development plans of Luang Prabang Province and current development trend in the project area, several reports and information were collected as shown in the following Table 5.1.4.

Sector	Plans, Programs and Relevant Information for Luang Prabang Data Source		
Economic Urban Development Sector	8th Socioeconomic Luang Prabang Development Plan 2016-2020	Department of Planning and Investment/Luang Prabang	
	Status of the Project Implementation of the Responsible Committee for Site Survey-Design, Marking the Boundary and Issue Government Land Use Rights Certificate for the Luang Prabang SEZ	Department of Planning and Investment/Luang Prabang	
	Luang Prabang Urban Regulation 2012	World Heritage Office/Luang Prabang	
	Guidebook on Urban Planning and Detailed Planning integrated with Disaster Risk Reduction (DRR)	Ministry of Public Works and Transportation	
	Statistical Report on Tourism in Laos 2016	Website of the Ministry of Information, Culture, and Tourism	
Disaster Management Sector	Draft National Disaster Management Plan 2012-2015		
	Disaster Risk Management Plans by Provinces of Sekong, Attapeu, Saravanh	Ministry of Labor and Social Welfare	
	Manual for National Disaster Risk Management Plan		
	Master Plan Drainage and Sewerage System 2013	Urban Development and Administration Authority-Luang Prabang (UDAA)	

Table 5.1.4 Plans, Programs, and Relevant Information for the Demonstration Project

Source: JICA Project Team

2) Activity 2-2: Implementation of ASEAN Urban Resilience Checklist (A/B) and Assessment

#### Implementation of the checklists (A/B) i)

Two checklists for (A) Disaster Risk Management and (B) Resilient Urban Development were applied to relevant organizations in the Luang Prabang Provincial Government in order to assess their coping capacity to disasters, in which the administration has the responsibility for planning and managing major public services for villages, towns, and cities in the province. For the implementation of the checklists (A/B), collaborative works were carried out by PIU in cooperation with relevant organizations of the provincial government as follows:

- Introductory workshop: for implementation of Checklists (A/B) to the officials from relevant organizations of the Luang Prabang Provincial Government (23 November 2017);
- Delivery and collection of checklists (A/B): to relevant organizations (15 departments and one institution, UDAA) in the provincial government organized by PIU;
- Verification of the results: through PIU review and confirmation of answers to respondents of relevant organizations;
- Analysis of the answers of the checklists (A/B): through quantitative assessment by • the JICA Project Team; and
- Result presentation workshop: for relevant organizations including questionnaire survey on checklists (5 March 2018).



Introductory Workshop for Checklists, 23 Nov 2017



Verification of the Result of Checklists by PIU

Source: JICA Project Team

#### Photo 5.1.2 Checklists (A/B) Implementation by PIU Members in Cooperation with **Relevant Organizations**

#### ii) Assessment of the results of the checklist (A)

The Checklist (A) for Disaster Risk Management was assessed through quantitative analysis with a scoring system installed into the questions and answers in the checklist. The quantitative result indicated intermediate average scores, in which the average total score is 1.07 points out of the maximum points (2.60 points). Looking into the details of scores by groups of questions based on the SFDRR Priority Actions, each group score got similar points without weak fields of activities drastically.

On the other hand, the answers were provided by various departments of the provincial government in comparison with the result of Checklist (B) for Resilient Urban Development. It is envisaged that one of the reasons is the various questions requiring many sectors' response due to the character of disaster management sector.

Final Report



Note: Public Administration Office (PAO), Department of Labor and Social Welfare (DLSW), Department of Public Works and Transportation (DPWT), Department of Planning and Investment (DPI), Department of Natural Resource and Environment (DNRE), Department of Fire Protection and Defense (DFPD), Department of Public Health (DPH), Department of Information Culture and Tourism (DICT), Department Energy and Mines (DEM), Department of Post, Telecommunications and Communications (DPTC), Department Energy and Mines (DEM)

Source: JICA Project Team

#### Figure 5.1.1 Response Scores by Group (SFDRR Priority Actions) and Respondent Organization Distribution of the Result of Checklist (A)

#### *ii)* Assessment of the result of Checklist (A)

The Checklist (B) for Resilient Urban Development was assessed using the same method of Checklist (A). The quantitative result indicated lower average scores than Checklist (A), in which the average of the total score is 1.04 points, out of the maximum points (3.10 points). Looking into the details of scores by groups of questions based on the SFDRR Priority Actions, each group score has gaps of points among them; especially, "B1 Understanding Disaster Risks", "B3 Enhancing Disaster Preparedness" and "B2 Investing in DRR" were given lower scores. In case of respondents of questions, the answers tended to be predominantly from limited departments (e.g., Department of Public Works and Transportation: DPWT) than the result of Checklist (A). It is envisaged that one of the reasons is the various functions of DPWT in infrastructure services.



Note: Public Administration Office (PAO), Department of Labor and Social Welfare (DLSW), Department of Public Works and Transportation (DPWT), Department of Planning and Investment (DPI), Department of Natural Resource and Environment (DNRE), Department of Public Health (DPH), Department of Information Culture and Tourism (DICT), Department Energy and Mines (DEM), Department of Information Culture and Tourism (DICT)

Source: JICA Project Team

#### Figure 5.1.2 Response Scores by Group (SFDRR Priority Actions) and Respondent Organization Distribution of the Result of Checklist (B)

3) Activity 2-3: Coping Capacity Assessment and Prioritization of Identified Issues through the Checklists (A/B)

The following shows the steps and methods applied in reviewing and examining the prioritization of identified issues through checklists (A/B) implementation.

- The items in the checklists assessed with lower scores were considered as issues to be treated with required actions incorporated in the action plans.
- Issues identified to be treated with required actions were elaborated and selected through prioritization process with stakeholders' participation and discussions (workshops).
- The draft idea of required actions for both action plans for formulating Disaster Management Plan (DMP) and Urban Development and Land Use Plan (UDLP) was coordinated and confirmed by the stakeholders through the workshop.
- The proposed two action plans for formulating DMP and UDLP were finalized through discussions and confirmations by the stakeholders through the workshop.

#### (3) Preliminary Disaster Risk Assessment

Although PIU or relevant stakeholders of Luang Prabang Province was/were programmed to conduct the preliminary disaster risk assessment in DP-LP, difficulty to implement the assessment by themselves was identified due to lack of basic skills in software manipulation (GIS or iRIC). As a result, the JICA Project Team conducted the assessment and focused workshops in order for them to understand the basic process of assessment and promote the importance of planning in building urban resilience. The following activities were taken for the assessment:

#### 1) Activity 3-1: Hazard Assessment (Flood Probability Analysis)

According to target disaster type for Luang Prabang defined in the CN18 project, preliminary flood probability analysis was conducted for the target project area. The following are key steps and concerns of the flood probability analysis:

- There was a major flood in August 2018 in the target project area, where considerable damages were not recorded officially, but damages outside of the target area were recorded. The river flow volume of the Mekong River was recorded at 23,310 m<sup>3</sup>/s as 30-year flood exceedance probability in the flood.
- For the flood probability analysis, open source data and software (topographic data by ALOS<sup>1</sup> and software by iRIC<sup>2</sup>) were applied to the analysis in order to promote and disseminate the analysis as handy and costless tool for analysis to other local governments or cities in Lao PDR or ASEAN countries.
- The hypothetical condition was set by four cases of flood exceedance probability with river flow volumes of the Mekong River as 50 years (24,400 m<sup>3</sup>/s) and 100 years (26, 400 m<sup>3</sup>/s, 30,000 m<sup>3</sup>/s, 35,000 m<sup>3</sup>/s). The Khan River as one of the tributaries in the target area was excluded from the analysis.
- In this flood probability analysis, the level of analysis in terms of accuracy and reproducibility was not rectified due to no damages were reported in the historical record of the flood in 2018; therefore, this analysis could not be applied in the level of analysis for planning of disaster risk management and urban land use plan with zoning regulation.

<sup>&</sup>lt;sup>1</sup> ALOS: Global Digital Surface Model "ALOS World 3D – 30 m"

<sup>&</sup>lt;sup>2</sup> iRIC: River analysis/simulation freeware developed by the International River Interface Cooperative

#### 2) Activity 3-2: Exposure (Urban Assets) Analysis

Exposure (urban assets) analysis in the target project area was undertaken in terms of numbers of building in the flood potential areas identified by the flood probability analysis. The following are key steps and concerns of the flood probability analysis:

- Building data in 2012 for exposure analysis by potential flood were based on the GIS data from the Luang Prabang World Heritage Office.
- Building cells with attribute of building type by its central point on GIS database were analyzed by overlaying the spatial distribution of each flood depth of inundation in case of four hypothetical flood conditions.
- An introductory training workshop was held for four officials of Luang Prabang Province utilizing Quantum GIS as one of the open source application software. There were officials whose skills were available only for AutoCAD (drawing tool).

#### 3) Activity 3-3: Vulnerability Analysis

Vulnerability analysis, which is focused on the physical damage to each building in the target area, was undertaken in combination with both assessment results of the flood hazard analysis and exposure analysis. The following considerations are briefed in this analysis and the detailed explanation is referred to in section of (1) Report of Disaster Risk Assessment.

- From 20% to 24% out of the total buildings in the southern part of the target project area, lower lands would suffer by inundation in both cases of 50 years (24,400 m<sup>3</sup>/s) and 100 years (26,400 m<sup>3</sup>/s) flood exceedance probabilities. The northern part of the target project area would not suffer basically.
- The areas that will suffer from potential inundation in the southern part of the project area are comparatively low-density settlement area where the zonings are designated as "golf course area and rice fields area" partially and "urban peripheral area".
- Action plan formulation is focused on basic issues such as data formulation, methodological approaches of analyses, and planning process based on the checklist assessment. Therefore, this preliminary assessment including the results of the three assessments aforementioned was incorporated as reference for the action plan formulation.



50 years  $(24,400 \text{ m}^3/\text{s})$ 

100 years (26,400 m<sup>3</sup>/s)

Source: JICA Project Team

Figure 5.1.3 Flood Probability Analysis in Case of 50 years (24,400 m<sup>3</sup>/s) and 100 years (26,400 m<sup>3</sup>/s) Flood Exceedance Probabilities

#### (4) Formulation of Action Plans

1) Activity 4-1: Action Plan for Formulating Disaster Management Plan (DMP) in Luang Prabang

#### *i)* Approach for Action Plan Preparation

The action plan was prepared through several steps from the input side to output side as illustrated in Figure 5.1.4 below. One of the key approaches is to effectively utilize the results of the checklist assessment. The checklist is broadly composed of four categories in line with the priorities for action in Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030. The action plan was therefore deliberated and prepared in keeping with the four categories. Besides, since various sectors are involved in disaster management, discussions and consensus-building among institutions need to be emphasized. Thus, all the disaster-related institutions participated from the earliest process of preparation.



Source: JICA Project Team

#### Figure 5.1.4 Image of Sequential Steps for Activity 4-1

#### *ii)* Principal Process of Action Plan Preparation

Based on the list of issues that were recognized by the checklist assessment, the issues were narrowed down through a screening process. The key considerations for prioritization include a) saving human lives first, b) appropriate sequential order of development, c) well-balanced disaster management, d) integrated measures against flood, and e) disaster-related institution's concern based on their experiences. Eventually, nine issues were selected from 32 issues as issues to be incorporated into the action plan.

Actions required for overcoming the nine issues were enumerated individually. These issues can be tackled separately. However, they were programmed by combining more than one issue in consideration of ease of implementation as well as linkages and flows between the respective issues. Figure 5.1.5 illustrates an image of formulating programs.





Note: The gray color fonts denote duplicated issues because they are related to two programs. Source: JICA Project Team

#### Figure 5.1.5 Image of Formulating Programs in DMP Action Plan for Luang Prabang

Subsequently, an implementation schedule was prepared as 30-month launch in view of necessary time for executing each action as well as workflow between the actions.

In addition to plenary discussions in the three workshops to which all the institutions were invited, PCU, PIU and the JICA Project Team members had several discussions. Each discussion substantially centered on the following points particularly after drafting the action plan:

- Implementing bodies (both leading institutions and cooperating institutions) for respective actions considering their mandates as well as ordinary activities;
- Implementation schedule in terms of time required for the financial arrangement as well as the time required for actions to be performed by less-experienced officers; and
- Various approval matters for implementing actions (e.g., installation of signboard within the world heritage area)

#### *iii)* Composition of Action Plan

Finally, the action plan was agreed by all the participants in the workshops. The major contents described in the action plan are outlined in Table 5.1.5 below. Besides, its full English version is presented in Appendix 5.1 (2) 1). However, since it has not been endorsed by the governor of Luang Prabang Province, it is still considered a draft version.

Chapter	Major Contents	
Chapter 1 Introduction	<ol> <li>Context</li> <li>Basic Approach for Developing the Action Plan</li> </ol>	
Chapter 2 Basic Information Required for Deliberating Action Plan	<ul> <li>2.1 General</li> <li>2.2 Understanding of Current Disaster Management in the Target Area</li> <li>2.3 Reference Information toward Formulating Desirable Disaster Management Plan</li> </ul>	
Chapter 3 Thematic Issues toward Building Resilient Cities	<ul> <li>3.1 Methodology of Processing Various Issues</li> <li>3.2 Processing Issues in Consideration of Prioritization</li> <li>3.3 Selected Issues as High Priority</li> </ul>	
Chapter 4 Actions to be Undertaken for the Respective Issues	<ul><li>4.1 General</li><li>4.2 List of Actions to be Undertaken</li><li>4.3 Detailed Descriptions of Actions</li></ul>	
Chapter 5 Priority Program	<ul><li>5.1 Formulation of Programs</li><li>5.2 Basic Concepts of Program Formation</li><li>5.3 Implementation Schedule</li></ul>	
Chapter 6 Way Forward	<ul><li>6.1 Recommendations from JPT to PDMC of Luang Prabang</li><li>6.2 Recommendations from JPT to MLSW &amp; MPWT</li></ul>	

 Table 5.1.5 Major Contents of DMP Action Plan for Luang Prabang

Note: PDMC = Provincial Disaster Management Committee Source: JICA Project Team

#### iv) Recommendations for Smooth Implementation of Action Plan

In addition to some recommendations described in Chapter 6 of the Action Plan, PCU, PIU and the JICA Project Team discussed how to take an initial action for smooth implementation of the action plan. The following would be key preparatory actions required for commencing the action plan:

- The action plan needs to be endorsed by the governor of Luang Prabang Province prior to implementation. The necessary budget will not be arranged unless it is endorsed. DLSW should take initiative and act for the endorsement in the provincial assembly.
- The national government is forced to preferentially allocate funds for disaster management planning to the target areas that are specified in the 8th NSEDP3. On the other hand, MLSW is expected to actively support the DLSW of Luang Prabang Province to acquire the budget for implementing the action plan.
- 2) Activity 4-2: Action Plan for Formulating Urban Land Use and Development Plan (ULDP) in Luang Prabang
- *i) Method and process for the formulation of an action plan*

In the process of formulation of action plans for urban land use and development plan (ULDP), three key approaches were taken, i.e., 1) capacity assessment to be identified as coping capacity of DRR through implementation of Checklists (B: Resilient Urban Development) of Output 3 of CN18; 2) preliminary risk assessment of the Mekong River flood utilizing open-source data and software to identify potential flood risk; and 3) workshops implementation for coordination and building consensus among relevant departments in Luang Prabang Province.

Figure 5.1.6 shows the planning process for the action plan formulation for an urban land use and development plan in Luang Prabang. It should be noted that the involvement of relevant

<sup>&</sup>lt;sup>3</sup> 8th Five-Year National Socio-economic Development Plan (2016–2020)

organizations of the Luang Prabang Provincial Government is essential and this was manifested through several workshops in coordination with PIU in terms of project operation; on the other hand, technical coordination and integration between DMP and ULDP are main elements to promote city resilience in the DP-LP.



Note: WS1: AP-DMP = Workshop-1 on Action Plan for Formulating Disaster Management Plan, WS2: AP-ULDP = Workshop-2 on Action Plan for Formulating Urban Land Use and Development Plan, WS3: AP-Coordination = Workshop-3 on Coordination and Adjustment Source: JICA Project Team

#### Figure 5.1.6 Planning Process to Formulate the Action Plans

#### ii) Identifying issues and required actions utilizing results of the checklist

The results of the checklist (B) applied to relevant organizations (15 departments and a provincial office of UDAA) of the Luang Prabang Provincial Government in coordination with PIU identified weak activities and performance as issues of coping capacity for urban resilience. Based on the results of the checklist, PIU and members of relevant organizations discussed and built a consensus of prioritization of issues toward the following:

Understanding the process of preliminary flood risk assessment and its implications

- Based on the preliminary flood probability analysis in cases of 50 and 100 years exceedance probability (Mekong River) in the target area utilizing open source data and software (iRIC), potential building exposures in the target project area were identified and shared in the workshop.
- The results of analysis implied that urban assets indicating around 20% of the total buildings in the target area would not be heavily affected by flood in 50 years. Although this preliminary analysis could not be the basis of a detailed disaster risk management plan or an urban land use and development plan due to limited data for verification, it could give valuable indicators for spatial analysis of urban structure assessment for long-term planning.

#### Prioritizing identified issues toward actions required

- In order to narrow down issues identified in the checklist toward actions required in the action plan formulation, a group work by members of relevant organizations was organized; and three issues were prioritized at the maximum, ranking them as A, B, and C in each issue category (two digits number).
- The prioritization in the workshop was assessed through a quantitative method in which criteria for prioritization were set and scored through excel form in PC.

#### Coordination and confirmation of both actions of DMP and ULDP

• After formulating the actions in both DMP and ULDP plans, a workshop for consensus building was held through coordination and adjustment between the plans. And the results of coordination were agreed by the members through discussions.

#### *iii)* Formulation of proposed action plan

Based on the required actions prioritized by members of the provincial government organizations in formulating ULDP through workshops, a proposed action plan was formulated taking account the implementation agencies and timeframe applied to each action.





Workshop for Prioritizing Required Actions for DULP Source: JICA Project Team

Presentation of the Group Work Result (2018.03.22)

#### Photo 5.1.3 Checklists (A/B) Implementation by PIU Members in Cooperation with Relevant Organizations

*iv)* Further considerations toward the implementation of action plan

Necessary actions toward implementation of both action plans for formulating DMP and ULDP were identified and confirmed through discussion with members of PCU and PIU same as in the previous section 4) Activities 4-1, such as 1) endorsing the governor of Luang Prabang Province through a provincial committee agreement and 2) securing budgets for the actions in the provincial program or national government funding in consideration of the assignments of responsible agencies and coordination body.

(5) National Workshop

#### 1) Overview of the National Workshop

The national workshop was held on April 4, 2018, in Luang Prabang with 47 participants in total including 42 national and provincial government officers related to urban resilience in Lao PDR. The participants include officers from eight provinces other than Luang Prabang. The guest provinces are Luang Namtha, Oudom Xay, Xayabury, and Xiengkhouang provinces from the northern part of the country, Vientiane, Bolikhamxay, and Khamunane provinces from the middle part, and Champasak province from the southern part.

The purposes of the national workshop are:

• Raise awareness to understand and embody the significance of the concept, method of the Disaster and Climate Resilient Cities in Lao PDR through the Demonstration Project in Luang Prabang in association with the ASEAN Guidebook for Urban Resilience;

- Share the results and outcomes of the demonstration project in Luang Prabang and discuss the lessons learned and further issues with the national governments, provincial governments, and other relevant organizations in Lao PDR, while learning opportunities and peer-to-peer exchanges are also promoted; and
- Support the provinces/districts in making use of the first edition of the ASEAN Guidebook including Checklist as deliverables to relevant organizations in Lao PDR.

