A9 Record of Training of Junior Researchers

A9.1 List of Junior Researchers
A9.2 Activity Reports

"NATURAL DISASTER RISK ASSESSMENT AND AREA BUSINESS CONTINUITY PLAN FORMULATION FOR INDUSTRIAL AGGLOMERATED AREAS IN THE ASEAN REGION"

A Joint Project of the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre) and Japan International Cooperation Agency (JICA)

List of Junior Researchers

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Philippines	Ms. Ma. Lynn P. Melosanto	Philippine Institute of Volcanology and Seismology (PHIVOLCS), the Department of Science and Technology (DOST)	Senior Science Research Specialist
Vietnam	Ms. Nguyen Phuong Nhung	Researcher, Faculty of Hydrology, Meteorology and Oceanography, Hanoi University of Science	Researcher/Lecturer

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ASEAN Coordinating Centre for Humanitarian Assistance on disaster management

JICA

Activity Report of Junior Researcher

November 25, 2014

Aria Mariany (Indonesia)

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1. Introduction

Area Business Continuity Management (Area BCM) is a new concept to integrate the business continuity plan into either regional development plan or disaster management plan. Area BCM is important for business continuity because business in industrial park needs infrastructure such as road, port, etc, for supply chain. If one of such infrastructures is disturbed by certain disaster, the business continuity will also be disturbed.

The involvement of researcher is important in order to find better method or approach in Area BCM as well as to introduce the Area BCM into wider community. Therefore, the involvement junior researcher is important to help the introduction of Area BCM concept through their research, whether it can contribute to the Area BCM or vice versa, Area BCM can be used in their research.

2. Research Topics and Interests

My current research topic is the mechanism of disaster risk assessment. Currently the disaster risk assessment that is conducted by the scientist is technocratic, which means the scientist conducts a research without consider the people behaviour as well as perception. On the other side, people also have their own knowledge or perception or information regarding the risk.

A variety of methods to assess the risk of disaster has been much developed (Davidson, 1997; Fedeski & Gwilliam, 2007; Pamungkas, Bekessy, & Lane, 2011; Sengara & Suarjana, 2012; Sutanta, Rajabifard, & Bishop, 2009). This risk assessment is used in determining disaster risk reduction appropriate in an area (mitigation). Within the framework of disaster risk reduction, disaster risk assessment to be input to determine appropriate mitigation (ADRC, ISDR, UN, WMO, 2002). The term disaster risk itself has existed since 1976, when O'Keefe et.al (1976, in Lassa, 2010) states that the risk of disaster that happens when there is a physical interaction between extreme events and vulnerability in humans. This understanding is then also used by some experts as Blaiki, et al, 1994; Wisner, et al, 2004; Pelling, 2004; and Tierney, 2007, of which the event is known as the extreme physical hazard.

Based on these two factors, hazard and vulnerability, then conducted an assessment of the risks of disasters that may occur in the future. Some researchers, such as Davidson (1997) and Wisner (2007) added a capacity factor in the assessment. Capacity is the ability of humans to overcome the effects of disasters. This capacity is important to assess the risk of disaster to see the resources and local knowledge possessed by any community in its efforts to reduce disaster risk.

Post-earthquake and tsunami events in 2004 which led to many casualties and destruction of NAD territory, the Indonesian government began to realize that the emphasis on disaster risk reduction efforts in the disaster management system in Indonesia, it becomes very important. One is the risk assessment efforts through Head of BNPB Regulation No. 2 of 2012 concerning Guidelines for Risk Assessment, the Indonesian government tried to encourage local government to have the result of disaster risk assessment as a basis for decision making on risk reduction in Indonesia.

The approach used in disaster risk assessment in accordance with these regulations is a top-down that is the government using data and information related to the local community through secondary data and produce a picture of the level of risk in the district.

Most of the research on risk assessment is also top-down approach using quantitative or

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qualitative methods that were quantified.

In the risk assessment, the community knowledge is not considered. Yet society must have information through their local wisdom that can be utilized in the disaster risk assessment (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2007; Wisner, 2007).