The major topics presented and discussed in the workshop are summarized in Table 5.1.6. In addition to reporting the results of the demonstration project and sharing lessons learned, Xayabury Province introduced their provincial disaster management plan, which will serve as a useful reference for the participants from Luang Prabang Province. Besides, MPWT presented the guidelines on mainstreaming DRR into urban planning, which was developed in 2015.

Category	Topics of Presentation / Discussion
Introduction	<ul> <li>Brief of the CN18 Project and Guidebook (Output3): presented by the JICA Project Team</li> <li>Considerations on Resilient City Planning: presented by the JICA Project Team</li> </ul>
Results of Demonstration Project	<ul> <li>Brief of the Demonstration Project in Luang Prabang: presented by PCU (MLSW)</li> <li>Draft Action Plan for Formulating DMP: presented by PIU (DLSW)</li> <li>Draft Action Plan for Formulating ULDP: presented by PIU (DPWT)</li> </ul>
Peer-to-peer Exchanges	<ul> <li>Introduction of Provincial Disaster Management Plan: presented by Xayabury Province</li> <li>Introduction of Urban Planning Guidelines with DRR: presented by PCU (MPWT)</li> </ul>
Plenary Discussion	Plenary Discussion on Lessons Learned from Demonstration Project: facilitated by PCU/JPT

Table 5.1.6 Major Topics of the National Workshop in Lao PDR

Source: JICA Project Team

#### 2) Outcomes of the National Workshop

The outcomes could be described below from the results of interactive sessions such as presentation, sharing lessons learned from the demonstration project, and discussions among participants of the national workshop.

- For the first time, a national workshop for urban resilience was conducted gathering relevant organizations within the country. This is an important event bringing together the disaster risk management sector and urban sector to exchange their ideas and discuss their issues with each other. This opportunity could create a climate favorable to the promotion of cross-sector exchange and cooperation in urban resilience of local governments in Lao PDR.
- The importance of coordination and cooperation between disaster risk management sector and urban sector in the local government was commonly recognized among participants (local government officials) in the workshop. This is one of the important issues in the proposed action plan.
- Continuous discussion and follow-up activities for the implementation of actions in the action plans were committed by the members of PCU and PIU of the demonstration project.

Final Report



National Workshop in the Beginning (2018.04.04) Source: JICA Project Team



Presentation by an Official of DPWT (2018.04.04)

#### Photo 5.1.4 Checklists (A/B) Implementation by PIU Members in Cooperation with Relevant Organizations

(6) 3<sup>rd</sup> ASEAN Urban Resilience Forum

The 3<sup>rd</sup> ASEAN Urban Resilience Forum in July 2018 was held at the Luang Prabang where the Demonstration Project was implemented. The demonstration project was introduced by members of PCU (MLSW) and PIU (Luang Prabang DPWT) to 41 participants of seven AMS and other relevant organizations. In conjunction of the purpose of share and dissemination of the project, the followings were achieved.

- Presentations of the demonstration project by the counterparts of Lao PDR could contribute to understanding tools for urban resilience and sharing experiences (e.g. successful concretization of SFDRR, effectiveness of Checklist, etc.) with lessons learned from the project among participants of ASEAN Member States, and appeal the ownership of the demonstration project.
- The presence and speech (strengthening coordination and cooperation of relevant agencies of the Province for urban resilience) of the Deputy Governor of Luang Prabang Province developed an atmosphere conducive to trigger the promotion of implementation of Action Plan for urban resilience of Luang Prabang.



Presentation by DMD-MLSW



Presentation by LP-DPWT

Source: JICA Project Team



# 5.2 Issues Encountered and Solutions

(1) Difficulty in Determining Respondents to Checklist Items

There are 125 and 113 items in the Checklists A and B, respectively. The items covered various sectors. Further, in some cases, more than one institution is related to one checklist item.

Prior to implementing the checklist assessment in Luang Prabang Province, a workshop was held for the purpose of explaining the outline of the project and how to implement the checklist assessment to the concerned institutions at the provincial level. However, due to insufficient understanding, the participants were not able to identify suitable respondents for the respective checklist items within the given time of the workshop. At this point in time, the decision was left to the respective participants. A few weeks later, all the participants submitted their responses and it was found that more than one institution responded to a certain item or none of the institutions responded to a certain item.

Eventually, in the case of Luang Prabang, appropriate respondents were deliberated and coordinated by PIU members after such situation occurred. It is necessary to keep in mind that such adjustment may be required in implementing the checklist assessment.

(2) Limitation of Self-assessment System in Checklist Assessment

The checklist does not require the submission of any evidence when answers are filled-in. For this reason, in some cases, answers do not seem to be given appropriately. In the case of Luang Prabang, such questionable answers were confirmed with the respondents on an individual basis.

In the future, measures should be taken so that respondents can sincerely participate in the checklist assessment by either submitting evidence documents or writing names of evidence documents in an answer sheet. Furthermore, it will be necessary for the national government to pay attention to the above situation in comparing checklist results between local governments.

(3) Necessary Improvement of Technical Terms of Checklists

The checklist implementation came across the difficulties of respondents (the officials of agencies of Luang Prabang Province) to answer the questions occasionally due to less accessible technical terminology by Lao language and its composition of questions based on inclusive and exhaustive contents covering all members of states of ASEAN of which some questions are not related to Lao local context. It is required for the dissemination of checklist in Lao to localize the contents in combination with careful interpretation to the Lao language.

(4) Appropriate Utilization and Operation of Checklists

The checklist in the Demonstration Project was implemented within limited time where the respondents were not given enough time for rectification or verification of answers. As these operational issues of the checklist have been discussed in several other workshops in CN18 project or questionnaires, suggesting its one-year operation based on the evidence of relevant activities and assignments of responsible respondents in monitoring activities. Introduction of checklist to formulate appropriate methods for utilization and operation in the local government is necessary, while national governments are also required to guide the utilization or operation through the provision of its guideline.

(5) Absence of Flood Specialized Staff in the Province

Some of the works included in the action plan require technical knowledge on hydrological and hydraulic engineering. However, there is no staff with specialized expertise to conduct such analysis and

study at the provincial level. DPWT was assigned with the task of flood risk assessment in the action plan considering the mandate of MPWT, which is positioned as an upper-level institution.

Although DPWT of Luang Prabang Province is willing to execute the above actions, it would be hard to do that unless technical assistance is given. Thus, MPWT is expected to provide appropriate assistance.

(6) Insufficient Technical Capacity for Disaster Risk Assessment

In the demonstration project, preliminary disaster risk assessment was introduced and applied to the target project area in Luang Prabang. The importance, methods, and process for the risk assessment utilizing open-source data and software (iRIC) were understood in general by officials of Luang Prabang Province through several workshops, in which the JICA Project Team prepared the results of the assessment.

During the workshops, participants pointed out that the flood risk assessment utilizing the software would be quite difficult in terms of required knowledge, skills, and budget for human resource at the local government level and even at the national level too. This implies that sufficient and continuous program including training or seminar to enhance technical capacity of officials would be inevitable in order to disseminate this technological tool, taking account of international cooperation due to lack of budget and appropriate technical services.

(7) Insufficient Capacity of Local Government for Planning

The action plan was supposed to be prepared by PIU in association with PCU with technical support of the JICA Project Team. However, it was found through the cooperative works at the early stage that PIU would face a daunting task in documenting the action plan because they have scant experience in planning and limited knowledge in disaster management plan.

Therefore, the JICA Project Team made efforts to familiarize them with disaster management plan by providing basic information on what disaster management plan is, including a) some descriptions of SFDRR 2015-2030, b) disaster management system in Lao PDR from the national to regional levels, c) examples of provincial disaster management plans that have been formulated in the other provinces in Lao PDR, and d) disaster management system in Japan for reference.

In case of urban land use and development sector in the demonstration project, introduction of planning process and methodological approaches were focused in the discussions through workshops, taking account the lack of long-term land use and its development plan in the target area as well as its limited timeframe for coordination with sector planning or other planning activities for ordinal process of integrated urban planning.

(8) Necessary Effective Coordination Mechanism with Relevant Sectors for Planning and Implementation

Luang Prabang Provincial Government manages development issues in the province through coordination and discussion by a single Provincial Committee composed of relevant agencies and other organizations. Thematic standing committees or sub-committees such as Disaster Management Committee or Urban Planning Committee have not been established yet in Luang Prabang Province. The discussions in the workshops revealed difficulties of coordination with relevant organizations for effective planning and implementation of disaster risk management or urban development.

Taking account of this situation, a standing organization (sub-committee) under the current Provincial Committee needs to be established for effective coordination and cooperation (e.g., sub-committee for disaster management) in Luang Prabang Province.

(9) Assurance of Effectiveness of Action Plan Implementation

Although both proposed action plans for formulating disaster management plan and urban land use and development plan obtained consensus and were agreed in the workshops, the official approval process was not done. Follow-up activities for this approval of the action plans are needed by PIU in cooperation with PCU to assure implementation of the proposed action plans.

# 5.3 Good Practices

(1) Involvement of All Relevant Institutions from the Early Stage

All relevant institutions had participated in several workshops of the demonstration project from its early stage. Therefore, they knew which actions are related to their office and positively proposed additional involvement in the actions from their own motivation.

In general, various sectors are involved in disaster management. It was confirmed through the activities of the demonstration project that awareness and good relationship between institutions have been enhanced through mutual understanding of situations from the stage of issue analysis.

(2) Information Sharing of Advanced Examples in the Country

There are several provinces that have already formulated a provincial disaster management plan. One of the advanced provinces in the country was invited to the national workshop and the provincial staff made a presentation of their provincial disaster management plan, which was formulated a few years ago with the assistance of a donor partner.

It would appear that the morale among participants from Luang Prabang Province was increased by knowing that a provincial disaster management plan has been formulated in another province. Such information sharing among provinces is considered effective to increase their motivation.

(3) Effectiveness of Utilization of Checklist for Enhancement of Coping Capacity of Local Governments

In spite of some necessary improvements of the checklist identified through the demonstration project, effectiveness of the checklists was confirmed by stakeholders and verified as one of the useful tools for enhancing coping capacity of local government in urban resilience in terms of coordination of organization, information sharing, and provision of basic indicators of activities. Therefore, it is expected that the checklists could be introduced to other local governments after necessary improvement.

(4) Rational Approach in the Planning Process

The proposed action plans in the demonstration project were formulated not only through a participatory planning approach of provincial government officials but also by a rational process in formulating the action plans such as quantitative prioritization process and strategic formulation of actions. Practicing these approaches by stakeholders of Luang Prabang Province were recognized and evaluated as understandable methods.

# 5.4 Lessons Learned for Other ASEAN Cities

(1) Key Considerations in Prioritizing Issues

In prioritizing issues that are recognized by the checklist, there are regional specific ways of prioritization, while there must be universal and general ways of prioritization also from the technical

point of view. For instance, not only the significance of a particular issue itself but also the appropriate sequential order of development needs shall be considered. This includes a case where a data collection system should be firstly developed prior to the improvement of data quality. It would be an efficient way to organize such prioritization conditions to some extent at the national level and then to provide information to local governments for reference.

(2) Supportive Actions to be Executed by the National Government

A local/provincial disaster management plan is to be prepared by the local government based on the action plan. On the other hand, the national government is expected to execute the following supportive actions:

- Technical support such as preparation of standards, guidelines, manuals, and so forth not only for supporting local governments to formulate plans but also for ensuring a certain level of technical quality in planning among the provinces.
- Financial support by preferentially allocating budgets to provinces that are willing to formulate local/provincial disaster management plan.
- (3) Appropriate Localization of Checklist for ASEAN Member States (AMS)

The checklists formulated by the CN18 project as common or standard version for AMS were revealed by necessary improvement of their contents through the implementation of checklists in the demonstration project. It was suggested in the workshops for the checklists to consider a terminological modification, appropriate disaster type in the questions, and operational issues in terms of appropriate respondents and frequency of its implementation. In this context, appropriate localization of checklists including arrangements of contents and wording of questions would be necessary when it is introduced, taking account of each country condition.

(4) Effective Enhancement of Coping Capacity through the Checklists

The checklists were recognized through the demonstration project as one of the effective tools to stimulate activities for building urban resilience under the priority actions of SFDRR such as the promotion of coordination and cooperative works, identification of weakness of coping capacity, and necessary actions. Taking account of the promotion and enhancement of priority actions of SFDRR in ASEAN countries, utilization of checklist is expected to support the activities of SFDRR effectively.

(5) Dissemination of Method for Disaster Risk Assessment for Urban Resilience

In the demonstration project, preliminary flood risk assessment utilizing partially open source data was implemented for the target area with the conditions of 50 and 100 years exceedance probability of the Mekong River. The result of this analyses utilizing open source data proved the effectiveness and its value on hazard assessment to identify the long-term flood probability.

On the other hand, relevant data to verify the flood probability analysis and exposure analysis were insufficient due to lack of historical data, number of points of river flow records, detailed topographic data, and others. Therefore, it is envisaged that the level of the rectification of analyses requires to provide supplemental data in order to fit with the flood management planning level. Taking account of this condition of Luang Prabang Province, many other small-medium cities or local governments in ASEAN are presumed to be in similar conditions, therefore, issues to promote hazard risk assessment in those local governments could be described below.

#### 1) Effectiveness of preliminary disaster risk assessment in long-term urban structure analysis

The preliminary flood probability analysis based on open source information (topographic by ALOS, software by iRIC) gave clear pictures in the hazard assessment and the following preliminary assessment in the demonstration project. Although there are issues of lacks of supplemental data, the analyses utilizing open source data could be effective measures for examine a long-term spatial development (urban structure) scenario through identifying vulnerable areas for unsuitable future urbanization. Therefore, even if the planning area does not have sufficient data, a preliminary flood risk analysis would be one of the useful tools to contribute to the identification of appropriate urban structure for other cities in ASEAN countries.

#### 2) Establishment of a promotive mechanism for implementing risk assessment

It was observed in the demonstration project that the flood probability analysis was still a big challenge for the officials of Luang Prabang Province in utilizing data and manipulating software due to their insufficient skills and opportunity including budget. As they do not have skilled staffs who can use GIS or iRIC software, it would be required to provide sufficient programs with a certain amount of budget to train their staff in skills development and practice it in actual works. As it is presumed that small-medium cities or local governments in ASEAN countries may face similar issues, effective mechanism for dissemination of this technical tool is required to be established by such cooperation with the national institution, utilization of private consulting firms and national funding supports.

# *3) Importance of baseline data provision or development in flood management planning and land use planning*

Although the demonstration project identified the effectiveness of utilizing the tool for the preliminary risk assessment, appropriate planning process for the disaster risk management plan and urban land use and development plan should rely on sufficient primary data through scientific analyses, for which the baseline survey and database are required to monitor quantitative changes through statistical data such as hydrological data, socioeconomic statistics, and urban assets. It would be common and considerable issue to launch continuous baseline survey for effective planning of urban resilience in ASEAN countries.

#### (6) Dissemination of Method for Disaster Risk Assessment for Urban Resilience

Continuous support and promotion of urban resilience activities for AMS should be undertaken by ASEAN through monitoring projects related to urban resilience, dissemination of outputs of CN18 products (e.g., guidebook, checklists) through websites and ASEAN Urban Disaster Resilience Forum.

# CHAPTER 6: DEMONSTRATION PROJECT IN DENPASAR, INDONESIA

# 6.1 Activities

- (1) Task 1: Establishment of Implementation System for the Demonstration Project in Denpasar
  - 1) Activity 1-1: Establishment of Project Coordination Unit (PCU) at the National Level

In order to supervise, coordinate, and monitor the Demonstration Project in Denpasar, the Project Coordination Unit (PCU) was established at the national level which composed of five members, namely, three officials from the National Disaster Management Authority (BNPB), one official from the Ministry of Agrarian Affairs and Spatial Planning (ATR) and one representative official from the Center for Volcanology and Geological Hazard Mitigation (PVMBG). The following Table 6.1.1 shows the list of PCU members.

 Table 6.1.1 Project Coordination Unit (PCU) and Members for the Demonstration Project in Denpasar

	Position	Assigned Position for the Project	
1	BNPB	National Project Coordinator	
2	BNPB	National Project Member	
3	BNPB	National Project Member	
4	ATR	National Project Member	
5	PVMBG	National Project Member	

Source: JICA Project Team

#### 2) Activity 1-2: Establishment of Project Implementation Unit (PIU) at the Local Level

After the establishment of PCU, the Project Implementation Unit (PIU) was established at the local level (Denpasar City and Bali Province) in order to execute and coordinate the Demonstration Project. The members were composed of five members, i.e., two officials from the Regional Disaster Management Agency (BPBD) both from Denpasar City and Bali Province, one official from the Development Planning Agency at sub-national level (BAPPEDA) of Denpasar City and two officials from the Ministry of Public Works and Human Settlements (PUPR) of Denpasar City and Bali Province. The BPBD and the PUPR of Bali Province were included in the PIU since the former agency has mandate for supervising tsunami mitigation while the latter has mandate for approving spatial plan prepared by the BAPPEDA Kota Denpasar. The following Table 6.1.2 shows the list of PIU members.

# Table 6.1.2 Project Implementation Unit (PIU) and Members for the Demonstration Projectin Denpasar

	Position	Assigned Position for the Project
1	BPBD Kota Denpasar	Head of Project Implementation Unit
2	BPBD Bali Province	Provincial Project Member
3	BAPPEDA Kota Denpasar	City Project Member
4	PUPR Bali Province	Provincial Project Member
5	PUPR Kota Denpasar	City Project Member

Source: JICA Project Team



Kickoff Meeting, 27 November 2017

Source: JICA Project Team

#### Photo 6.1.1 Meetings for Establishing the Implementation Organizations

(2) Task 2: Data Collection and Review of Current Conditions

#### 1) Activity 2-1: Data Collection

The PIU members in agreement with the JICA Project Team requested for local data and information collected in Denpasar City, while the JICA Project Team collected necessary information and data from "open-source (website mainly)" and data in relevant ministries and agencies in cooperation with PCU members. The data and information collected composed of three categories as follows:

#### *i)* Statistical data

Socioeconomic statistical data such as population and economic activities (e.g., RGPD, development indicators) were collected mainly from Kota Denpasar and relevant websites of the Indonesian government and international organizations.

#### *ii)* Hazard information

Existing results of the tsunami hazard assessment and map in Kota Denpasar were collected from the relevant agencies including BNPB, PVMBG, BPBD Bali Province, and BPBD Kota Denpasar, as well as research projects or studies from relevant international organizations through their websites. For the tsunami hazard assessment, key information and data were collected as shown in Table 6.1.3 below.

Title of Data and Information	Type of Data/Information	Data Source
Peta Bahaya Tsunami (Tsunami Hazard map)	JPEG	BNPB
Peta Kawasan Rawan Bencana Tsunami(Tsunami Disaster Prone Areas Map)	GIS data	PVMBG
A Probabilistic Tsunami Hazard Assessment for Indonesia	Document	PVMBG
Technical Documentation Tsunami Hazard Maps for Bali	Document and JPEG	GTZ

Table 6.1.3 Key Data Information for Tsunami Hazard Assessment

Source: JICA Project Team

#### iii) Spatial data and GIS data

In order to analyze the preliminary tsunami risk assessment including exposure analysis and evacuation analysis, spatial data including building and infrastructure data by GIS were collected from BPBD, BAPPEDA, PUPR Kota Denpasar, and PUPR Bali Province as shown in Table 6.1.4.

Category	Title of Data	Data Source
General Information	Administrative boundary	BAPPEDA Kota Denpasar
	River Network	PUPR Bali Province
	Coastal Line	PUPR Bali Province
Public Building	Comment Officer	BAPPEDA Kota Denpasar
	Government Offices	PUPR Kota Denpasar
	Educational Facilities (School)	BAPPEDA Kota Denpasar
	Tourism Facilities (Hotel)	BAPPEDA Kota Denpasar
	Health Facility (Hospital)	BAPPEDA Kota Denpasar
	Social Facilities	BAPPEDA Kota Denpasar
	Worship Facilities	BAPPEDA Kota Denpasar
Infrastructure and Land Use	Spatial Structure and Pattern Maps	BAPPEDA Kota Denpasar
	Transportation Plan Map	BAPPEDA Kota Denpasar
	Spatial Pattern Map	BAPPEDA Kota Denpasar
	Transportation Map	BAPPEDA Kota Denpasar
	Energy Network Plan	BAPPEDA Kota Denpasar
	Water Supply Plan	BAPPEDA Kota Denpasar
	Infrastructure System Plan	BAPPEDA Kota Denpasar
Building Distribution	Building Distribution	BAPPEDA Kota Denpasar

Table 6.1.4 Collected GIS Data for Preliminary Tsunami Risk Assessment

Source: JICA Project Team

iv) Plans, programs, and relevant information

Taking account of the reviews of existing development plans of Kota Denpasar, several reports and information were collected as shown in Table 6.1.5.
Sector	Plans, Programs, and Relevant Information	Data Source
	Masterplan for Tsunami Disaster Risk Reduction (Masterplan Pengurangan Risiko Bencana Tsunami) 2012	BNPB
	BPBD Prov Renstra 2014-2018	BPBD Bali Province
Disaster	Document of the Implementation Manual (JUKLAK) and the Technical Guidance (JUKNIS) Certification of Disaster Preparedness for the Service Providers of Tourism Industry, Business 2015	
Management Sector	SOP(Standard Operating Procedure) 2010	
	Disaster Management Plan(Rencana Penanggulangan Bencana Kota Denpasar) 2014- 2018	BPBD Kota
	Pamphlet,leaflet Alert Earthquake and Tsunami	Denpasar
	Masterplan Penanggulangan Bencana Kota Denpasar (Disaster Masterplan) 2016	BAPPEDA Kota Denpasar
	Long-term Spatial Plan (RTRW) 2011-2031	BAPPEDA Kota Denpasar
	Indication (Indikasi) Program RTRW Denpasar 2011-2031	
	Mid-term Development Plan (RPJMD) 2016-2021	
	Local Government Work Plan (RKPD) 2016	
Urban	Building Code (Bangunan Gedung) 2015	
Planning and	Attached documents (to maps)	
Development Sector	District Zonation Regulations of West Denpasar (Peraturan Zonasi Kecamatan Denpasar Barat) 2014	
	National Spatial Planning Programs (Rencana Tata Ruang Wilayah Nasional) 2008	ATR
	Amendment to Government Regulation Number 26, 2008 -National Spatial Planning Programs	
	National Mid-term Development Plan (Rencana Pembangunan Jangka Menengah Nasional) 2015-2019	

Table 6.1.5 Plans, Programs, and Relevant Information for the Demonstration Project

Source: JICA Project Team

# 2) Activity 2-2: Review of the existing plan

## *i)* Plan related to disaster risk management

The tsunami evacuation map is prepared in two areas, namely; Sanur and Serangan. However, some of the assembly points designated in this map are located at an open space with no high buildings at the tsunami inundation area, which means an evacuee cannot escape from a tsunami. In addition, most of the areas except for Sanur and Serangan in Kota Denpasar have not prepared their evacuation map and temporary evacuation buildings are not also designated.



Source: BPBD Kota Denpasar

## Figure 6.1.1 Tsunami Evacuation Map at Sanur Area



Source: JICA Project Team

## Photo 6.1.2 Tsunami Evacuation Signage (on the left) and Designated Evacuation Site (on the right)

On the other hand, action plan related to tsunami mitigation is included in *Rencana Penanggulangan Bencana* (RPB) Kota Denpasar 2014-2018 as shown in Table 6.1.6. In this action plan, three focus priorities, eight programs, and 22 actions were identified regarding tsunami, which is reviewed through this demonstration project.

Focus Priorities		Programs		Acti	Action		
1	1 Improved Effectiveness of Disaster Prevention and		Improved institutional and community capacity in disaster prevention and	1	Socialization of tsunami hazards, impacts and ways of saving people in tsunami prone areas through mass media: Local TV, radio, and local newspapers accessible to the public		
	Mitigation		mitigation	2	Socialization on tsunami hazards and self-preservation methods to elementary to senior high school students		
		2	Optimizing resource management and spatial and land management for disaster prevention and mitigation	3	Establishment of regulations for no increase in the construction of public facilities and government facilities in tsunami prone areas		
		3	Disaster mitigation	4	Construction of tsunami retaining walls at risky coastlines		
			management	5	The planting of mangroves and coral reefs at the coastline is potentially affected by the tsunami		
2	Improved emergency preparedness	4	Capacity building of disaster preparedness	6	Socialization of community awareness knowledge improvement in every urban village at risk of tsunami		
	and emergency			7	Compilation of contingency plans for Tsunami disaster		
	response			8	Implementation of tsunami disaster evacuation training to communities in tsunami-prone areas		
				9	Making tsunami inundation maps		
				10	Implementation of research results to build tsunami shock absorbers in the Tsunami PB Priority Zone		
		5	Accelerated development of infrastructure and logistics facilities in emergency management	11	Preparation of tsunami disaster level evacuation plan at city level and priority zone of Tsunami Disaster Management		
				12	Development of Tsunami Early Warning System		
				13	Logistics planning and provision of funds, equipment and materials needed for emergency response activities / efforts		
				14	Provision of evacuation sites and trails, temporary shelters, and facilities for clean water and sanitation / toilet facilities		
		6	Improved capacity for	15	Conducting a quick review of the tsunami disaster		
			management	16	Search, rescue and evacuation of tsunami disaster victims		
			-	17	Fulfill basic needs of food, clothing, shelter, health services, clean water, and sanitation		
3	Disaster	7	Rehabilitation and	18	Assessment of damage and losses due to disaster		
	Implementation		reconstruction of the physical field	19	Preparation of the Rehabilitation and Reconstruction Action Plan		
				20	Recovery of public facilities infrastructure and reconstruction of houses of disaster victims		
		8	Rehabilitation and reconstruction of social, economic, and	21	Assess the number of victims and damage to the economy and the environment		
			cultural fields	22	Recovery of health and psychological conditions		

Table 6.1.6 Action List regarding Tsunami on RPB

Source: BPBD Kota Denpasar (translated into English by JICA Project Team)

## *ii)* Plan related to spatial planning

One of the most important official documents related to urban planning and development is the Long-term Spatial Plan (RTRW) 2011-2031.

RTRW - an abbreviation for "*Rencana Tata Ruang Wilayah*" or "Spatial Plan" - is a key legal document for spatial planning in Indonesia. RTRW is covered across levels, namely; RTRWN (N: *Nasional* or National), RTRWP (P: *Provinsi* or Provincial), RTRW *Kabupaten* (Regency), and RTRWK (K: *Kota* or City).

The National Spatial Plan or RTRWN is the direction of policy and strategy of utilization of state territory space as stipulated in PP. 26 of 2008 (Source: [1])

A Provincial Spatial Plan, hereinafter referred to as RTRWP, is a general spatial plan of the province, which refers to the RTRWN, RTR Islands, and RTR National Strategic Area, containing objectives, policies, spatial planning strategies, space structure plan, spatial plan, determination of strategic area, direction of space utilization, and direction of spatial use control (Source: [2]).

A Regency Spatial Plan (RTRW *Kabupaten*)/City Spatial Plan (RTRWK) is a general spatial plan of the regency/city, which contains the objectives, policies, spatial planning, regency/city spatial plan, regency/city strategic location, direction of spatial use of the regency/city, and regulation of controlling the utilization of area space of the regency/city (Source: [3]). This project focuses more on the local scale.

In the case of Denpasar City, "*Rencana Tata Ruang Wilayah Kota Denpasar Tahun* 2011-2031" or RTRW Kota Denpasar (Spatial Plan for Denpasar City Period 2011-2031), 92 pages, is the key spatial planning guiding document.

With regard to DRM and DRR, the JICA Project Team refers to the Sendai Framework for Disaster Risk Reduction 2015-2030, which has been widely adopted globally. In this framework, there are four priorities to be taken into account: 1) Understanding Disaster Risks, 2) Strengthening Local Governance to Manage Disaster Risk, 3) Investing in Disaster Risk Reduction for Urban Resilience, and 4) Enhancing Disaster Preparedness for Effective Response and Build Back Better.

A review of the RTRW Kota Denpasar 2011-2031 document by the JICA Project Team from the viewpoint of DRM has shown the parts that need to be given attention, updated or revised including but not limited to the following assessments:

- The document mentions a few parts of Tri Hita Karana concept, but a detailed explanation along with an associated guidance on how to adopt it is not provided. Overall, this concept highly affects the zoning and land use plans of the city, which in turn, affects DRM and DRR.
- The RTRW Kota Denpasar document mentions a few parts of "disaster management system". However, currently such important system is not available yet.
- The RTRW Kota Denpasar document mentions a few parts of "evacuation routes". It also names specifically some evacuation routes such as Jalan Ngurah Rai, Jalan Hang Tuah, etc. However, a complete evacuation route network to be associated with a network map does not exist yet. Similarly, the document mentions specifically some evacuation places (both open field type such as Lumintang Square in North Denpasar District, and indoor type such as Sports building of Lila Nyamuk in North Denpasar). However, a complete evacuation place list to be associated with a location map does not exist yet. These

important lists and maps shall be made and open to the public to raise awareness about disaster evacuation.

- The document mentions in a few parts about disaster prone areas. However, officially, there is no agreed risk map provided in order to specify such disaster-prone areas.
- The document mentions in a few parts about Benoa Port as a "strategic area" and an international port to be. However, a tsunami risk assessment has shown that the port is located in a very tsunami prone area. If it is struck by tsunami, it will cause catastrophic consequences.
- The document mentions in a few parts about "protected areas" (in environmental, cultural, historical or spiritual dimensions) as well as "heritage". However, no detailed lists and maps of such areas and/or buildings are available.
- At some parts in the document, a precise figure for land use planning is provided as a norm (such as the plan for the development of a protected area or an aquaculture area). However, there is no associated justification on how to define such concrete figures.

Table 6.1.7 shows details of the review of the RTRW Kota Denpasar 2011-2031 by the JICA Project Team.

Priority	V Page Article Sub		tion	Content in original Bahasa	Content in English (rough translation)	Comment
	12	5	Sub	Penataan ruang Kota Denpasar bertujuan untuk mewujudkan ruang Kota Denpasar yang produktif, aman, nyaman dan berkelanjutan sebagai pusat kegiatan nasional dalam sistem perkotaan,	Spatial arrangement Denpasar City aims to realize the space of the city of Denpasar is productive, safe, comfortable and sustainable as the center of national activities in the urban system	The word "safe" in this context may be understood differently (e.g. Safe against disasters or crime) and thus, should be spelled out
	13	8	(3)-c	memantapan pelayanan Pelabuhan Benoa sebagai pelabuhan internasional	strengthening the services of Benoa Port as an international port	Benoa Port is prone to tsunami, so this vision shall only be realized when more resilient countermeasures are assured
saster Risks	15	10	(1)-d	pengembangan mitigasi dan adaptasi kawasan rawan bencana	The development of the mitigation and adaptation of disaster prone areas	Which risk map to base on to specify these areas? An associated map of disaster prone areas shall be provided
1. Understanding Dis	15	10	(3)-c	menyediakan informasi kepada masyarakat mengenai batas- batas kawasan lindung, kawasan budidaya serta syarat-syarat pelaksanaan kegiatan budidaya dalam kawasan lindung.	providing information to the community about the boundaries of the region protected areas, cultivation areas and conditions of implementation of cultivation activities within protected area.	Through which information platforms can the public access? Currently this is not available
	15	10	(5)-a	menetapkan ruang yang memiliki potensi rawan bencana	specify spaces that have the potential for disaster prone	This needs to be based on only one (and most agreed) risk map.
	38	41	(1)-	Kawasan rawan bencana, terdiri atas:	Disaster-prone areas, consists of:	Volcanic disaster shall be added (especially after Mt. Agung's eruptions in 2017)
	38	41	(3)-	Kawasan rawan tsunami,, sebarannya terdiri atas:	Tsunami prone areas,, consists of:	Which risk map to base on to specify these areas? Also, an associated mapping of these tsunami prone areas shall be provided

 Table 6.1.7 Review of the RTRW Kota Denpasar 2011-2031

		Naviga	tion		Content in English (rough	-
Priority	Page	Article	Sub	Content in original Bahasa	translation)	Comment
	66	35	(4)-a	pemetaan kawasan rawan banjir, kawasan rawan gelombang pasang dan kawasan yang berpotensi tsunami;	mapping of flood prone areas, tidal wave areas and areas potentially tsunami prone	This needs to be based on a risk map (the officially most agreed one)
	69	81	(5)-	Ketentuan umum peraturan zonasi Kawasan rawan bencanaterdiri atas:	General provisions of zoning regulations of disaster prone areasconsists of	Such zoning maps for each type of disaster shall be established and open to the public
isk	15	10	(5)-d	mengembangkan sistem penanggulangan bencana wilayah kota secara terpadu	develop integrated urban disaster management system	This is important, but currently not available
emance to manage Disaster Ri	53	61	(8)-	Peta penetapan kawasan strategis kota sebagaimana dimaksud pada ayat (1), digambarkan dalam Peta Kawasan Strategis Kota dengan tingkat ketelitian 1 : 25.000, sebagaimana tercantum dalam Lampiran XIX, yang merupakan bagian tidak terpisahkan dari Peraturan Daerah ini.	The map of the city strategic area designation as referred to in paragraph (1) shall be described in the City Strategic Area Map with a level of accuracy of 1: 25,000, as contained in Attachment XIX, which is an integral part of this Regional Regulation.	All maps in Attachment XIX are drawn at the provincial scale. There should be maps drawn at the city scale for Denpasar City (such as 1:10000 or 1:5000)
Strengthening Local Gov	57	64	(4)-b-5	perwujudan sistem jaringan prasarana kota yang terdiri atas sistem prasarana nasional dan provinsi dalam wilayah kota, terdiri atas	The embodiment of a city infrastructure system comprising a national infrastructure system and provinces within urban areas, consisting of: 5. the embodiment of disaster management system	A "disaster management system" shall be developed and articulated more here
2. S	59	65	(3)-c-4- b	(b) ketentuan umum peraturan zonasi sistem penanggulangan bencana	(b) general provisions of zoning regulations of disaster management systems	A "disaster management system" shall be developed and articulated more here
Resilience	1		а	di sisi lain Visi Pembangunan Kota Denpasar dikembangkan pada perwujudan Denpasar Kota Berbudaya dilandasi Tri Hita Karana, sehingga membutuhkan kearifan dalam konsep penataan ruang,	on the other side of Denpasar Development Vision developed in the embodiment of Denpasar City Culture based Tri Hita Karana, thus requiring wisdom in spatial planning concepts,	This is the first time the Tri Hita Karana concept is mentioned in the document without any explanation. It is recommended to add here: "Read more at"
Urban	36	37	(1)-d	Kawasan lindung,, terdiri atas: d. kawasan rawan bencana	Protected areasconsists of: d. disaster prone areas	This content is unclear and needs justification
Reduction for	36	37	(2)-	Rencana pengembangan kawasan, seluas kurang lebih 1.200 (seribu dua ratus) hektar	The plan for the development of a protected area, shall be as broad as possible approximately 1,200 hectares	This sentence needs an explanation and the figure needs a justification
sting in Disaster Risk l	41	43	(2)-	Rencana pengembangan kawasan budidaya sebagaimana dimaksud pada ayat (1), seluas kurang lebih 11.577 (sebelas ribu lima ratus tujuh puluh tujuh) hektar atau 90 % (sembilan puluh perseratus) dari luas wilayah kota.	The plan for the development of cultivation area as referred to in paragraph (1) shall be an area of approximately 11,577 (eleven thousand five hundred seventy seven) hectares or 90% (ninety percent) of the city area.	These figures needs a justification
3. Inve	73	85	(3)-e	penanaman pohon-pohon pelindung dan vegetasi alami sepanjang pesisir yang dapat meredusir hantaman tsunami	planting trees and natural vegetation along the coast to reduce the tsunami hit	It is recommended to spell out the specific types of vegetation which can help reduce tsunami energy (the "bio-shields"). Other types such as coral or submerged reefs and sand dunes can also be considered.

	Navigation				Content in English (rough	
Priority	ty Page Article Sub		Sub	Content in original Bahasa	translation)	Comment
	73	85	(3)-b	pembangunan sistem peringatan dini tsunami di sepanjang pantai wilayah kota	development of tsunami early warning systems along the coastal areas of the city	"tsunami early warning systems" as well as the coastal areas shall be spelled out briefly here.
	14	8	(5)-f.	mengembangkan jalur-jalur evakuasi bencana	develop disaster evacuation routes	Currently these routes are fragmented or not looped. And there is no associated map to visualize their network
	15	10	(5)-c	mengembangkan jalur-jalur dan tempat-tempat evakuasi	develop evacuation paths and evacuation sites	Currently these paths are fragmented or not looped. And there is no associated map to visualize their network
tter	35	34	(4)-a	Jalur evakuasi bencana,terdiri atas: a. jalur-jalur jalan yang digunakan terdiri atas: Jalan Ngurah Rai, Jalan Hang Tuah,	Disaster evacuation routesconsists of: The roadways used consists of: Jalan Ngurah Rai, Jalan Hang Tuah	An associated map to visualize these roadways shall be provided
uild Back Bet	35	34	(4)-b	Jalur evakuasi bencana,, terdiri atas:jalur-jalur jalan atau gang pada kawasan permukiman	The disaster evacuation route,, consists ofpaths or alleys in residential areas	If possible, specify the name of these paths or alleys as they relate to development and building control
and B	46	49	(2), (3)	Tempat atau ruang evakuasi, terdiri atas:	Evacuation places or spaces, consist of:	An associated location map of these places shall be provided
4. Enhancing disaster preparedness for effective response	53	61	(6)-	Kawasan strategis yang memiliki kepentingan perlindungan keragaman sumber daya hayati dan perlindungan terhadap bencana, terdiri atas Kawasan Tahura Ngurah Rai.	Strategic areas that have a biodiversity protection interest and protection against disasters, consisting of the Tahura Ngurah Rai Area.	This is a valid point. This area should be protected, strengthen, and geographically specified, in the context that the city's planned economic developments will encompass this area.
	68	80	(3)-	Ketentuan umum peraturan zonasi untuk sistem penanggulangan bencana kota,, terdiri atas ketentuan umum peraturan zonasi untuk jalur evakuasi bencana, terdiri atas: a. jalur evakuasi bencana tsunami, terdiri atas jalur jalan atau gang-gang pelarian darurat ke tempat yang lebih tinggi yang dapat berupa bangunan tempat evakuasi, tempat terbuka alami atau buatan pada lokasi yang lebih tinggi minimal 6 (enam) meter di atas permukaan laut; dan b. jalur jalan yang digunakan sebagai jalur evakuasi merupakan jalan-jalan utama kota yang terhubung lebih singkat dengan tempat-tempat atau ruang evakuasi bencana yang telah ditetapkan maupun lokasi rumah sakit.	General provisions of zoning regulations for urban disaster management systems, , consists of general rules of zoning regulations for disaster evacuation routes, consisting of: a. tsunami evacuation routes, consisting of road lanes or emergency escape routes to a higher place that can be a place of evacuation, place open natural or artificial at a higher location of at least 6 (six) meters above sea level; and b. the road lane used as the evacuation route is the main roads of the city which are connected more briefly to places or disaster evacuation rooms has been established as well as the location of the hospitals.	Associated maps of such evacuation routes (road lanes, emergency escape routes, main streets, etc.) as well as elevation maps shall be established and open to the public
	73	85	(3)-f	membangun tower-tower penyelamatan di pantai untuk mengakomodasi pelaku kegiatan di pantai bila terjadi tsunami	constructing beach-rescue towers to accommodate coastal activities in the event of a tsunami	A guidance on the planning and architectural design of these towers shall be provided. Some concerned points may include their distribution, form, size, height, features.