Wisner (2007) also said that the importance of integrating the community participation (bottom up) with a risk assessment carried out top-down. According to Wisner (2007), this integration is necessary because people actually have a capacity that is not understood by the government so that the government sets strategic policy for disaster risk reduction a top-down manner. Wisner (2007) cited a study conducted by communities in Bolivia, the Philippines, and Zimbabwe through community dialogue. This opinion is strengthened by Cadag & Gaillard (2012) which states that the development of local knowledge to reduce vulnerability to specific hazards in a risk assessment to develop along with the development of scientific knowledge, therefore it is necessary to integrate the two in order to reduce vulnerability to a particular hazard.

Community Involvement in Disaster Risk Assessment

One of the efforts to bridge the Society as an actor, who interacts daily in the neighborhood where he lives, causes people to have knowledge of the conditions in the region as well as the knowledge of how society will treat the area. Therefore, early community involvement is very important planning (Forester, 2000) to build a sense of community attachment to this policy.

Involving the public in decision-making will be made public, the government and other stakeholders to sit together and make decisions through a process of dialogue face to face (Anshell & Gash, 2007; Innes & Booher, 2010). Face-to-face dialogue process conducted so far is between government representatives and community representatives who actually is an arm of the government, such as the head of neighbourhood unit (RT or RW), sometimes while individual interests are not represented. Therefore, the involvement of the individual in society is very important. Individuals in the community can be represented by existing organizations in the community, such as the women group (PKK), prayer groups, youth groups, and so forth (Mulyasari, 2014). However, in disaster risk assessment involving the community, whether to be quite effective if done face-to-face dialogue between stakeholders?

Catastrophic events are uncertain, so the estimation of disaster risk and disaster mitigation is still uncertain. In planning, the uncertainty hence needs for consultation and communication among stakeholders (Innes & Booher, 1999; Woltjer, 2000; De Roo & Proter, 2007), until an agreement is reached (Innes & Booher 1999; Woltjer, 2000).

In mitigation, the agreement between the community, the government and other stakeholders is essential. Community has the capacity and the ability to adapt and mitigate risk, as well as having knowledge related to disaster risk in the region. However, people also need to know the information about disaster risk provided by the government. Likewise, there is information from the public that may be used by decision makers. So it needs to be a collaboration in risk management to address the existing problems in conventional risk management (Mercer, Kelman, Taranis, and Suchet-Pearson, 2010). They pointed out in the study of climate change and introduced the term adaptive collaborative risk management. Additionally in terms of mitigation, in developed countries such as in USA, the collaboration among stakeholders is done in the emergency management response (Jr. Waugh & Streib, 2006).

Problem and Issue

Risk assessment in disaster risk assessments intended to demonstrate a certain level of risk to

disasters in an area. The results of this risk assessment are expected to be accepted by all stakeholders. If we see from the pyramid of wisdom, it can be seen that data into information and then into knowledge and finally evolve into wisdom (Zer-Aviv, 2014). The results of this risk assessment are also expected to be wisdom for people in the area to change its behaviour and make it wisdom to be able to reduce their vulnerability to specific hazards in a particular area.

Various theories and practices related to disaster risk reduction and disaster risk assessment has been done, either through a top-down or through community involvement (bottom-up). The practice of community involvement in disaster mitigation that occurred during this time was the participation of the community, which in the ladder of participation by Arnstein (1969), are on stage tokenism, that public opinion be heard in the planning, but ignored in decision making. This leads to policies and related information of disaster mitigation made by the government is not run by the people and practices of disaster mitigation in the community are not recognized at the level of government. This happens because people have their own knowledge about disaster risks in the region, both derived from risk perceptions and the intuitive of such risks, as well as the government, have disaster risk information obtained through a series of disaster risk assessment process.