Note: JPT recommends parts marked in grey should be updated or revised.

## *iii)* Building Code

A review of Building Code in Denpasar City (Perda Denpasar No.5 of 2015) has shown some of the following fact findings:

- In "Building requirements in areas prone to natural disasters", the document lists out "areas prone to natural disasters include areas prone to landslides, areas prone to the tide, areas prone to flooding, areas prone to hurricanes and areas prone to natural disasters geology" (Section 7, article 80, [1]), but tsunami, earthquake or volcanic disaster are not listed. Therefore, there is no dedicated paragraph for "Building requirements in areas prone to tsunami".
- The document mentions that "the implementation of the building the building in areas prone to natural disasters as mentioned in paragraph (1) done to meet certain requirements that consider safety and security for the benefit of the general public is regulated in RTRW, RDTR, rule over zoning for and/or announcement of coordination with the related SKPD" (Section 7, article 80, [2]), but no referral correlation with those legal documents is provided.
- The document mentions about tsunami prone areas as "the coastal areas with a low elevation and/or potentially or have experienced a tsunami" (Article 89, [1]), that the implementation of these areas must meet the requirements in accordance with the provisions in RTRW, RDTR, zoning regulations, etc. (Article 89, [2]), and "shall have certain technical engineering capable anticipating occupant safety and / or building collapse Building due to tsunami waves" (Article 89, [4]). However, there is no detail to define such terms as "low elevation" or "potentially experience", no details of correlation with those legal documents, and no details of the standard of acceptable "technical engineering".

Table 6.1.8 shows details of the review of the RTRW Kota Denpasar 2011-2031 by JPT.

N	Navigation			Content in English (rough	
Page	Article	Sub	Content in original Bahasa	translation)	Comment
10	7	(8)	Klasifikasi berdasarkan ketinggian Bangunan Gedung 15 (lima belas ) meter meliputi:	Classification based on the height of Building 15 (fifteen) meters include:	In view that the JPT is proposing to plan and build temporary tsunami evacuation centers exempted from the traditional 15m height limit, it is recommended to add another point (d), which mentions about this kind of special high-rise buildings as an exception
11	11	(5)	Bangunan Gedung yang akan dibangun di atas tanah milik sendiri atau di atas tanah milik orang lain yang terletak di kawasan rawan bencana alam harus mengikuti persyaratan yang diatur dalam Keterangan Rencana Kota.	Buildings to be built on own land or above the land belonging to another person located in the area prone to natural disasters must following the requirements set forth in the description of the City Plan.	It is suggested to add the viewpoint of disaster response. So the last part can be edited as:in the area prone to natural disasters must following the requirements set forth in the description of the City Plan as well as disaster contingency plans
31	72	(4)	Bentuk atap dominan adalah atap limasan/pelana yang khas Bali.	The dominant roof shape is a typical limasan / saddle roof in Bali.	It is suggested to add:, "with an exception of a possible partial flat roof for selected high-rise buildings like selected hotels, which can serve as temporary tsunami evacuation places"

 Table 6.1.8 Review of Building Code in Denpasar City (Perda Denpasar 05-2015)

Navigation		n		Content in English (rough		
Page	Article	Sub	Content in original Bahasa	translation)	Comment	
33	80	(1)	Kawasan rawan bencana alam meliputi kawasan rawan tanah longsor, kawasan rawan gelombang pasang, kawasan rawan banjir, kawasan rawan angin topan dan kawasan rawan bencana alam geologi.	Areas prone to natural disasters include landslide prone areas, tidal prone areas, flood prone areas, prone areas, hurricanes and geological hazard prone areas.	It is suggested to spell out geological hazards (such as earthquake, tsunami, volcanic disaster and abrasion disaster) here	
37	89	(4)	Penyelenggaraan Bangunan Gedung di kawasan rawan tsunami sebagaimana dimaksud pada ayat (1) harus memiliki rekayasa teknis tertentu yang mampu mengantisipasi keselamatan penghuni dan/atau keruntuhan Bangunan Gedung akibat gelombang tsunami.	Implementation of Buildings in tsunami prone areas such as referred to in paragraph (1) shall have certain technical engineering capable anticipating occupant safety and / or building collapse due to tsunami waves.	It is suggested to mention here some possible resources of such technical engineering capacity. For example, the Building Expert Team (TABG) can be a good socialized resource. This team can be more active to support the local government in regulating, supervising, and providing technical assistance	
55	138		Bangunan Gedung Umum Sebagai Tempat Penampungan	Building Public Building For Temporary Shelters	It would be good to mention more specifically here some types of public buildings which can serve as temporary shelters (such as schools, stadiums, sport complexes, hospitals, etc.)	
55	139	(4)	Bantuan perbaikan rumah masyarakat sebagaimana dimaksud pada ayat (3) meliputi dana, peralatan, material, dan sumber daya manusia.	Assistance in repairing community houses as referred to in paragraph (3) includes funds, equipment, materials, and human resources.	It would be good to add a sentence: "The Building Expert Team (TABG) can be part of or a partner of this assistance".	

Note: JICA Project Team recommends parts marked in grey should be updated or revised. Source: JICA Project Team

## 3) Activity 2-3: Implementation of ASEAN Urban Resilience Checklist (A/B) and Assessment

## i) Comparison between ASEAN Urban Resilience Checklist and 71 Indicators in Indonesia

Indonesia has their own checklist which is called 71 Indicators. Before implementing the ASEAN Urban Resilience Checklist, the JICA Project Team compared these two checklists. Figure 6.1.2 shows the hierarchical relationship between ASEAN Urban Resilience Checklist and 71 Indicators.





# Figure 6.1.2 Relationship between the Two Checklists

The following characteristics were identified based on comparison:

1) ASEAN Urban Resilience Checklist has questions related to risk sensitive urban planning.

2) Each question on 71 Indicators is relatively general, and that of the ASEAN Urban Resilience Checklist is more technical.

3) Based on the comparison, it can be assumed that the ASEAN Urban Resilience Checklist can be supplements to 71 Indicators.

Considering these characteristics, this project implemented the ASEAN Urban Resilience Checklist in order to evaluate the capacity and identify issues and necessary actions in the future.

*ii)* Implementation of the Checklists (A/B)

Two checklists of (A) for Disaster Risk Management and (B) for Resilient Urban Development were applied to relevant organizations in the Kota Denpasar government in order to assess the coping capacity to disasters, of which the administration has responsibility for planning and managing major public services. For the implementation of the checklists (A/B), collaborative works were carried out by the PIU in cooperation with relevant organizations of the Kota Denpasar government as follows:

- **Checklist workshop:** for implementation of checklists (A/B) to the officials from relevant organizations of Kota Denpasar government (12 January 2018)
- **Collection and verification of the results:** through PIU review and confirmation of answers to respondents of relevant organizations
- Analysis of the answers of checklists (A/B): through quantitative assessment by the JICA Project Team.
- **Result presentation workshop:** for relevant organizations (19 February 2018)



Checklist Workshop, 12 January 2018

Source: JICA Project Team

## Photo 6.1.3 Checklists (A/B) Implementation by PIU Members in Cooperation with Relevant Organizations

## *iii)* Assessment of the Result of the Checklist (A)

The checklist (A) for Disaster Risk Management was assessed by quantitative analysis with the scoring system installed into the way of questions and answers in the checklist. The quantitative result indicated that the total score is 14.0 points out of 40 points. Looking into details of the

scores by the groups of questions based on the SFDRR Priority Actions, it is assumed that "A2 Disaster Risk Governance to Manage Disaster Risk" needs to be strengthened.

On the other hand, looking into the score by departments, it is found that PU-BM and Semua implemented enough measures already against disaster risk, while low score department such as PLN and Perdag should improve their measures on disaster risk management.



Note : Development Planning Agency at Sub-National Level (BAPPEDA), National Disaster Management Office (BNPB), Regional Disaster Management Office (BPBD), Financial and Asset Management Agency (BPKAD), Education Agency (Diknas), Health Agency (Dinkes), Environment Agency (DinLH), Trade Agency (Perdag), Public Works and Spatial Planning Agency <Road Divion> (PU-BM), Public Works and Spatial Planning Agency <Human Settlement Divion> (PU-CK), Public Works and Spatial Planning Agency <Spatial Planning Divion> (PU-Tarung), Regional Secretary (Sekda), All Agencies (Semua), Transportation Agency (Dinas Perhubungan), State Electricity Company (PLN), Local Police (Kepolisian)

Source: JICA Project Team

## Figure 6.1.3 Responded Scores by Group (SFDRR Priority Actions) and Respondent Organization Distribution of the Result of Checklist (A)

## *iv)* Assessment of the Result of the Checklist (B)

The checklist (B) for Resilient Urban Development was assessed by the same method of the checklist (A). The quantitative result indicated its higher scores than Checklist (A), of which the total score is 17.3 points out of 40 points. Looking into details of the scores by the groups of questions based on the SFDRR Priority Actions, it can be seen that measures related to "B1 Understanding the Risk" and "B2 Investing in Disaster Risk Reduction for Resilience" should be strengthened. In case of respondents of the questions, it is found that BAPPEDA, BKPD and PU-SDA have relatively high scores, while other respondent institutions have low score and need to be improved.

Final Report



Note : Development Planning Agency at Sub-National Level (BAPPEDA), Meteorological, Climatological & Geophysical Agency (BMKG), National Disaster Management Office (BNPB), Regional Disaster Management Office (BPBD), Financial and Asset Management Agency (BPKAD), Statistical Beaureau (BPS), Cultural Agency (Dikbud),Education Agency (Diknas), Health Agency (Dinkes), Social Affairs Agency (Dinsos), Forestry Agency (Kehut), Local Police (Kepolisian), Trade Agency (Perdag), Fishery Agency (Perikan), Industrial Agency (Perind), Agriculture Agency (Pertan), State Electricity Company (PLN),Public Works and Spatial Planning Agency <Road Divion> (PU-BM), Public Works and Spatial Planning Agency <Spatial Planning Agency <WtaerResources Divion> (PU-SDA), Public Works and Spatial Planning Agency <Spatial Planning Divion> (PU-Tarung), Regional Secretary (Sekda), Telecommunication Office (Telkom), Army Force (TNI).

Source: JICA Project Team

## Figure 6.1.3 Responded Scores by Group (SFDRR Priority Actions) and Respondent Organization Distribution of the Result of Checklist (B)

4) Activity 2-3: Coping Capacity Assessment and Prioritization of Identified Issues through Checklists (A/B)

Based on the result, the JICA Project Team identified critical issues from the questions with low scores as follows:

- < Theme.1 How to make disaster resilient government offices? >
- · Relevant sector: BNPB/BPBD, Bappeda, PU-CK, PU-Tarung, Sekda
- Relevant question:

A22.1	Investing in DRR measures on public buildings				
A23.1	Preparing back up or alternatives of key facilities				
B31.2.1	Pre-planned land use allocation for relocation of critical public				
	facilities to make resilient future				

- < Theme.2 How to prepare for swift and effective disaster response? >
- · Relevant sector:: BNPB/BPBD, Bappeda, PU-CK, Kepolisian, DinLH, Dinkes
- Relevant question:

A31.1.5	Designation of emergency relief / evacuation road for safe and efficient emergency response
A32.2.2	Provision of drills and training for emergency medical and hygiene response
A34.1.1	Formulation of disaster waste disposal plan
A34.1.2	Designation of temporary waste disposal site

B22.3.1	Organized distribution of spaces for emergency operation (command base, camp, helipad, etc.)
B22.3.2	Efficient and rational allocation of space/land for temporal shelter
B22.3.3	Efficient route for emergency operation and evacuation
B22.3.4	Efficient and rational allocation of facilities for evacuation and logistic activities
B22.3.5	Efficient and rational allocation of facilities for emergency medical treatment
B26.2.2	Hospital contingency plan reflecting the strategy and the development scenario
B26.2.3	Planning and drills for emergency treatment and triage based on the contingency plan

< Theme.3 How to prepare for safe evacuation? >

- Relevant sector:: BNPB/BPBD, Bappeda, PU-CK, Sekda, Diknas
- Relevant question:

A33.1.1	Formulation of an evacuation plan/program for community, school and other key public facilities
A33.1.2	Formulation and designation of safer evacuation routes
A33.1.3	Designation and provision of safer and resistant evacuation facilities (open space, shelter, etc.)
A33.1.4	Provision of stockpiling (food, medical-care, hygiene, etc.) for sustainable evacuation
A33.1.5	Provision of evacuation signage and map for efficient evacuation
B26.1.3	Planning and drills for emergency and evacuation based on the contingency plan at school
B26.1.4	Coordinated protocol with DRM to facilitate schools as evacuation places

< Theme.4 How to incorporate disaster risk reduction into land use strategies? >

· Relevant sector:: Bappeda, PU-CK, BNPB/BPBD, PU-tarung

• Relevant question:

B21.1.1	Promoting integration of measures for DRR and CCA in land use planning
B21.1.2	Enhancing DRR in sector planning (infrastructure, public facilities, health, education)
B21.2.1	Land use allocation for the scenario of the resilient city development
B21.2.2	Density allocation and adjustment in habitable areas considering vulnerable areas
B21.2.3	Securing open and green space from an aspect of buffer zone for disaster resilience

Based on these issues, the draft idea of necessary actions for revising action plans were discussed by the stakeholders through the workshop as described in "Activity 4-1: Action Plan Workshop".

## (3) Preliminary Disaster Risk Assessment

The JICA Project Team conducted the preliminary tsunami risk assessment together with BAPPEDA and BPBD of Kota Denpasar. The following activities were taken for assessment.

## 1) Activity 3-1: Hazard Assessment

Three versions of tsunami hazard map exist in Denpasar, which are prepared by PVMBG, BNPB, and GTZ.



Source: PVMBG





Source: BPBD Kota Denpasar

## Figure 6.1.5 Tsunami Hazard Map by BNPB

Based on the discussion with PIU and PCU members, that of PVMBG was selected for the risk assessment considering that PVMBG has main role and mandate for preparing hazard map. It is desirable to use the latest hazard map developed in 2012, but this version has not conducted inundation calculation yet and only has the result of tsunami height on the coastal line.

Considering these conditions, the JICA Project Team selected the tsunami hazard map by PVMBG (2008) for the assessment. This PVMBG version is the worst case of tsunami caused by earthquake with Mw 9.0.

## 2) Activity 3-2: Data Collection and Analysis of Urban Assets

In order to overlay the chosen tsunami hazard map and urban assets in the assessment, GIS data were collected as shown in Table 6.1.4.

The mangrove forests in the south of the city was originally planted by the Ministry of Environment, which actually serve as a "bio-shield" against tsunami. If possible, it is recommended that the ministry will strengthen the forests by planting mangroves more densely and/or filling the gaps where possible based on a reached consensus with the city.

Similarly, the existing green spaces/urban forest stretched at the west side of Denpasar (marked in green dotted line) can be a "bio-shield" to help protect the city center in an event of tsunami. This bio-shield shall be strengthened by planting trees more densely and/or filling in the gaps where possible. This is important, because scientifically, the energy of tsunami at those gaps are significantly enhanced and can cause great damages along its flow through those gaps.



Source: BAPPEDA Kota Denpasar

## Figure 6.1.6 Peta Penggunaan Lahan Kota Denpasar (Land Use Map of Denpasar City, as of 2009)

### 3) Activity 3-3: Preliminary Disaster Risk Assessment

Preliminary Disaster Risk Assessment is composed of tsunami exposure analysis and tsunami evacuation analysis.

## (A) Tsunami Exposure Analysis

Tsunami exposure analysis was conducted by BAPPEDA with support from the JICA Project Team. The analysis summarized the number of buildings and infrastructure located in tsunami prone area by overlaying tsunami hazard map and urban assets.

Table 6.1.9 illustrates the number of buildings and infrastructure facilities in tsunami prone area by tsunami hazard index. Tsunami hazard index can be divided into three, namely; Index 1 which means tsunami inundation depth is more than 3 m, Index 2 which means that is between 1 m and 3 m; and Index 3 which means that is less than 1 m.

		Tsuna			
	Target	1	2	3	Total
i)	Government Offices	24	58	33	115
ii)	<b>Educational Facilities</b>	39	89	48	176
iii)	Tourism	80	9	35	124
iv)	Health Facilities	4	8	5	17
v)	Social Facilities	14	37	35	86
vi)	Worship Facilities	20	30	27	77

Table 6.1.9 Number	of Buildings and	Infrastructure in	Tsunami	<b>Prone Areas</b>
	or samango ana			

Source: JICA Project Team and BAPPEDA Kota Denpasar

Figures 6.1.7 to 6.1.12 show the distribution map of urban assets exposed to tsunami risk.



Source: JICA Project Team and BAPPEDA Kota Denpasar

## Figure 6.1.7 Distribution of Government Offices Located at the Tsunami Prone Area



Source: JICA Project Team and BAPPEDA Kota Denpasar





Source: JICA Project Team and BAPPEDA Kota Denpasar

# Figure 6.1.9 Distribution of Tourism Facility Located at the Tsunami Prone Area



Source: JICA Project Team and BAPPEDA Kota Denpasar

Figure 6.1.10 Distribution of Health Facility Located at the Tsunami Prone Area



Source: JICA Project Team and BAPPEDA Kota Denpasar

## Figure 6.1.11 Distribution of Social Facility Located at the Tsunami Prone Area



Source: JICA Project Team and BAPPEDA Kota Denpasar

# Figure 6.1.12 Distribution of Worship Facility Located at the Tsunami Prone Area

Based on the result of the analysis, BPBD Kota Denpasar and BAPPEDA Kota Denpasar identified important facilities which should be protected from tsunami as listed in Table 6.1.10.

Facility	Penggunaan	Risk
Waste disposal facility	IPAL Suwung	1
Waste disposal facility	TPA Suwung	1
Waste disposal facility	TPA Suwung	1
Government office	Gardu Induk Sanur	1
Government office	Kantor Konsul Kehormatan Republik Federal Jerman	1
Government office	Pelabuhan Indonesia III	1
Government office	PT. Pertamina	1
Government office	Kantor Konsulat Cina	2
Government office	Kantor Konsulat India	2
Government office	Konsulat Australia	2
Government office	PLN Gardu Induk Sanur	2
Government office	PLN Kuta	2
Government office	Kantor PLN	3
Government office	Kantor Telkom	3
Government office	PLN Denpasar	3
Government office	PT PLN (Persero) Distribusi Bali	3
Health facility	Puskesmas Denpasar Selatan II	1
Health facility	RS Bali Mandara	1
Social facility	Panti Sosial Tresna Werda Wana Seraya	1
Worship facility	Pura Mutering Jagat SIdakarya	1
Fasilitas Peribadatan	Pura Sakenan	1

Table Vilit V Innovitant I achieve Located at the Isunanni I i vne i tre	Table 6.1.10 Im	portant Facilities	Located at the	Tsunami Pr	one Area
--	-----------------	--------------------	----------------	------------	----------

Source: JICA Project Team

The following key findings are confirmed through this risk assessment:

- Three officially specified strategic areas in Denpasar City, namely: Sanur, Benoa Port, and Serangan are located in tsunami prone areas. Especially, Benoa Port is a particular critical infrastructure which stores hazardous materials, and thus, becomes a vulnerable point. If struck by tsunami, it will cause catastrophic consequences.
- Other critical infrastructure such as the future terminal, depot (depo BBM), power network, telecom network, bus terminal (type B and type C), an arterial road (Jalan Bypass Ngurah Rai), and an MTR route (Sarbagita BWK) are prone to tsunami.
- Utility facilities including electric, water supply, sewage and disposal need to be protected from tsunami for maintaining various activities in Kota Denpasar.
- Village offices including Kantor DESA and Kantor Lurah should be protected from tsunami in order to maintain local government function in the village.
- A lot of schools are located at tsunami prone area and safe temporary evacuation shelter as well as evacuation plan and drill should be prepared.
- The regional hospital in Kota Denpasar is located at a relatively safe area, however, the hospital and community health center, namely; Puskesmas Denpasar Selatan II and RS Bali Mandara, are at the tsunami prone area. In addition, an important social facility, *Panti Sosial Tresna Werda Wana Seraya*, has high tsunami risk.
- Important Hindu temples including Pura Mutering Jagat SIdakarya and Pura Sakenan have high tsunami risk.
- Commercial and service areas in Serangan and the southern belt connecting Kuta-Sanur are located in tsunami prone area.
- Some densely populated areas, such as those located just inside of the Jalan Bypass Ngurah Rai in the south and east parts of the city, have high tsunami risk.
- Commercial and service areas in Serangan and the southern belt connecting Kuta-Sanur are tsunami prone.
- At the provincial scale, one of Bali province's key arterial and logistics routes (Jalan Bebas Hambatan) that partly runs through Denpasar City is within the tsunami prone zones. This route connects Nusa Dua through Mandara Toll Road, Jalan Bypass Ngurah Rai in Sanur to Padang Bai Port. It has no alternative routes, so if struck by tsunami, logistics in the south parts of Denpasar and Bali Island will be disrupted.

## (B) Tsunami Evacuation Analysis

In Kota Denpasar, there are two tsunami evacuation maps at the Sanur and Serangan area, and one tsunami temporary evacuation building was established in Serangan. However, sufficient tsunami temporary evacuation buildings are not designated or prepared in most of the areas in Denpasar. Based on this background, preliminary tsunami evacuation analysis was conducted in order to consider possible temporary evacuation buildings and identify the area where there is difficulty for tsunami evacuation. This analysis was conducted as follows:

- Village offices, public schools, and hotels are selected as candidates for temporary evacuation buildings.
- Possible evacuation distance from earthquake occurrence to tsunami arrival was set as 750m based on the some assumptions.

• Four types of evacuation buffer with 750m were produced and merged on GIS, namely: a) 750m from the edge of hazard map, b) 750m around the village office, and c) 750m around the public school, and d) 750m around the hotel.

Based on the results, most of areas in Kota Denpasar can be covered by designating village offices, public schools, and hotels as temporary evacuation building as Figure 6.1.13 illustrates. In contrast, the result clarified that four areas including Benoa Port has difficulty for tsunami evacuation and additional measures should be taken to these areas.



Source: JICA Project Team

## Figure 6.1.13 Identification of Tsunami Evacuation Difficulty Area

However, it should be noted that this analysis does not consider building height due to the lack of information. Therefore, additional analysis is strongly recommended after survey for building height of candidate evacuation building.

In addition, the JICA Project Team recommends way forward on designating Temporary Evacuation Building / Space based on the above analysis.

# i) Updating tsunami hazard map by PVMBG

First of all, updating tsunami hazard map by PVMBG is necessary. The existing hazard map by PVMBG shows only three indicators and does not have detail information about inundation depth due to the lack of information and technology at that time. In the final PCU-PIU meeting PVMBG confirmed that they will update tsunami hazard map in Kota Denpasar after receiving

request letter from Kota Denpasar or BNPB. Therefore, Kota Denpasar should submit request letter as soon as possible.

## ii) Survey for temporary evacuation buildings

On the other hand, Kota Denpasar is required to conduct survey about candidate temporary evacuation buildings including Kantor Desa, public schools and hotels. This survey will check a) Building height or story, b) Accomodation capacity and c) Earthquake resistance to check its applicability for temporary tsunami evacuation.

Moreover, recently Bali Province gives Disaster Preparedness Certification and Bali Hotel Association gives Tsunami Ready Certification with certain check. These certification process or checklist can be referred when Kota Denpasar will conduct survey on Kantor DESA, public schools, and so on.

## iii) Identification of temporary evacuation buildings / site

Based on the above work, temporary evacuation buildings can be selected by comparing estimated tsunami inundation depth in updated hazard map and building height of candidate evacuation building. If there is open space higher than estimated inundation depth in the area, this space also can be utilized as temporary evacuation site.

## iv) Identification of tsunami evacuation route

After identification of temporary evacuation buildings / site, evacuation route can be designated. This work can be done together with local community and school, and this will be related to RTRWK as well as RDTR.

## v) Sharing tsunami hazard map

After identification both of tsunami evacuation buildings and route, Kota Denpasar is required to provide tsunami hazard map to local community and schools which indicates tsunami evacuation buildings and route as well as tsunami inundation risk.

## vi) Tsunami evacuation drill

To prepare evacuation building or route is not a goal. It is very important to socialize it through periodical tsunami evacuation drill.

## 4) Activity 3-4: GIS Familiarization

QGIS training was held three times with the support from the Udayana University as teaching assistant in order to teach basic operation of QGIS and tsunami exposure analysis. About 15 officials participated the training from Kota Denpasar and Bali Province.



Source: JICA Project Team

# Photo 6.1.4 QGIS Training

## (4) Formulation of Action Plans

This activity aims to improve the action plan with listed priority actions both for Disaster Management Plan(DMP) and Urban Land Use and Development Plan (ULDP). Priority actions were selected by Denpasar City based on the two results, namely, that of preliminary disaster risk assessment and that of the action plan workshop which is described in the following section.

# 1) Activity 4-1: Action Plan Workshop

In order to discuss the priority action based on the result of the checklist, the action plan workshop has been conducted on 4 May. Participants from relevant agencies both of Kota Denpasar and Bali Province discussed four themes extracted from the results of the checklist and wrote down their opinion about the following questions:

- A) Current situation regarding the issue
- B) What have been done about the issue?

C) What kind of action is necessary for the issue?



Source: JICA Project Team



As a result, more than 150 opinions and suggestions were collected as summarized in Table 6.1.11.

Note: In Table 6.1.11, the "hardware" category refers to tangible things like infrastructure, facilities, structures, buildings, etc., while the "software" category refers to intangible things like operation, programs, capacity, plan, policy, regulation, education, human resource, etc.

# Table 6.1.11 Opinions and Suggestions Obtained from Kota Denpasar duringthe Action Plan Workshop

Theme 1 Ho	w to make a	disaster	resilient	nublic	building?
THOME I. III	w to make a	i uisasiei	resincin	puone	ounuing:

Current situation regarding the issue	What have been done about the issue?	What kind of action is necessary for the issue?
Current situation regarding the issue	What have been done about the issue?	<ul> <li>What kind of action is necessary for the issue?</li> <li>Hardware: <ul> <li>Added a tsunami alarm that is also connected to the yellow and green zone so that a quick disaster is detected</li> <li>Need to add one TEWS at Mertasari Beach</li> <li>Relocation of public buildings in the red area</li> <li>Public buildings can be built more than 15 m</li> <li>Examination of the strength of government building structures if</li> </ul> </li> </ul>
		<ul> <li>necessary strengthened the structure by using earthquake analysis in accordance with the Indonesian National Standard (SNI) 2018 on Structure of Building</li> <li>Government and school buildings have a tsunami site</li> <li>Added the TES building on Sindu and Mertasari beaches</li> </ul>

Current situation regarding the issue	What have been done about the issue?	What kind of action is necessary for the issue?
<ul> <li>Software:</li> <li>Presence of trained and alert personnel</li> <li>Coordination with related institutions such as social agency, BPBD, police, etc.</li> <li>Train people to be trained with evacuation routes, assembly points, etc.</li> <li>Disaster management training</li> <li>Improve the capacity of disaster technical teams</li> <li>Periodic tsunami simulation is being held</li> <li>Efficient disaster management organizations</li> <li>The formation of resilient village</li> <li>Establish a disaster safe school</li> <li>The existence of communication connected with medical personnel</li> <li>Utilizing information technology to respond to disasters / problems in the community</li> </ul> Hardware: <ul> <li>An evacuation route has been prepared</li> <li>Establishment of Pusdalops (Operation Control Center for Disaster Management ) for the province and Rupusdalops (Central Control Room and Operations) for the city / district</li> <li>Forming an integrated disaster infrastructure facilities</li> </ul>	<ul> <li>Software:</li> <li>Disaster training and disaster management simulation have been done</li> <li>Recruitment of disaster preparedness personnel</li> <li>Emergency Response Training from BPBD conducted annually</li> <li>Available regulation of disaster mitigation</li> <li>Availability of disaster area map information</li> <li>Setup and structuring of disaster prone areas</li> </ul> Hardware: <ul> <li>Create a safe path for evacuation</li> <li>Provision of evacuation places using existing buildings such as bale banjar, gymnasium</li> </ul>	<ul> <li>Software:</li> <li>Improved disaster management training</li> <li>Improve coordination among related agencies</li> <li>Structuring a more planned city to facilitate evacuation</li> <li>Disaster response training to the community is multiplied</li> <li>Preparation of SOP</li> <li>Hardware:</li> <li>Strengthening facilities and infrastructure</li> <li>Hotels and government offices are equipped with evacuation points</li> <li>Establish an adequate evacuation site</li> <li>Buildings that allow for evacuation of Art Center, Gedung Sewaka Dharma, Sports Center Tembali, Hotel e.g., Grand Bali Beach, International Sanur Paradise. Road for evacuation such as JI. Renon, JI. Hang Tuah</li> </ul>

# Theme 2. How to prepare for swift and effective disaster response?

Current situation regarding the issue	What have been done about the issue?	What kind of action is necessary for the issue?
Software:	Software:	Software:
<ul> <li>Routine is done by tsunami hazard simulation</li> <li>The existence of hazard mitigation SOP</li> <li>There has been an understanding of the importance of evacuation</li> <li>The hotels that have cooperated in disaster evacuation are certified by BPBD</li> <li>Availability of volunteers</li> <li>Availability of logistics</li> <li>Hardware:</li> <li>The number of tsunami evacuation place such as in Serangan is still minimal</li> <li>Evacuation place has been built in Serangan</li> <li>There is an evacuation route</li> <li>Utilizing the existing buildings such as bale banjar, sports arena, school, public field, as a place of evacuation</li> <li>Build a shelter or make cooperation with high-rise buildings for preparing an</li> </ul>	<ul> <li>Did a tsunami drill</li> <li>Hotel certification for earthquake and tsunami preparedness cooperation</li> <li>Provide preparedness officers, paramedics, and adequate information</li> <li>The local government has responded quickly to disaster</li> <li>The provision of victim assistance is very adequate</li> <li>The existence of regulation of evacuation place for shelter one of them in public building</li> <li>Hardware:</li> <li>Already made an evacuation route</li> <li>Put a siren on the sunrise beach</li> <li>The use of sports fields, hotel facilities, government buildings, banjar can be used as evacuation places</li> <li>Build an evacuation place in Serangan</li> </ul>	<ul> <li>Strengthening of simulation, socialization, coordination among related institutions</li> <li>Include disaster issues in each stage of development planning. Prepare a Regional Action Plan for all dinas(department)</li> <li>High building data collection</li> <li>Create disaster masterplan and evacuation zone regulations in Denpasar RTRW</li> <li>Increased community knowledge about the tsunami, recognition of tsunami hazards, and its characteristics</li> <li>Need a building regulation safe against tsunami</li> <li>Hardware:</li> <li>Created a sign for the building that could be a place of evacuation</li> <li>Hotel, Ngurah Rai Sports Arena, hotel, Buyung field, GOR Yowan Nabdala can be a place of evacuation also</li> </ul>
assembly point		

# Theme3. How to prepare for safe evacuation?

Current situation regarding the issue	What have been done about the issue?	What kind of action is necessary for the issue?
<ul> <li>Current situation regarding the issue</li> <li>Software:</li> <li>Preparing new tourist destinations other than Sanur</li> <li>Eliminate the potentially disastrous areas in the RTRW</li> <li>Land use planning has not been considered in disaster mitigation</li> <li>There are settings in the RTRW related to the spatial pattern and there is already a regulation in the disaster materplan</li> <li>Establish cooperation between municipalities and provinces</li> </ul>	<ul> <li>What have been done about the issue?</li> <li>Software : <ul> <li>Safe areas to stay in case of tsunami are north and south Denpasar where evacuations have also been provided</li> <li>Mangrove planting has already been done</li> <li>The spread of local wisdom</li> <li>Make evacuation route in RTRW in the form of space structure</li> <li>Areas that must be resilient are Sanur, Renon, Serangan, and Sesetan. For buildings, it is a government office</li> </ul> </li> <li>Hardware:</li> </ul>	<ul> <li>What kind of action is necessary for the issue?</li> <li>Software : <ul> <li>Need to do research about the potential of local wisdom into tsunami mitigation</li> <li>An earthquake-resistant building workshop should be carried out</li> <li>Conducted cooperation agreement with the universities</li> <li>Not only to make rules but also how to enforce the law</li> <li>Education / workshop for agencies</li> <li>Support from all relevant stakeholders</li> </ul> </li> </ul>
related zones that have been determined with regulation of multipurpose building <b>Hardware:</b> • Buildings that should be more prioritized are school buildings	Buildings that must be resilient are government-owned buildings and hotels.	<ul> <li>RTRW incorporated disaster hazard and its handling strategy</li> <li>The law of building expert needs to be drafted</li> <li>There needs to be a comparative study to other areas that are also prone to tsunami</li> <li>Buildings that do not have evacuation sites are not authorized</li> <li>Use of online technology for tsunami and earthquake hazards</li> <li>Establish disaster prevention- related regulations</li> <li>Land-use planning aims to regulate development in a safe location</li> <li>Hardware:</li> <li>Make mangrove as a protected area</li> <li>Designing earthquake and tsunami resistant buildings</li> <li>Public buildings are equipped with evacuation site</li> <li>The cornerstone of the helipad was propagated</li> <li>The laying of evacuation routes should be accurate</li> </ul>

Theme4. How to incorporate Disaster Risk Reduction into land use and urban development?

Source: JICA Project Team

# 2) Activity 4-2: Identification of priority action in Denpasar

Based on the result of preliminary disaster risk assessment and action plan workshop, BPBD and BAPPEDA with the JICA Project Team identified priority actions for tsunami resilience as listed in Table 6.1.12.

# Note: APWS = Action plan workshop, RA = Result of risk assessment, JPT = Recommendation from the JICA Project Team

	Action item		So Recor	ource o nmend	of lation	Respor Institu	nsible ution		Period	1
Category	(English)	Remarks	AP WS	RA	JPT	Main	Sub	Short	Mid	Long
Priority 1. Uno	lerstanding disaster risk									
Hazard map	Updating the hazard map	BPBD is only to use the map prepared by the Central Government			0	BPBD			0	
	Sharing hazard map	Ditto			0	BPBD			0	
Risk assessment	Update risk assessment and evacuation analysis based on updated hazard map				0	BPBD			0	
	Raising awareness through tsunami evacuation drill, workshop and meeting		0			BPBD		0	0	
	Education and raising awareness for agencies		0			BPBD		0	0	
Raising awareness	Cooperation with universities including GIS training		0		0	BAPPE DA		0	0	
	Strengthen community awareness through community events, exhibitions, workshops, flyers, etc.				0	BPBD		0	0	0
Raising awareness for agencies       o       Image: Cooperation with universities including GIS training       o       o       BPBD       o       o       o         Strengthen community awareness through community events, exhibitions, workshops, flyers, etc.       O       o       Image: Cooperation with universities including GIS training       o       o       BAPPE DA       o       o       o         Priority 2. Strengthen community events, exhibitions, workshops, flyers, etc.       Image: Cooperation with universities including GIS training       o										
	Rearrangement of Masterplan Bencana and PRB				0	BPBD			0	
	Regional action plan for all departments based on close communication between all departments		0		0	BAPPE DA			0	
	Improvement of RTRWK considering hazard potential		0		0	BAPPE DA		0		
	Develop and clarify a "disaster management system" stated in RTRW				0	BAPPE DA				0
	Involve other sectors (e.g., private or community) in DRM and DRR				0	BAPPE DA			0	0

# Table 6.1.12 Priority Actions for Tsunami Resilience in Kota Denpasar

Catalogue	Action item	Demoster	Sc Recon	ource o nmend	of lation	Respo Instit	nsible ution	Period		1
Category	(English)	Kemarks	AP WS	RA	JPT	Main	Sub	Short	Mid	Long
Priority 3. Invo	esting in disaster risk reduction for	resilience								
Prevention	Prevention measures in three strategic areas (Sanur, Benoa Port and Serangan), such as embankment for Benoa Port		0	0		BPBD	Intansi terkait lainnya		0	
and mitigation on critical facilities and	Improvement (or Relocation) of government offices in red area		0	0		PU				0
e	Relocation and prevention measures on important infrastructure including power plant, disposal facility, and so on			0		BAPPE DA				0
Prevention of tsunami	Examination of road embankment on bypass			0	0	PU		0	0	
with structural measures	Examination of installation of mangrove forest	Authority of Central Government		0	0	KLHK			0	0
Building and land use	Building regulation in tsunami prone area		0			BPBD	BAPP EDA, PU		0	
control	Land use planning (RTRWK) considering hazard potential		0		0	BAPPE DA		0		
Priority 4. Enh reconstruction	nancing disaster preparedness for eff	fective response and t	o "Build	l Back	Better	" in recove	ry, rehabi	litatio	n and	
	Designation of temporary tsunami evacuation facility		0	0		BPBD	BAPP EDA	0	0	
	Installing temporary tsunami evacuation facility(tower)		0	0		PU				0
Evacuation facility and route	Data collection of high building and survey for candidate evacuation building		0			PU	Intansi terkait lainnya		0	
	Designation of tsunami evacuation route		0			BAPPE DA	BPBD	0	0	
	Rearrangement of tsunami evacuation signage				0	BPBD		0		
	Installing evacuation equipment at government offices		0		0	BPBD		0		
Equipment for tsunami evacuation	Installing TEWS (Sindu & Mertasari Beach)	Authority of Central Government	0			BMKG				
	Installation of additional tsunami siren (alarm) in inland area	Authority of Central Government	0	0		BMKG				
Evacuation Planning	Evacuation zone regulation in Denpasar RTRW		0			BAPPE DA		0	0	

Category	Action item (English)	Remarks	Source of Recommendation			Responsible Institution		Period		
			AP WS	RA	JPT	Main	Sub	Short	Mid	Long
	Designation of place on gathering facilities including hospital and school			a	0	BPBD		0	0	
	Preparing for community-level tsunami evacuation map				0	BPBD		0	0	
	Evacuation drill on community, school, and hospital		0		0	BPBD		0	0	
	Consideration of traffic jam during tsunami evacuation				0	BPBD		0	0	
	Examination of alerting and supporting for evacuation of tourists (cooperation with hotel)				0	BPBD	BAPP EDA	0	0	
	Encouragement for more hotels to renovate their facilities to add evacuation facilities (e.g., outdoor staircases, flat roofs) to receive certification from BNPB Bali Province				0	BPBD		0	0	0

Source: JICA Project Team

In addition to the above list, JICA Project Team recommends as follows:

1. Updating tsunami hazard map

In the preliminary tsunami risk assessment, tsunami hazard map prepared by PVMBG(2008) was used. However this hazard map does not include detail information about inundation depth due to lack of technique and data at that time.