Studies related to disaster risk assessment has been done, both the technocratic nature, in the sense made by planners or government (Sengara & Suarjana, 2012), or done by involving the community (Davidson, 1997; Sutanta, H., Rajabifard, A., & Bishop, I.D., 2009; Worldbank 2012). In fact, few researchers have used the term collaboration in disaster management (Worldbank, 2012; Mercer, Kelman, Taranis, and Suchet-Pearson, 2010; Waugh Jr. & Streib, 2006), but still the researchers or scientist take a bigger part in the disaster risk assessment even involving the community. However, researchers who have different scientific backgrounds, such as geologists, planner, geophysics, and others will give you a different view compared to people who live everyday in that place (Cardona , 2003). Therefore, research must be done by considering the wider public perception and intuition in assessing risks (Cardona, 2003). It is intended to produce an effective and efficient disaster risk reduction (mitigation) (Maskrey, 1994).

There are only few researches that are trying to raise the public's perception and intuition in assessing the risk of disaster. Therefore, this research will explore community perceptions and intuition in assessing disaster risks that can be integrated with mechanisms for disaster risk assessment was conducted by researchers and government, so that would be obtained disaster risk assessment mechanism that produces the level of risk that is agreed upon by the community and government (including researchers).

3. Relationship between Area BCM and Research Topics

In the Area BCM cycle, the first step is to understand the risk area. Risk assessment method is used to develop the understanding the area. My research is related to the development of risk assessment method that can be accepted by all stakeholders, especially community and government. The aim is at developing the appropriate method of risk assessment, including determination of factors that build the disaster risk, which probably can be used in assessing the risk for Indonesia. This risk can be used as input to determine the appropriate measures in Area BCM for business continuity.

Currently, I am in the preliminary stage of my research, i.e. developing the methodology to conduct the research.

In future research, I would like to conduct a study regarding how the ABCM concept can be

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integrated in the regional planning and development. This study will be conducted in collaboration with other colleague.

4. Activities during the Project

Table 1 Summary of Activities

Date	Event	Your Role or Activities
22 August 2013	Meeting No 2	• Assist the coordination with the Bappeda West Java Province, BPBD West Java Province, and the working group members from infrastructure and lifeline operators, local government, industrial park, companies, and other supporters
17 December 2013	Workshop 1	• Facilitator • Assist the workshop committee and national coordinator
20 December 2013	Progress Seminar 1	• Note taker
January – February 2014	Flood Survey	• Field coordinator and develop survey report
6 March 2014	Workshop 2	• Facilitator • Assist the workshop committee and national coordinator
22 May 2014	Workshop 3	• Facilitator • Assist the workshop committee and national coordinator
26 August 2014	Final Seminar (Local)	• MC • Assist the workshop committee and national coordinator
28 Augus 2014	Final Seminar (National)	• MC • Assist the workshop committee and national coordinator
1 September 2014	Asean Seminar	• Note taker
September – October 2014	ABCP Document Review	• Collect the document review from working group member

5. Lesson Learned from the Project

ABCM is a new concept of disaster mitigation which is integrated with the regional planning. It is important, since currently between the development plan and disaster management plan, are not integrated yet. The problems and challenges faces during carrying out my roles are:

1. The willingness of stakeholder, especially in government. Area BCM is not their priority, therefore, the commitment from some of the stakeholders is not really good. And therefore, it depends on the willingness and the interest of the leader from organization. Especially government, they need clear regulation to involve in the process of ABCP development.

2. Lack of transfer of knowledge. Some government staff who attended the workshop are always different from one workshop to another, depends on the assignment. Therefore,

it needs a knowledge transfer from the staff who attends the workshop to other members of government organization.

3. Throwing each other agencies responsibilities to other agencies. Because this is not the responsibility of one agency, they are afraid if they work out the limit of their role and responsibility.

There are several suggestions for improving Area BCM, i.e.:

1. For Indonesia country, I think the top-down approach is important. Since, according to my experience in coordination with Bappeda West Java Province, the activity that comes from top-down will have more attention and commitment. So, if you want to engage with Bappeda, so the initiative should come from Bappenas at national level or at least from the governor.