Therefore, **updating tsunami hazard map is strongly required** for planning land use considering tsunami risk in RTRWK. During the PIU and PCU meeting, PVMBG stated that they will update their assessment once BNPB or Kota Denpasar submit request letter to them.

2. Detail survey for designation of tsunami temporary evacuation building

As shown in A7.2 of Appendix 7, JPT conducted preliminary tsunami evacuation analysis assuming that all hotels, Kantor Desa and schools is appropriate for temporary evacuation building.

However, this analysis must consider building height(stories) compared to tsunami inundation depth, as well as building strength against earthquake and building capacity containing evacuees. In order to improve the analysis, <u>survey in order to select the appropriate temporary</u> evacuation building is strongly required.

3. Designation of tsunami evacuation route

This task should be done after designation of tsunami temporary evacuation building. For designation of evacuation route, working together with local community in workshop style is recommended. This part will be linked to RDTR as well.

4. Considering structural measures against tsunami risk

During this demonstration project, most of analysis focused on the tsunami evacuation as well as non-structural measures. These measures are useful for saving life, but it does not reduce tsunami damage on building and infrastructure. For preventing and mitigating tsunami damage and prevent from massive economic damage on Kota Denpasar, structural measures such as road embankment and tide embankment should be considered.

## 5. Periodical Checklist implementation

Checklist result provides various information such as strength and weakness on Kota Denpasar as well as issues on tsunami resilience. Therefore, the checklist and action plan workshop should be conducted periodically with relevant agencies in order to monitor progress of action.

6. Close coordination between BPBD and BAPPEDA as well as all Dinas for making action plan

So far, action plan regarding to prevention and mitigation has not benn discussed among all Dinas. However, action plan workshop on the demonstration project attended by relevant Dinas led to active discussion and a lot of opinion about action item by each Dinas. Therefore, this kind of discussion among all Dinas is recommended for updating action plan in RPB.

## (5) National Workshop

## 1) Overview of the National Workshop

The National Workshop was held on 9 May 2018, in Denpasar with 53 participants. From the national government, BNPB and PVMBG participated the workshop. While guest cities/districts are Badung, Buleleng, Jembrana, Klungkung and Tabanan from inside Bali Province, on the other hand, Banda Aceh, Padang, Pacitan, Bandar Lampung, Pangandaran, Kulonprogo, Cilegon, and Cilacap are from outside Bali Province.

The purposes of the national workshop are:

- To raise awareness in order to understand and embody the significance of the concept, method of the Tsunami Disaster Resilient Cities in Indonesia through the Demonstration Project in Denpasar in association with the ASEAN Guidebook for Urban Resilience;
- To share the results and outcomes of the demonstration project in Denpasar and discuss the lessons learned and further issues with the national governments, local governments, and other relevant organizations in Indonesia, while learning opportunities and peer-topeer exchanges are also promoted; and
- To support cities/districts in making use of the first edition of the ASEAN Guidebook including the checklist as deliverables to relevant organizations in Indonesia.

The major topics presented and discussed in the workshop are summarized in Table 6.1.13. In addition to reporting the results of the demonstration project and sharing lessons learned. Besides, PCU members including BNPB and PVMBG presented the overview of tsunami hazard assessment and tsunami risk reduction in Indonesia.

Category	Topics of Presentation / Discussion			
Introduction	Brief of the CN18 Project and Guidebook (Output3): presented by the JICA Project Team			
Background	Overview of tsunami hazard assessment in Indonesia presented by PVMBG			
	• Overview of tsunami risk mitigation in Indonesia presented by BNPB			
Results of	• Result of checklist and preliminary risk assessment presented by the JICA Project Team Draft Action			
Demonstration	Plan for Improving DMP: presented by PIU (BPBD)			
Project	• Draft Action Plan for Improving ULDP: presented by PIU (BAPPEDA)			
Peer-to-peer	• Introduction of past tsunami disaster and lesson learnt presented by Banda Aceh and Padang			
Exchanges	• Introduction of Urban Planning considering tsunami risk presented by Pachitan			
Plenary	• Plenary Discussion on Lessons Learnt from Demonstration Project: facilitated by PCU/ the JICA			
Discussion	Project Team			

## Table 6.1.13 Major Topics of the National Workshop in Indonesia

Source: JICA Project Team

## 2) Outcomes of the National Workshop

The outcomes could be described below from the results of interactive sessions such as presentation, sharing lessons learned from the demonstration project, and discussions among participants of the national workshop.

- Most of the participants attended this kind of workshop related to tsunami for the first time. It was very valuable chance not only to share the output of demonstration project but also develop common understanding on tsunami risk mitigation in Indonesia.
- During the workshop, BNPB stated that this workshop could be a trigger for the future formation of the Working Group Forum of Tsunami for communication of local governments prone to tsunami conveying their aspirations to the central government.
- They learned the necessity of tsunami risk mitigation and disaster risk reduction through the demonstration project in Kota Denpasar. Some of the local governments who attended the workshop showed their willingness and interest to follow Kota Denpasar and conduct similar project.
- Through the presentation by Kota Denpasar and discussion after that, it was confirmed the close cooperation between BPBD and BAPPEDA on disaster risk reduction and action plan formulation.



National Workshop in the Beginning (2018.05.09) Source: JICA Project Team



Q and A during the National Workshop (2018.05.09)

## Photo 6.1.6 National Workshop

## (6) 3<sup>rd</sup> ASEAN Urban Resilience Forum

The 3rd ASEAN Urban Resilience Forum in July 2018 was held at the Luang Prabang where the Demonstration Project was implemented. The demonstration project was introduced by members of PCU (BNPB and ATR) and PIU (BPBD and BAPPEDA Kota Denpasar) to 41 participants of seven ASEAN Member States and other relevant organizations.

Presentations of the demonstration project by the counterparts of Indonesia could contribute to understanding tools for urban resilience and sharing experiences (e.g. successful concretization of SFDRR, effectiveness of Checklist, importance of risk assessment, etc.) with lessons learned from the project among participants of ASEAN Member States, and appeal the ownership of the demonstration project.



Presentation by ATR

Presentation by BAPPEDA

Source: JICA Project Team

Photo 6.1.7 Presentation of the Denpasar Demonstration Project by PCU and PIU Members in 3rd ASEAN Urban Disaster Resilience Forum (July 2018)

# 6.2 Encountered Issues and Solutions

< Tsunami Disaster Risk Assessment>

(1) Discrepancies among different versions of tsunami risk maps issued by different organizations

Along the data collection process, it was gradually found out that there had been different versions of tsunami risk maps issued by different organizations. Specifically, these organizations include the PVMBG (2008 version and 2012 version), BNPB and GTZ (read more at the "Preliminary Disaster Risk Assessment" part). Notably, the tsunami risk analytics in these versions at some specific areas can be very different. For example, Sanur area is marked as "green" in BNPB version, yet marked as "redviolet" in PVMBG versions.

As it is crucial to officially identify one single version to base on, based on the discussion with PIU and PCU members, that of PVMBG was selected for the risk assessment considering that PVMBG has main role and mandate for preparing hazard map. It is desirable to use the latest hazard map developed in 2012, but this version has not conducted an inundation calculation yet and only has the result of tsunami height on coastal line. Considering these conditions, the JICA Project Team selected the tsunami hazard map by PVMBG (2008) for the assessment. This PVMBG version is the worst case of tsunami caused by earthquake with Mw 9.0.

(2) Absence of Tsunami Specialized Staff and Insufficient Technical Capacity in Denpasar City and Bali Province

Some of the future tasks require technical knowledge about tsunami (and also earthquake) engineering. However, there is no local expert with such specialized expertise to help the city for any related future tasks, so it would be hard to conduct such tasks unless technical assistance is provided. As such, for the sustainability of the project in the long run, it is expected that the central government will provide appropriate technical assistance and continuous training and capacity building programs to support the local governments, when and where necessary.

< Checklist >

(1) Difficulty in Determining Respondents to Checklist Items

There are 125 and 113 items in checklists A and B, respectively. The items cover various sectors. Further, in some cases, more than one agency is related to one checklist item.

Prior to conducting the checklist assessment, a dedicated session was held to explain the outline of the project and how to implement the checklist assessment to various concerned agencies. However, it was found out that in many respondent cases, although their agency was relevant, their own department was not relevant to issues that were associated with the respective questions. Therefore, the agency staff did not know the answer, and left it blank, and suggested that they would go back and check with the most relevant department and send the answers at the later stage. A few weeks later, the JICA Project Team could collect the first round of answers, and there were still many blank items left. After that, the JICA Project Team requested the PIU to help coordinate with all the related agencies to provide the missing answers. In the end, the JICA Project Team was able to collect sufficient answers. It was observed that there were cases where more than one institution responded to a certain item or none of the institutions responded to a certain item. In some other cases, an adjustment for more appropriate respondents may be necessary.

(2) Limitations of Self-assessment System in Checklist Assessment

First, the checklist does not require the submission of any evidence when answers are filled in. Secondly, respondents do not have a sense of responsivity for the accuracy of their answers. For these reasons, in some cases, answers seem to be highly subjective and not seriously and appropriately given. Some respondents seemed to think seriously in giving the proper answers while some others seemed to give answers quickly without adequate considerations.

Thus, in some cases, some questionable answers were confirmed with respondents on one-on-one basis. In the future, measures shall be taken so that respondents can seriously participate in the checklist assessment by either submitting evidence documents or writing names of evidence documents in an answer sheet. Furthermore, it would be necessary for the national government to pay attention to the abovementioned issue when comparing checklist results between the local governments.

- < Urban Planning and Land Use>
  - (1) Building Height Limit

According to Bali's construction regulations, all buildings in Bali must not exceed 15 m in height. Local community regards this as the building must not exceed the height of a coconut tree. Coconut tree has been chosen as a symbol of the interaction between humans and environment (as part of Tri Hita Karana

philosophy). All parts of a coconut tree (root, stem, leaf, and fruit) are seen to bring benefits to the people and community. Although coconut trees are varied in height, this figure of 15 m is widely acceptable among the locals. This local regulation was made in the early of 1970s, and only one building in Bali - Grand Bali Beach Hotel (10-storey), which was built before the launch of this regulation, is higher than 15 m. This is a constraint when it comes to plan and build temporary evacuation centers for tsunami disaster.

To overcome this constraint, the JICA Project Team discussed with related agencies, especially the PU Kota Denpasar and the Bappeda, and proposed to them to revise the Construction Regulations and Building Code to give way for an exception of "special buildings" such as temporary evacuation centers. In fact, this idea has some legal basis. In the Mayor Decree No.5 of 2015 on Building Code, the Article 20 states that the height of buildings may not exceed 15 m [...], except special buildings upon getting an approval from the city government. In the end, agreement and consensus on the approval-based possibility for the exception were reached.

Besides tall temporary evacuation centers, BPBD Bali Province has taken the initiative to approach, persuade, and sign the memorandum of understanding (MOU) with a number of tall hotels near the coastal lines, in which they would renovate their buildings and facilities by themselves to meet the city's requirements and receive a tsunami-safe certificate. Hotels need to pass 52 indicators for all disasters to get certified. So far, 42 hotels have been certified, and the BPBD Bali Province targets to have 160 hotels certified in the entire Denpasar (each year to have around 25 more hotels certified). In an event of tsunami disaster, those hotels will open for the public to evacuate to and temporarily stay in their property.

- < Action plan >
- (1) Needed Assurance of Effectiveness in the Implementation of the Action Plan

Although the proposed action plans (for both DRR and land use and development) have reached consensus among all related agencies in the action plan workshop, follow-up activities by the PIU in cooperation with the PCU are needed in order to assure the effectiveness in the implementation of the action plans.

(2) Complexity of Role Demarcation, Reporting System and Little Collaboration among Related Agencies

One of the challenges faced during the demonstration project is the politically sensitive complexity of role demarcation, reporting system, and the little collaboration among related agencies. In order to overcome it, the JICA Project Team has made efforts to identify the key agency which can play the central coordination role and speak to all related agencies (in the case of Denpasar: Bappeda Kota Denpasar), then constantly motivate and enhance the agency's capacity. Overall, it is important to enhance lateral and vertical inter-agency communication and coordination through actual engagements in common activities of mutual interest and responsibility.

# 6.3 Good Practices

(1) Good Practices by the National Government

In recent years, the ATR has made some good initiatives relevant to the project. For example, the ATR has integrated the Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) into the national level policy and coordination, including spatial planning. This is reflected in some initiatives, such as the integration of tsunami hazard map into the land use map of Pacitan City in the south of Java, and the retrofitting of some public buildings to function as tsunami evacuation shelters in Padang City in West Sumatra.
Other good initiatives include BNPB's Resilient City (Kota Tangguh) which develop a 71-indicator measurement tool ("71 Indikator") that measures urban resilience of the city and district governments. The new tool has been being adopted under the urban resilience guideline (Pedoman Kota Tangguh) applied at the city and district levels by BNPB as the agency's new capacity index "scorecard system".

Besides the policy-making initiatives, there are other practical implementations such as mangrove planting by the Ministry of Environment in the southern part of Denpasar. Although the original purpose of this mangroves planting initiative was not for tsunami protection, it does indeed provide a "bio-shield" against tsunami for the southern part of Denpasar.

(2) Good Practice by the Local Governments

Denpasar City has established an online geo-portal which provides various data in various forms including GIS (refer to http://geoportal.denpasarkota.go.id/), which is publicly accessible. The city also actively crowd source its citizens for public feedbacks and reporting of categorized urban issues through phone apps such as "Pro Denpasar" app (also available online at: https://pengaduan.denpasarkota.go.id/). Besides, an advanced one-stop data center named Damayana Center, which provides real-time data and monitoring as well as GIS data.



Source: Dinas Komunikasi dan Informatika Kota Denpasar(left) and JICA Project Team(right)

#### Photo 6.3.1 Pro Denpasar

In addition, the BPBD Bali Province has taken the initiative to issue "Disaster Preparedness Certification" for hotels, which encourages them to renovate their buildings and facilities by themselves to meet the city's 52 indicator requirements for all disasters including tsunami. As of February 2018, 42 hotels have been certified, and the BPBD Province aims to have 160 hotels certified in the whole Denpasar City (every year to have approximately 25 hotels certified). This kind of public-private partnership (PPP) is a good practice for other ASEAN member-states.

BADAN PENANGGULANGAN BENCANA DAERAH PROVINSI BALI DISASTER MANAGEMENT AGENCY BALI PROVINCE
SERTIFIKAT KESIAPSIAGAAN BENCANA Disaster Preparedness Certification Nemor: 893.3/1399 / Puddalogs / BPBD Dirgatakan batwa: This is to recognize that:
NUSA DUA BEACH HOTEL & SPA
(Vepathe Vagincarth / Higa Algoney

Source: BPBD Bali Province

#### Figure 6.3.1 Disaster Preparedness Certification Issued by BPBD Bali Province

#### (3) Good Initiatives by Local Universities

Local universities such as Udayana University and Universitas Hindu Indonesia offer GIS training courses for their students. This is an important "home grown" resource for GIS expertise that can be locally mobilized for GIS-related matters. Some of their graduates work for local government agencies, so they may have opportunities to utilize their GIS knowledge and skills in their work. The universities themselves also have some collaborations with local agencies, which involve GIS. For example, the PPIDS (Pusat Pengembangan Informasi dan Data Spasial, or Center for Information and Spatial Data Development) at Udayana University provides GIS training to local government officials in Bali Province. On the other hand, they also provide support and cooperation, such as a cooperation with BNPB for Mount Agung geomorphology. Another example was a cooperation in 2016 between the Study Centre of Universitas Hindu Indonesia with BPBD and Bappeda at the city level related to map making.

#### (4) Participation Processes

In this demonstration project, the participation level by staff from various related agencies at both city and provincial level was good. Most encouragingly, there was active involvement of junior staff who enthusiastically went beyond conventional "passive" participation to support the JICA Project Team under their guidance on some technical analysis of GIS data. Moreover, at the National Workshop for outcome sharing, there was active attendance, active sharing and active discussion by various Indonesian coastal cities who share a common threat of tsunami. Through active and effective sharing and exchange activities, it was observed that consensus and motivation among participants were increased.

#### (5) Good Practices by the JICA Project Team

The effective utilization of the workshops - including the checklist workshops, GIS training workshops and action plan workshop – resulted in a capacity improvement of local government agencies. In general, various sectors are involved in disaster risk management. In Denpasar, staff of related local government agencies have participated in the demonstration project's rounds of meetings and workshops from its early stage. It was observed that awareness, relationship, and coordination among the institutions have been enhanced through better mutual understanding, role sharing, and task demarcation.

Among the three types of workshops provided, the first highlight was the checklist workshops. In spite of some necessary improvement of the checklist in the future as identified through the demonstration project, the effectiveness of the checklists was confirmed by stakeholders and evaluated as one of the useful tools for enhancing coping capacity and urban resilience of local governments against disasters with regard to coordination among organizations, data collection and information sharing. Therefore, it is recommended that the checklists could be introduced to other local governments after necessary revision and improvement.

The next highlight was the action plan workshop, in which a participatory process and systematic thinking method in the brainstorming and formulating action plans were secured. And since some of the staff had been involved in some previous workshops and knew which actions were related to their agency, they actively proposed their additional ideas for possible actions from their own motives.

## 6.4 Lessons Learned from Other ASEAN Cities

(1) Lessons Related to Urban Planning and Development

The Denpasar Demonstration Project showcases the essential and emerging approach to mainstreaming DRM into urban planning and development plans as a regular management and planning process, and as an integral part of the local government functions, operations, and services. Traditionally, disasters have been tackled with response only approach, which has been shown ineffective and unstainable. However, there has been an emergent global paradigm shift from the traditional disaster response only approach to disaster prevention and response one (more comprehensive and more sustainable). The Sendai Framework for Disaster Risk Reduction 2015-2030 is an important example being adopted globally, and this Demonstration Project reflects this new approach. Urban planning can play a key role in disaster prevention, as it helps guide and govern mid-term and long-term plans towards sustainability.

The key step is to incorporate disaster risk management (DRM) inputs into existing and future urban planning plans. This can be done in two steps. The first step is to overlay the disaster risk maps onto urban planning plans (including zoning, land use, infrastructure and utility networks, and building distribution) to identify critical networks and structures that are prone to disasters, then recommend amendments. The GIS can be a useful platform to implement this. The second step is to review key regulation and policy documents such as mid-term and long-term spatial development plans as well as Building Code, and the parts related to DRM may be revised or supplemented. The mid-term can be five years, while the long-term can be 20 years, which shall be reviewed every five years. In the Denpasar case, the mid-term document is called Mid-term Spatial Plan (in Bahasa: RTRW, 20-year term), while the long-term one is called Long-term Spatial Plan (in Bahasa: RTRW, 20-year term).

(2) Lessons Related to Capacity Building

GIS software is a powerful tool to bridge disaster risk and urban planning. In the case of Denpasar for example, the JICA Project Team provided GIS training for local government officers such as BAPPEDA, BNPB, BPBD, PU, etc. (at both the city and provincial levels). When the demonstration project finishes, it is expected that some trained staff will be able to continue their engagement and take collective efforts in DRR management on their own towards sustainability. In addition, GIS training is also expected to be conducted in other ASEAN Member States.

(3) Supportive Actions to be Executed by the National Government

A local/provincial disaster management plan is to be prepared by the local government based on the action plan. On the other hand, the national government is expected to execute the following supportive actions:

- Technical support such as preparation of standards, guidelines, manuals, and so forth not only for supporting local governments to formulate plans but also for ensuring a certain level of technical quality in planning among provinces.
- Financial support by preferentially allocating budgets to provinces that are willing to formulate local/provincial disaster management plan.
- (4) Lessons Related to Scalability of the Demonstration Project
  - At the national level, it is useful to establish and leverage on a national network or forum of different municipalities who share a common disaster risk for information exchange, experience sharing, capacity building as well as possible collective efforts. For example, in this project, the ATR the central agency for spatial planning based in Jakarta has helped suggest

a list of tsunami potential cities in Indonesia (many of them participated in the National Workshop) with an aim to make them become a forum to provide collective efforts for tsunami DRR in the country.

- At the regional level (in this case ASEAN), it is suggested to appropriately localize the checklists for other ASEAN member-states. The checklists were originally formulated by the CN18 project as a common or standard version for ASEAN Member States. However, the implementation of the checklists through the demonstration project has revealed that an improvement of their contents is needed. For example, it was suggested in the checklist workshops to consider a terminological modification as well as modifications of disaster type. Moreover, it is necessary to appropriate/customize respondents in each case. In this context, appropriate localization of checklists including arrangements of contents and wordings of questions would be necessary when it is introduced in other countries, taking into account of those country's conditions. Taking account of promotion and enhancement of the priority actions of the Sendai Framework for DRR in ASEAN countries, the utilization of checklists is expected to support activities of this framework effectively.
- Continuous support and promotion for urban resilience activities for ASEAN Member States should be taken by the ASEAN through monitoring projects related to urban resilience, dissemination of the outputs of CN18 products (e.g., guidebook, checklists) through websites, and ASEAN Urban Disaster Resilience Forum.

Final Report

# Chapter 7: REGIONAL WORKSHOP (The 3<sup>rd</sup> ASEAN Urban Resilience Forum)

# 7.1 Overview of the 3<sup>rd</sup> ASEAN Urban Resilience Forum

ASEAN Urban Resilience Forum (AURF) was conducted in progressing the implementation of Concept Note 18 (CN18) - "Building Disaster and Climate Resilient Cities in ASEAN". One of the output of CN18 is Establishment of a Regional Network and Formation of Partnerships to Increase Urban Resilience in ASEAN.

The 3rd AURF took place for two days on July 17-18 2018 at Le Palais Juliana Hotel in Luang Prabang, Lao PDR. Seven ASEAN Member States representing Cambodia, Indonesia, Lao, Malaysia, Myanmar, Thailand and Viet Nam, one representative each from ASEAN Secretariat (ASEC) and AHA Centre, Senior Advisor from JICA, nine representatives from Luang Prabang attended the forum. Each ASEAN Member State delegation consisted of government officials form national and local level, involved in disaster management and urban planning.

The core objectives of the forum are:

- 1) Sharing of Experience and Lessons Learnt obtained from the demonstration project;
- 2) Utilization of Guidebook for Building Resilient Cities and ASEAN Urban Resilience Check List;
- 3) Sharing the experience and lesson learned from ASEAN Member States.

The detail agenda of the forum is as shown in the following table.

1 <sup>st</sup> Day: July 17, 2018			
Time	Agenda	Organization	
9:00-9:15	Opening Remarks	Host Country (Lao PDR)	
9:15-9:30	Outline of CN18	JICA Project Team	
9:30-9:45	Background and Concept of Demo. Project	JICA Project Team	
9:45-10:25	Report of Demo. Project in Denpasar, Indonesia	BNPB, Denpasar City, Indonesia	
10:25-10:40	Coffee Break	All	
10:40-11:20	Report of Demo. Project in Luang Prabang, Lao PDR	MLSW, Luang Prabang Province, Lao PDR	
11:20-11:30	Findings of Demo. Project	JICA Project Team	
11:30-11:45	Q and A on Demo. Project	All	
11:45-13:00	Lunch Break	All	
13:00-13:15	Explanation of Group Work (Good points of Demo. Project/Points to be reflected/Inputs)	JICA Project Team	
13:15-14:15	Group Work	All	
14:15-15:00	Presentation	All	
15:00-15:15	Coffee Break	All	
15:15-15:55	Presentation (continue)	All	
15:55-16:00	Announcement and Close	JICA Project Team	

#### Table 7.1.1 The 3<sup>rd</sup> AURF Agenda

2nd Day: July 18, 2018			
Time	Agenda	Organization	
9:00-10:00	Preliminary Disaster Risk Assessment in Luang Prabang	JICA Project Team and JICA	
10:00-10:15	Coffee Break	All	
10:15-10:45	Outline of Guidebook/Checklist	JICA Project Team	
10:45-11:00	Guidance on Group Work	JICA Project Team	
11:00-12:00	Group Work (challenges and gaps for dissemination of guidebook and checklist)	All	
12:00-13:15	Lunch	All	
13:15-14:30	Presentation		
14:30-14:45	Coffee Break	All	
14:45-15:45	Panel Discussion - How to utilize CN18 Outputs-	ACDM WG on P&M Member States and JICA	
15:45-16:00	Closing Remarks	JICA and Co-chairs (Thailand)	

Source: JICA Project Team

# 7.2 Discussions in the 3<sup>rd</sup> ASEAN Urban Resilience Forum

#### (1) The First Day: July 17, 2018

The first day of the forum offered a balanced combination of interactive presentation on the project outline, report of Demonstration Project in Luang Prabang, Lao PDR and Denpasar, Indonesia. Deputy Governor of Luang Prabang Province, Lao PDR as the host country for the 3rd AURF, opened the forum by welcoming the representative participations to the world heritage city, Luang Prabang. He mentioned that Lao PDR recognized the disaster risk management as a priority and has mainstreamed it into the National Socio-Economic development plan and Economic Development Strategy which emphasis to sustainable development, enhancing of the environment protection, preparedness for emergency response, prevention, risk reduction and post recovery.



Source: JICA Project Team

Photo 7.1.1 Opening Session of the 3<sup>rd</sup> AURF



Source: JICA Project Team



Experiences of Denpasar and Luang Prabang on brief of demonstration project in each city were presented. Both cities focused on the action plan for formulating disaster risk mitigation and urban planning as the result of the demonstration project. The project produced a set of action plans for consideration for the both cities in the masterplan for the city development. This session shows how different cities approach similar aspects of adaptation.

#### 1) Report on Demonstration Project in Denpasar-Indonesia

During this session, four Indonesian representatives from different organization presented disaster situation in Indonesia, spatial plan and DRR action plan in Denpasar and overview of the demonstration project. Indonesia as a disaster-prone country, 80 percent out of 514 districts are prone to hazards as they are located along the Pacific "Ring of Fire". Millions of Indonesians live in disaster prone areas. Average loss and damaged caused by disasters are estimated to be around Rp 30 trillion, excluding those caused by mega disasters. Government of Indonesia has allocated Rp 4 trillion reserved funding on disaster management annually and this is still insufficient for post disaster recovery activities. Resilient cities have the capacity to resist, adapt and effectively recover from the disaster effects.

	Presentation Theme	Position	Assigned Position for the Project	
1	Disaster Situation in Indonesia and DRR activities of BNPB / Overview of demonstration project / Summary	Disaster Risk Management Analyst, National Disaster Management Authority(BNPB)	Member of the Project	
2	Roles of Spatial planning on disaster management cycle	Section head of New Area Development, Ministry of Land Affairs and Spatial Planning(ATR)	(PCU)	
3	Tsunami Risk and issues at Denpasar City / 5 Tasks on Demonstration Project	Head of Regional Disaster Management Agency(BPBD), Denpasar City	Project Implementation	
4	Spatial plan and DRR action plan at Denpasar City / 5 Tasks on Demonstration Project	Section Head of Infrastructure and Spatial Development, Regional Development Planning Board (BAPPEDA), Denpasar City	Unit (PIU)	

 Table 7.1.2 Members for the Presentation of the Demonstration Project in Denpasar

Source: JICA Project Team





Source: JICA Project Team

#### Photo 7.1.3 Presentation of Denpasar Demonstration Project by PCU and PIU Members

Denpasar city has potential for tsunami, flood, wind/surge, and earthquake. The demonstration project in Denpasar focused only on tsunami. Three important strategic areas in Denpasar including Sanur, Benoa Port and Serangan are in tsunami-prone area. The presentation emphasizes strategic approaches to mitigate the disaster risk from tsunami in Denpasar City. To mitigate tsunami risk, 3 focus priorities, 8 Programs, 22 actions are identified in Denpasar Disaster Risk Management Plan 2014-2018 which will be updated based on this demonstration project results.

The effectiveness of the ASEAN Urban Resilience Checklist (as one of task in the demonstration project) was confirmed by stakeholders and evaluated as one of the useful tools for enhancing coping capacity and urban resilience of local governments. It was suggested to appropriately localize the checklists for other ASEAN Member States such as terminological modification as well as modifications of disaster type. This demonstration project also included GIS Training and preliminary risk assessment to enable local officials to understand disaster risk and identify which facility or area should be protected from disasters. Future issue for the implementation are continuous supports and promotion of this kind of demonstration project into other cities in ASEAN Member States.

## 2) Report on Demonstration Project in Luang Prabang-Lao PDR

The members of PCU (MLSW) and PIU (Luang Prabang DPWT) introduced the demonstration project in Luang Prabang.

	Presentation Theme	Position	Assigned Position for the Project
1	Part I: Brief of the Project and Part IV: Lessons Learned from the Project	Deputy Director, Disaster Management Division, Social Welfare Department, Ministry of Labour and Social Welfare,	Member of the Project Coordination Unit
2	Part II: Draft Action Plan for Disaster Management Plan	Senior Cooperation Officer Ministry of Labour and Social Welfare	(PCU)
3	Part III: Draft Action Plan for Urban Land Use and Development Plan	Deputy Division of Housing, Department of Public Works and Transportation, Luang Prabang Province	Project Implementation Unit (PIU)

Table 7.1.3 Members for the Presentation of the Demonstration Project in Luang Prabang

Source: JICA Project Team



Presentation by DMD-MLSW

Source: JICA Project Team

Presentation by LP-DPWT

#### Photo 7.1.4 Presentation of the Luang Prabang Demonstration Project by PCU and PIU Members

Unlike Denpasar, the demonstration project in Luang Prabang is focusing on flood because it is one of major natural hazards in Lao PDR and Luang Prabang. 9,646 buildings (85% out of total 11,309 buildings) are in inundation risk. Preliminary Risk Assessment enabled to identify spatial vulnerability in the target area for long-term hazard risk probability. Based on the demonstration project activites, the counterparts of Lao PDR could contribute to understand the tools (checklist, risk assessment) for urban resilience and sharing experiences (e.g. successful concretization of SFDRR, effectiveness of Checklist, etc.) with lessons learned from the project among participants of AMS and appeal supplemental the ownership of the demonstration project. Coping capacity assessment on utilizing checklists enabled Luang Prabang to stimulate the importance of DRR and necessary involvement and coordination by various relevant sectors. Methodological process for action plan including prioritization of actions enabled Luang Prabang Province to learn as effective measures. Furthermore, issue for improvements includes checklists of disaster management and urban land use and development required by further improvements (e.g. terminology, responsible organization for checking, prioritization of actions). Effective coordination mechanism to fit with possible arrangement by Lao institutional system. Technical assistance for understandings and skill development in planning of Risk Assessment and Disaster Management in association with Urban Land Use and Development.

In line with the opening speech (strengthening coordination and cooperation of relevant agencies of the Province for urban resilience) from Deputy Governor of Luang Prabang Province, developed an atmosphere conducive to trigger the promotion of the implementation of Action Plan for the urban resilience of Luang Prabang.

#### 3) Key Findings on Disaster Risk Assessment

National governments has a role of preparing for hazard assessment or its guideline. While local governments have two roles which are (1) detail hazard assessment (if necessary) and (2) disseminate hazard map with necessary local information such as evacuation point. However, the implementation in each AMS is different. The project team also found out the issue for calculation result and data is not utilized by local governments due to result and data of hazard map by national government are inefficiently shared and recognized by local governments and lack of skill of the official government in charge.

#### (2) The Second Day, 18 July 2018

The second day was divided in four sessions, explanation of Preliminary Disaster Risk Assessment in Luang Prabang, outline of guidebook/checklist, group work on challenges and gaps for dissemination of guidebook and checklist and closed with a panel discussion on how to implement the CN 18 outputs. The sessions offered ample time for interactive discussion, building concrete ideas for the project implementation. Before the explanation of preliminary disaster risk reduction, AHA Centre gave a brief presentation about AURF website update and Leveraging ASEAN Resilient Cities Checklist for ASEAN-ERAT Level 2 on Rapid Assessment & Early Recovery. The moderator of AURF Website is the ASEAN Member States representatives in the ACDM WG P&M. The AURF Website is hosted and maintained by ASEAN Coordination Centre for Humanitarian Assistance on disaster management (AHA Centre), hereafter referred to as the Website Host.

JICA Senior Advisor also gave a presentation on building disaster and climate resilient cities in ASEAN. He underlined that urban resilience can be achieved by DRR integrated management. Sustainable development of the local society finally depends on how the management system can effectively embed the reduction of all risks arising over future time period into society. AURF should keep functioning to standardize, familiarize and disseminate the system to all cities in ASEAN.

#### 1) Activity on Group Work for ASEAN Urban Resilience Checklist (AUR-Checklists)

The group work on the second day was a break out session, during which the participants worked in small groups on challenges and gaps for dissemination of guidebook and checklist. Each group worked on one particular objective. The main questions that needed to be addressed in these small groups included Evaluation of current situation on DRA and issues and solution on DRA.

The workgroup by seven ASEAN Member States for ASEAN Urban Resilience Checklists (A/B) aimed at identifying issues of utilization and dissemination of the AUR-checklists and formulating the roadmap of sustainable checklist utilization. Each group by ASEAN Member State figured out given two worksheets including identified issues in the previous workshops to be filled out through group discussions and represented the results of the worksheets, Table 7.1.4

shows the noticed results of worksheets of ASEAN Member State group works apart from the issues identified in the previous workshops such as technical issues (clear terminology of the questions, contents of questions to fit with each locality of ASEAN Member States, etc.) and operational issues (implementation regarding to frequency, responsible organization, etc.)

Table 7.1.4 Activities Program and Results of Group Work by AMS in the Forum

	Work Activities	Noticed Results by AMS
1	To identify key issues on utilization and disseminating AUR- Checklists (A/B)	<ul> <li>Still weak linkage of questions to desirable agencies (IND)</li> <li>Lack of basic skills for PC and application (LAO)</li> <li>Performance indicators for local governments necessary to be considered for questions of AUR-Checklists (MYS)</li> <li>Sub-national level (Province, Region, etc.) would be key dissemination (KHM)</li> </ul>
2	To formulate a Road Map for the establishment of the sustainable Checklists.	<ul> <li>Short-term action for high-level decision makers involvement to adapt Checklist (IND/MYS)</li> <li>Checklist delivery through website tool (TH)</li> <li>Mid-term action for community involvement for Checklists application (IND)</li> </ul>
3	To make a presentation on the result of group work	3~5 minutes representation by seven AMS to the participants of the Forum

Source: JICA Project Team



Group Work by Participants of Lao PDR Source: JICA Project Team

Presentation by MPWT, Lao PDR

## Photo 7.1.5 Group Work Session by Members Lao PDR

#### 2) Activity on Group Work for Disaster Risk Assessment

In this section, two group works was conducted. Firstly, the workgroup by seven ASEAN Member States aimed at identifying the current capacity of Disaster Risk Assessment (hereinafter "DRA") by answering questions related to DRA extracted from ASEAN Urban Resilience Checklist. Each workgroup answered them referring to the small-medium city in each country since the capacity of DRA differs with cities in the same country. Figure 7.1.1 illustrates the result of the evaluation by seven ASEAN Member States, which indicates the average capacity of each ASEAN Member State.

Final Report



Source: JICA Project Team

#### Figure 7.1.1 Result of Group Work with Average Capacity on DRA

Then, the workgroup discussed "who should do what" to improve and utilize DRA, using a given matrix worksheet with three key questions and three stakeholders including local government, national government and ASEAN. In addition, ASEAN Member States introduced good practices related to key questions during the presentation which was held after discussion. Table 7.1.5 shows three key questions and the noticeable opinions on them.

	Key Questions	Main Opinions by AMS
1	How can hazard map be utilized by local governments?	<ul> <li>Hazard map should be utilized for an evacuation plan, shelter management, land use plan and capacity assessment of the community(MMR, CAM, THL),</li> <li>Local governments have a role to disseminate hazard map to community level(VTN)</li> <li>In order to utilize hazard map, it is necessary to assign Disaster Risk Management to local government with clear operational functions(LAO)</li> <li>National governments should provide technical assistance and financial support as well as information sharing scheme (MMR, LAO, MYS)</li> <li>Knowledge sharing among AMS is important(MYS)</li> </ul>
2	How to improve urban asset information including GIS?	<ul> <li>Local government should appoint responsible persons to collect data information. But the problem is lack of knowledge how to utilize GIS(MMR)</li> <li>Local government needs to assign a financial resource to improve urban asset information(VTN).</li> <li>National government should assign GIS/Database technical expert to support subnational level(CAM)</li> <li>ASEAN is required to provide financial and technical support including GIS training(ALL)</li> </ul>
3	How to improve risk analysis skill on local governments?	<ul> <li>DRM and risk analysis should be included in organizational mandate at local government(LAO, MMR).</li> <li>Set up a specialized team (LAO)</li> <li>National governments need to coordinate with an international organization to human resources support such as experts, advisor(VTN).</li> <li>A modified and adaptable methods for the region should be shared in AMS(MMR).</li> </ul>

Table 7.1.5 Key Questions and Main Opinions on the Group Work

Source: JICA Project Team

Final Report



Group Work by Participants of Thailand Source: JICA Project Team



Presentation by Thailand

#### Photo 7.1.6 Group Work Session by Members of Thailand

#### 3) Achievement of the Group Works for Disaster Risk Assessment

Through answering extracted questions related to DRA from AUR-Checklists, participants could understand the situation and capacity of own country as well as compare with other ASEAN Member States. In addition, common understandings including the following key points are shared toward an improvement of the capacity for DRA through discussion and presentation.

- Local government is required to share and disseminate hazard map, but it is difficult due to lack of resource and skill. Therefore, national governments are desirable to provide necessary financial support and technical assistance including GIS training and guideline.
- On the regional level of ASEAN, regional activities are required such as Training of Trainer (TOT), knowledge sharing in ASEAN meeting and peer to peer learning.
- Some good practices are shared such as InaRisk by Indonesia, as well as Community base on Disaster Risk Management by Indonesia and the portal site developed by AHA Centre.

#### 4) Panel Discussion

The final agenda of the forum was exploring the future actions for building resilient cities in ASEAN through a panel discussion which involved one panelist from each ASEAN Member State, ASEC and AHA Centre representative. The main objective of the panel discussion was for dialogue and engagement of each representative in order to utilize the CN18 output. There are three main topics in the panel discussion:

#### *i)* Who should do what for dissemination of Checklists in ASEAN?

The checklist was designed as a tool for the local government to aware of their weakness and make regulation based on the area situation. The panelist agreed that National and Local Governments are responsible to disseminate the checklist.

*ii)* Who should do what for local governments to conduct Disaster Risk Assessment?

Conducting disaster risk assessment requires analysis skills with GIS software and technical knowledges on hazards. Nowadays, most of National Government in ASEAN Member States has capacity on that skills. Transfer knowledge such as training of trainers is needed to support Local Government on conducting disaster risk assessment.