2. Since many proposed measures especially for infrastructure is as part of national government authority, it needs to involve more related government organization at national level.

3. Encourage the stakeholders to see that ABCM

4. There are some inputs from the working group members during workshop that the ABCP needs to consider other hazards. According to my opinion, some of the working group members thought that flood is not priority to be managed, therefore, the acceptance of level of risk for certain hazard by all stakeholders is necessary.

5. The content of ABCP needs to simplify to make it more understandable and applicable by the stakeholders.

6. Your Future Works and Area BCM

The possibility of integration of Area BCM and approaches used for Development of Area BCP is very possible. Since my research is on the method of risk assessment, in my future research, I can use it as an input for developing the method. In the future, the new developed method of risk assessment can be used in the development of ABCP in the phase of understanding the area.

Besides, I also mentioned that I in collaboration with colleague want to conduct a study on ABCP that is integrated with regional planning and development.

For both study, I will prepare each paper that is related to Area BCM.

7. Conclusions

Area BCM and Area BCP is a new concept for business continuity. It becomes important because business continuity for industry especially for small medium enterprise is very depended on the development of infrastructure. Vice versa, the disrupted industry will impact the regional economy, including the employee. Therefore, ABCM and ABCP is very important. The biggest challenge is the commitment of stakeholders, especially the willingness of the organizations' leader, so top-down approach is necessary.

The study related ABCM need to do more and more, one of them is my research regarding the risk assessment methodology that can be used to understand the area, especially the disaster risk and also the study about the integration of ABCM with the regional development.

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Activity Report of Junior Researcher

October 31, 2014

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1. Introduction

The Junior Researchers' training prepared researchers interested in the study of partnership-building and collaboration to the process of developing area BCM, as well as provided a venue to engage actual and potential partners from the industrial zones and public agencies in the pilot areas.

2. Research Topics and Interests

As a science researcher from the Philippine Institute of Volcanology and Seismology, I have been involved in assessing the impacts of volcanic eruptions and earthquakes events in the Philippines and in translating the lessons from these events into forecasting and warning tools, such as volcanic and earthquake hazard information.

Currently, one of my major tasks is promoting the use of our Institute's hazard information products by stakeholders to contribute to the national effort of disaster risk reduction and management (DRRM). To do so, our strategy in the case of institutions and organizations is to engage these stakeholders in mainstreaming DRRM into policies and guidelines (central government level) and into their development planning and business processes (local government, institutions and organization level).

My current research interest is the role played by institutions with DRRM mandates in influencing other public agencies, organizations and communities to take (further) steps in improving the state of disaster resilience of Philippine society in general. In particular, I am seeking to describe the degree of cooperative and coordinative relationship – the interconnectedness – of the institutions of the disaster risk reduction and management (DRRM) system in the Philippines that is articulated in Republic Act 10121 (2010)[1].

I am describing DRR as a wicked problem (Rittel and Webber, 1973)[2], which means that it is a complex problem – multi-causal, multi-faceted, and interdependent – that cannot be solved by institutions working singly according to their mandates (Backvis and Juilllet, 2004)[3]. Therefore, I am proposing that DRR institutions tend to develop coordinative and collaborative mechanisms at many levels to create and take advantage of synergies that could widen the influence and impact of their programs, plans and activities.

In describing the interconnectedness of DRRM institutions, I used theories of institutions

[1] An act strengthening the Philippine Disaster Risk Reduction and Management system, providing for the National Disaster Risk Reduction and Management Framework and institutionalizing the National Disaster Risk Reduction and Management Plan, appropriating funds therefor and for other purposes.

[2] Rittel H.W.J. and Webber, M.M. (1973). Dilemmas in a General Theory of Planning. Policy Sciences, Vol. 4, 155-169. Amsterdam: Elsivier Scientific Publishing Company

[3] Bakvis, H. and L. Juillet (2004). The Horizontal Challenge, Line Departments, Central Agencies and Leadership, Ottawa, Canada School of Public Service.

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(North, 1991; Scott, 1995, Peters, 2005)[4] and a conceptual framework called whole-of-government (Ling, 2002; MAC, 2004; Christensen and Laegreid, 2007a, b; Fard and others, 2010; Halligan and others, 2011; Hicks, 2012)[5]. The whole-of-government framework came in the heels of New Public Management (NPM) reforms popular in the 1990's that, among other things, created a multitude of single-focus organizations meant to improve efficiency but unintentionally fragmented government service delivery. The post-NPM reforms recognized that the separate activities of existing organizations did not achieve the important public policy goals. Hence, the whole-of-government framework can be viewed as a move to find back a center.

3. Relationship between Area BCM and Research Topics

The Area BCM is an example of a process of establishing coordinative and collaborative mechanisms between stakeholders in an agglomerated industrial area. The stakeholders include both public agencies and industry sectors, including private businesses as well as lifeline providers. These stakeholders are key players of the economic sector, and which are part of the structure supporting the path of the Philippines towards a fully-developed economy.

The Area BCM process 1) established a shared vision of an industrial community resilient to disasters from natural hazards; 2) evaluated the natural hazard that has the potential to negatively impact their business processes immensely; 3) identified the emergent common problems they would face if such hazard were to occur; and 4) proposed the manner to address these common problems.

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Whole-of-government literatures suggest that coordination and collaboration take different forms in the countries that pursued the initiative. Ling (2002) suggested that when several public agencies "join up", four dimensions of organizational processes may be affected (figure 1). These dimensions are organization, accountabilities and incentives, service delivery, and working across organizations.

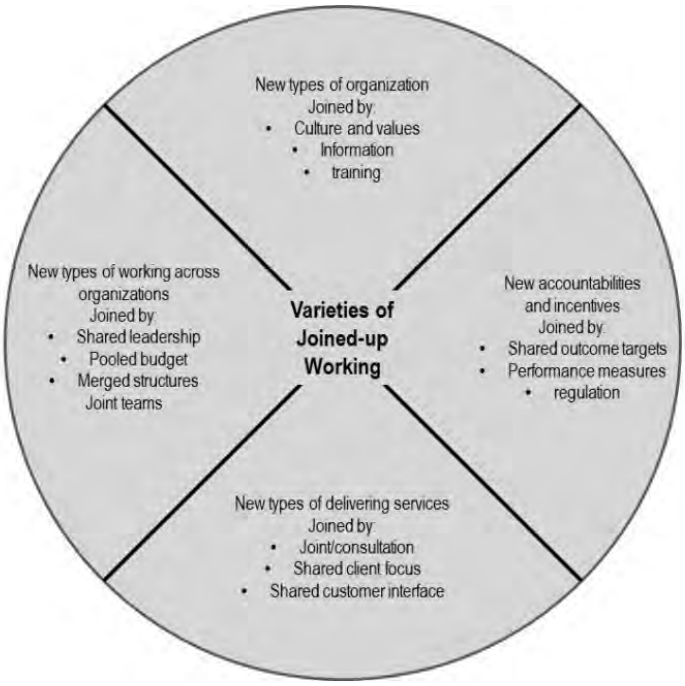

Figure 1. Ling (2002) identified four dimensions of joined-up government.

Although the analysis of Ling (2002) focused on government agencies (institutions with legal mandates), the Area BCM process potentially captures some of the elements of the dimensions proposed by the author.

Stakeholders of the Area BCM in Laguna, Philippines pursuing the shared vision of community resilience may evolve a culture that fit the structural (coordinative and collaborative) relationship suggested by the results of three workshops and contained in the Draft Area-Business Continuity Plan. The prospective points of convergence (elements of the dimension) may bring about the outcomes summarized in the Table 1 below.

While sustaining the enthusiasm for the Area BCP requires much more than attendance to workshops, initial indication that there are strong champions and advocates among the stakeholders augurs well for the future of the planning process.