Final Report

*iii)* Who should do what for involving the important stakeholders such as urban planners and local government?

Campaign is important to improve awareness of disaster risk assessment at every level. In addition, certified urban planner and NGO who has a strong influence in planning and development aspect, can collaborate with relevant stakeholders and build awareness on importance of urban resilience.



Source: JICA Project Team

#### Photo 7.1.7 Panelist from each AMS, ASEC, and AHA Centre in the Panel Discussion Session

During the closing session, many participants expressed appreciation for the two-days forum, as it provided space to discuss ideas for the implementation of CN 18 outputs. Feedback from the delegates indicate the two-day forum have been a tremendous success, which stimulated on how to implement the outputs. Participants appreciated that the forum was a good platform to share knowledge and best practices of different countries and create opportunities to extend networking among countries involved. The need for follow up implementation mechanisms in each country needs to be addressed.



Source: JICA Project Team **Photo 7.1.8 Closing Session of the 3<sup>rd</sup> AURF** 

## 7.3 Outcome of the 3<sup>rd</sup> ASEAN Urban Resilience Forum

#### 7.3.1 Achievement of the 3rd ASEAN Urban Resilience Forum

#### (1) Sharing Experience and Lessons Learnt obtained from the Demonstration Project

With the aim to share good practices and operational results and enable other ASEAN Member States to learn from Luang Prabang and Denpasar, this forum was successfully conducted. Based on the experiences shared from the two cities, it recognized the importance of GIS data. Updating GIS database was included in action plan of both cities. Currently, there is still lack on the preparation of urban assets information. Urban asset information including the GIS data is not fully prepared. It was confirmed that each department has own data but not unified into one database. ASEAN Member States can learn that it is important to share hazard and risk information among related agencies and reflect them to the plan of each agency.

On top of that, technical issue such as updating and improving hazard assessment, and handling and utilizing hazard and risk data (GIS skill) are important. The government and related stakeholders must share, manage and update data related to hazard and urban asset. And at the end, the result of risk assessment need to be reflected in various plans including city spatial plan. Because development plan considerations play a key role in contributing to the mitigation and preparation of a community to effectively confront a disaster.

(2) Utilization of Guidebook for Building Resilient Cities and ASEAN Urban Resilience Checklist

It must be discussed how the checklist can be utilized by setting up workshops to train how to process the checklist. Coordination and training would be required to get effective mechanism and results in order to move effectively forward to "what is the next". Taking into account of some participants not always well known with the contents of checklist due to their first experience of the AUR-checklists and already-known issues (technical and operational issues through previous workshops), the works were given the priority to institutional issues. The workgroup could identify the following institutional issues toward effective dissemination and sustainable utilization of the AUR-checklists.

- The necessary improvements in coping with the technical and operational issues were shared as "Localization of AUR-Checklist" to be applied to each ASEAN Member State with different natural and socio-economic environment.
- High-level decision making to adopt AUR-Checklists to ASEAN Member States was also shared as common issues to disseminate them effectively.

AMS during the group works shared that basic skill and capacity development in small and medium cities of AMS is essential issues for familiarization of AUR-Checklist.

(3) Sharing the Experience and Lessons Learned from ASEAN Member States

Sharing experiences took a spotlight in the 3<sup>rd</sup> AURF. The experiences shared during the forum came from both the pilot demonstration projects (Denpasar and Luang Prabang) and all ASEAN Member States participants. The participants embody the value of sharing experiences among diverse countries and affirming the importance of collaboration between the stakeholders.

Through the sharing experiences, each ASEAN Member State expressed that they have specific department in charge of disaster risk analysis in the national level. And this department produced some action plans which are integrated into spatial plan documents. But, all ASEAN Member States have the same issue of limited knowledge and skill of the local government. ASEAN Member States culminated with the same perspective that each national government and local government must work closer together to achieve resilience cities. National government and other organizations such as urban planning association, academic institutions, need to transfer the knowledge through a capacity building to local government. Lao PDR and Malaysia representatives expressed that working towards effective engagement between national and local government starts with a common understanding of resilience city definition. Developing a common definition, concept and coordination that is shared by all stakeholders are the key in this process.

In the other hand, representatives from Indonesia, Malaysia, and Vietnam explained that the Sendai Framework, aiming to guide the multi hazard management of disaster risk in development at all levels as well as within and across all sectors, serves as a guiding theoretical framework for the implementation in their countries.

#### 7.3.2 Lessons Learned for Future Forum

The ASEAN Urban Resilience Forum was launched in 2016 to forge partnerships and dialogues about implementation of resilience cities in ASEAN. The resilient cities forum is a place where partnerships are formed and strengthened, results are showcased, challenges are addressed, and opportunities are identified. The active participation of PCU and PIU from the two cities of demonstration projects, who share their knowledge and experiences during the 3<sup>rd</sup> forum have made this forum fruitful.

After conducted the forum three times, it is clear that there was active participation of participants throughout the presentation, plenary and working groups, which helped to ensure the discussions covered a wide-ranging aspect. Overall, there was a lack of familiarity with the terminology for some newly join participants meant the facilitators had to actively steer the conversation to begin with; however, in the 3<sup>rd</sup> forum participants responded easily to the questions given and were able to share relevant concepts from their countries during the working groups.

All participants expressed a keen interest in the ongoing results of the demonstration project and would be happy to have their country stay involved for a further discussion. For the future forum, it is strongly suggested that the invitations are initially extended to cover more stakeholders including government ministries, funding agencies, researchers, private sector, NGOs, and representative of the major actors in disaster management and urban planning in each ASEAN Member State. It will offer a multidisciplinary approach to stakeholder cooperation, capacity building, and knowledge sharing from experts around ASEAN Member States.

Thematic forum is important element for the urban resilience forum. The next forum is not only offer good practices from each ASEAN Member State, but also build a system for follow-up and evaluation of action plan is needed. Beside the case studies/good practices presentation, it will be give an extra point for the next forum to have special side events such as poster exhibition from each ASEAN Member State to show their work and adaptation on resilience cities activities. It will extend the dialogue and show how different cities approach similar aspect on disaster management.

Capacity building activities such as technical and regional workshops, advisory and technical developments undertaken in the implementation phase will further ensure the achievement of the forum results. And it is also important to share the forum results through online platforms, media and events.

# CONCLUSION

# **CHAPTER 8: CONCLUSION AND RECOMMENDATIONS**

## 8.1 Conclusion

The Project on Building Disaster and Climate Resilient Cities in ASEAN has been implemented from November 2015 to July 2018 with the assistance from the Japan International Cooperation Agency (JICA). Both the Project Steering Committee (PSC) members and the JICA Project Team have worked together to attain the three outputs of the project. During the project period, ten PSC meetings from the 2<sup>nd</sup> PSC to the 11<sup>th</sup> PSC were held to share the progress and issues of the project and to confirm the next steps for the outputs. Events including the 1<sup>st</sup> and 3<sup>rd</sup> ASEAN Urban Resilience Forum (AURF), the 1<sup>st</sup> to 4<sup>th</sup> Workshops for Urban Resilience were also held to exchange ideas for urban resilience as well as for project outputs such as the future image of AURF, the draft TOR of the demonstration project and implementation of the demonstration project, guidebook and checklists for urban resilience. The following are the conclusions for each output:

# <u>Output 1: Establishment of a regional cross-sectoral collaboration mechanism and formation of partnerships to increase urban resilience in the ASEAN</u>

(1) Establishment of AURF

The regional framework called AURF was established and was organized three times in July 2016, May 2017, and July 2018. The first two forums were held mainly for sharing knowledge and experience among the participants, sharing ideas for developing plans for future AURFs, and producing a guidebook and checklists. The programs of the 2<sup>nd</sup> AURF were designed based on the feedback of the 1<sup>st</sup> AURF. The 2<sup>nd</sup> AURF contained group discussions and presentations by each ASEAN States (AMS), so the preferred style for future AURFs was also identified through the two forums. The 3<sup>rd</sup> AURF had discussions on how to utilize CN18 outputs after the project is completed.

(2) Development of Communication Tools (Website, Facebook Page, Mailing List, and Newsletter)

Both the PSC members and the JICA Project Team have worked to develop communication tools to increase urban resilience in the ASEAN. The communication tools include a website, Facebook page, mailing list, and newsletters. The website introduces outlines of AURF and CN18 and uploads the project reports and presentation of the events. Since it took a long time to develop the website for the Urban Resilience Forum due to unsettlement of the website management issues, the Facebook page for "Building Disaster and Climate Resilient Cities in ASEAN" was developed as the supplemental tool for the website. As of July 2018, about 111 persons follow the Facebook page. The mailing list containing information of participants of the project events, such as forums and workshops, was also developed. Newsletters introducing project activities were also published and distributed to the

participants of the project events and the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Partnership Conference.

(3) Planning for Future AURF

To strengthen functions of the established AURF and to ensure sustainability, the JICA Project Team worked together with PSC members to develop an action plan for future AURF, a draft rule of the forum, a draft concept note for the AURF, and a draft TOR for the forum secretariat. For fund raising for the forum, PSC members agreed that both co-chairs of the ASEAN Committee on Disaster Management (ACDM) Working Group (WG) on Prevention and Mitigation (P&M) and ASEAN Secretariat (ASEC) would seek assistance from development partners rather than the AADMER Fund, which has uncertainty in terms of fund availability. In the 9<sup>th</sup> ACDM WG meeting on P&M, the WG members concluded that the WG would take over the action plan, the rule, the concept note, etc., drafted by the JICA Project Team and finalize them on their own. This is because the WG needs to re-examine the concepts, functions, etc., considering that similar forums have been set-up in the region and that there is a need to make a distinction between the similar forums and the re-examined forum.

#### Output 2: Evaluation of candidate cities, indicator development for resilient cities, commitment and partnership building for demonstration project on risk assessment of priority cities in AMS, capacity development for urban resilience through the implementation of the demonstration project in two cities in the ASEAN

(4) Listing Urban Cities in the ASEAN and Gathering Information

The JICA Project Team worked together with the National Project Coordinator (NPC) of each AMS to select 817 long list cities, 56 middle list cities, 16 short list cities, and eight candidate cities through step-wise screening based on preliminary disaster risk assessment and discussion with each AMS. For the 56 middle list cities, the JICA Project Team conducted base line surveys by subcontracting local consultants and conducted the 2<sup>nd</sup> preliminary disaster risk assessment mainly for capacity assessment. The 1<sup>st</sup> and 2<sup>nd</sup> preliminary disaster risk assessment provided objective information for the city selections. The eight candidate cities were selected based not only on the results of the 2<sup>nd</sup> preliminary disaster risk assessment, but also on the importance of the cities from the viewpoints of national development and national economy.

(5) Development of the draft TOR of the Demonstration Project

The JICA Project Team developed the draft TOR of the demonstration project through discussions with PSC members and attendants of the forums and workshops. The JICA Project Team developed two types of draft TORs; one is the demonstration project to be supported by JICA, and the other one is the project to be conducted by each AMS or to be supported by international partners. Both types of demonstration projects aim at contributing four priority actions for the Sendai Framework for Disaster Risk Reduction. Conducting disaster risk assessment and reflecting the assessment results for improving contingency plan, urban plan, and development plan are to be emphasized in the demonstration project.

(6) Implementation of Demonstration Projects

The demonstration project with JICA support was implemented in Luang Prabang, Lao PDR, and Denpasar, Indonesia. These two cities were selected by considering their willingness to implement and expectation of their commitments. The local governments of the two cities developed action plans for improving the disaster risk reduction plan and the land use plan by using checklists and referring to the

results of the preliminary disaster risk assessment. Issues in using the checklists and conducting the preliminary disaster risk assessment, good practices for building urban resilience, and lessons learned from other ASEAN cities were extracted from the demonstration project.

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

(7) Development of "Guidebook for Urban Resilience"

Through discussions with PSC members and attendants of the forums and workshops, the JICA Project Team developed a 100-page "Guidebook for Urban Resilience". The objectives of this guidebook are for government officials in charge of disaster risk reduction and urban planning and management officials at both national and local levels to achieve the following: i) to understand disaster risk, ii) to understand how to address issues and weak points for disaster reduction, iii) to mainstream disaster risk reduction in urban planning and development plan, and iv) to learn good practices and lessons learned from other city cases.

(8) Development of "ASEAN Urban Resilience Checklist"

As a part of the above guidebook, the JICA Project Team developed the "ASEAN Urban Resilience Checklist" through workshops in Indonesia, Lao PDR, and Thailand, and other regional workshops. The objectives of the checklist for local government are: 1) to understand the current status of disaster risk reduction and urban planning and clarify weaknesses through the checklist; 2) to identify necessary activities on disaster risk reduction and urban planning for urban resilience; and 3) to utilize checklist is to understand the situation of local governments and examine necessary supports on disaster risk reduction and urban planning. There are two types of checklists: A) Checklist for Disaster Risk Management and B) Checklist for Resilient Urban Development.

## 8.2 **Recommendation**

It is recommended that the ASEAN continue making efforts to sustain the outputs produced in the CN18 project for building urban resilience in ASEAN cities. The co-chairs of ACDM WG on P&M and ASEC shall take initiatives to ensure sustainability of the outputs with other concerned stakeholders at both national level and local level, as well as with private partners. The following are recommendations to enhance the outputs of the CN18 project and to build urban resilience in ASEAN:

(1) Continuation of ASEAN Urban (Disaster) Resilience Forum

The co-chairs and ASEC as the forum secretariat are requested to continue holding the ASEAN Urban (Disaster) Resilience Forum on their own after the assistance from JICA is completed. The co-chairs would play a role to plan, operate, monitor, and evaluate the forum, as well as to raise funds. ASEC would schedule the forum and coordinate with other AMS. The products such as the website, Facebook, and mailing list shall be utilized and promoted to involve the concerned stakeholders.

Since AURF aims at being a cross-sectional mechanism, it is recommended for both the co-chairs and ASEC to involve other sectors and other government levels, such as local and district/community levels, in the forum.

(2) Finalization of Concept Note, Terms, and Action Plan for Future Forum

The co-chairs with other members of ACDM WG on P&M shall re-examine and finalize the concept, terms, action plan drafted by the JICA Project Team to make a distinction between the current similar forums in the region and the forum to be re-examined.

(3) Utilization of Products Developed in the Project (Website, Facebook, Mailing List, Database, Guidebook and Checklist)

Both the co-chairs and ASEC shall continue related activities for building urban resilience by efficiently utilizing the website, Facebook, mailing list, database, guidebook, and checklists, which were developed in this project. The website, Facebook, and mailing list can be used for enhancing communication with the concerned stakeholders and promoting their participation to the activities. AHA Center shall utilize the database to disseminate city-level data and information. Both the co-chairs and ASEC shall distribute the guidebook and checklists to the concerned stakeholders of each AMS and monitor and evaluate the usage of the guidebook and checklists by each AMS.

#### 1) Website/Facebook

The AURF website was developed as a tool for promoting the activities. The developed website was transferred from the JICA Project Team to AHA Centre. AHA Centre is expected to update the website with the cooperation of each AMS. Each AMS is requested to provide the contents to be updated by AHA Centre when each AMS conducts related activities on building urban resilience. To supplement the functions of the website, ACDM WG on P&M shall utilize the Facebook page.

#### 2) Mailing List

The JICA Project Team assisted in developing a mailing list consisting of participants in the events, such as workshops and the forums, under the CN18 project. The listed members are potential supporters to sustain the CN18 related activities. ASEC is expected to coordinate the future forum, so ASEC shall manage the mailing list.

#### 3) Database

Since the preliminary risk assessments on cities in the AMS were examined, the expected database mentioned in Section 2.5 composed by geographical information system (GIS) has been made and contributed to Output 2: Products for Natural Hazards and Exposures in AMS. This database will be incorporated into the AHA Centre and will contribute to the Knowledge and Innovation Management (KIM) project managed by the ACDM WG toward the establishment of a database in the AHA Centre.

The KIM project aims at strengthening ASEAN's regional knowledge management system and mechanism and professionalism to enable ASEAN in becoming the global leader and the center for excellence and innovations in disaster management. In this context for the regional data management in disaster management, further actions need to be taken in line with the following considerations:

• The database is expected to contribute to activities giving referential information for prevention and mitigation in the ASEAN. Since AHA Center has focused on preparedness and response on disaster management, the formulation of a framework of a data management system for prevention and mitigation would be desirable in order to appropriately locate a function of the database by Output 2 in this expected system.

• The database for the prevention and mitigation program for the ASEAN could be enhanced and improved properly in accordance with the framework of a data management system, including sustainable operation and management activities with staffing and budgeting sources.

#### 4) Guidebook/Checklists

The guidebook and checklists were endorsed by ACDM (minister-level meeting). AHA Center will upload the guidebook and checklists on the website. Since checklists deal with technical matters, ACDM WG on P&M shall prepare them starting with follow-up activities, such as Training for Trainers and localization. ACDM WG on P&M also needs to encourage international partners who are willing to assist urban resilience projects in the ASEAN to utilize the guidebook and checklists.

(4) Dissemination of Experiences of Demonstration Project

Two demonstration projects in Luang Prabang, Lao PDR and Denpasar, Indonesia have captured the lessons learned from their implementations. The following are the further necessary actions to be taken in consideration with the lessons learned from the demonstration projects:

- The checklists formulated by the CN18 project as a common or standard version for the AMS were revealed by necessary improvement of their contents through the implementation of checklists in the demonstration project. Appropriate localization of checklists including arrangements of contents, wording of questions, and institutional legitimacy by the government would be necessary when they are introduced into the AMS, taking account of each country's local conditions.
- Although one of the important purposes of the demonstration project was to enhance the understanding and promotion of disaster risk assessment among local governments in Lao PDR, it was still a big challenge for the local government to utilize data and manipulate the software due to insufficient skill and opportunity, including budgets. As small to medium cities or local governments in ASEAN countries may face similar issues, an effective mechanism for the dissemination of this technical tool, even if open source data is available, must be established such as cooperation with the national institution, utilization of private consulting firms or universities, and national funding supports.
- The appropriate planning process for a disaster risk management plan and an urban land use and development plan shall rely on sufficient primary data through scientific analyses. Therefore, a baseline survey and a database are required to monitor quantitative changes in statistical data, such as hydrological data, socio-economic statistics, and urban assets information. It would be common and considerable to launch a continuous baseline survey for effective planning of urban resilient cities in ASEAN countries.
- Continuous and active supports and promotion of urban resilience activities in the AMS shall be taken by the ASEAN through monitoring projects relating to urban resilience and dissemination of the outputs of the CN18 project (e.g., guidebook, checklists) through the website and the ASEAN Urban Disaster Resilience Forum.

(5) Awareness Raising for Promoting Disaster Risk Reduction

All AMS shall raise awareness in promoting disaster risk reduction based on the Sendai Framework for Disaster Risk Reduction. Most of the AMS tend to put more emphasis on response and rehabilitation rather than prevention and mitigation and preparedness. In this project, the guidebook including the checklist addresses and the Sendai Framework for Disaster Risk Reduction aim at contributing to the four priority actions for the framework. Efforts for disaster risk reduction shall be shared and discussed in the ASEAN Urban Disaster Resilience Forum, as well as the implementation of the demonstration project and utilization of the products developed in the Project.

(6) Coordination with Other Stakeholders

National disaster management organizations in each AMS shall coordinate with other stakeholders, such as urban planning, health, education, and public works. This coordination is necessary at both the national and local levels for mainstreaming of disaster risk reduction into other sector development. Disaster management organizations at the national level and local level shall provide inputs on disaster risk information and data to other concerned organizations who draw up their sector plans.