Table 1. Potential outcome of A-BCP indicated in the Draft Area-Business Continuity Plan.

Dimension *(applies only to the owners of the A-BCP Manual)*	**Element**	**AREA BCM Pilot area** *(Potential Outcomes)*
New type of organization	Culture and values	Culture of resilience based on a mindset of looking out for each other's interest
	Information	Shared information on hazards and risks
	Training	Establishing a standard or baseline for DRR capacities
New accountabilities and incentives	Shared outcome targets	Strategic planning as for DRRM for the industrial zone
	Performance measures	Appropriate performance measures according to the common strategic plan
	Regulation	A guideline on Area-BCM emanating from the stakeholders in the industrial zone
New type of delivering services	Joint or consultation	(not apparent in the Draft document)
	Shared client focus	(not apparent in the Draft document)
	Shared customer interface	(not apparent in the Draft document)
New type of working across organizations	Shared leadership	Ownership of Area BCP Manual leading to sustained revisiting and updating of the manual
	Pooled budget	Shared resources for DRRM
	Merged structures or joint teams	Ownership of Area BCP Manual leading to sustained implementation of contents of the manual

4. Activities during the Project

Table 2. Summary of Activities

Date	**Event**	**Your Role or Activities**
August 13, 2013	1st Working Group Members' Meeting, Richmond Hotel, Quezon City	Participant
December 1 2013 and December 3, 2013	Training of Facilitators Workshop 1 Crimson Hotel, Muntinlupa City	Facilitator, Summary of results of break-out group
January 21, 2014	Progress Seminar Mandarin Oriental Hotel,	Participant

	Makati City	
January 23 and 24 2013	Second Panel Meeting, Dusit Thani Hotel, Makati City	Facilitator for Field Trip, presentation of information on Taal Volcano
February 20, 2014	Workshop 2 Crimson Hotel, Muntinlupa City	Facilitator, Summary of results of break-out group
May 27, 2014	Workshop 3 Crimson Hotel, Muntinlupa City	Facilitator, Summary of results of break-out group
June 18, 2014 and June 19 and 20, 2014	Junior Researchers' Meeting Third Panel Meeting, Melia Hotel, Hanoi	Sharing of participation and learning from Area BCP Project, Participant to meeting and field trip
August 15, 2014	Final Seminar, Crimson Hotel, Muntinlupa City	Participant

5. Lesson Learned from the Project

Challenges	Suggestions
Identifying champions from the target stakeholders. This is indicated by: -participant from same organization changes for each workshop; -participant not high enough in the organization hierarchy to influence decisions or make commitment regarding the Area BCM;	-Visioning exercise to come up with a common vision statement. Logically, this would be part of Workshop 1, after the stakeholders identified how an event (earthquake, in this case) can affect their own business and their business community. Shared vision may trigger community spirit, hence stronger commitments from the stakeholders. -Stakeholder Analysis, -Focus group discussion among leaders (from local government, business owners, and utility companies) to clarify to each other their organizational policies and strategic positions on DRRM.
Culture of disaster risk management. This is indicted by: -Written policy statement -operationalized policy found in documents about (organizational) BCP-BCM and budget; -emergency plans and exercises -sustained efforts in DRR activities	-The readiness of stakeholders to participate in Area-BCP can be assessed prior to the workshop, possibly through a survey. From this survey, a Risk Management Readiness Index (RiMRI) can be devised and tested, guided by theories on DRRM and BCM and other applicable theories. RiMRI measures the degree to which an organization considers disaster risk management in its business processes. A higher rating would probably indicate a readiness to embark in A-BCP.
Lack of formal definition of Area BCP. Other elements of Area-BCP, particularly the link between conceptual framework and adapted concepts (such as ISO 22301, emergency management, network and collaboration), which are	-Write and publish a conceptual paper that gives the definitions (found in the ppt and video). This way, the link between Area-BCP concept with other concepts adapted, usually done through the theoretical frameworks and shown in a model or A-BCP cycle, will be

not yet clearly developed, have bearing on the final formal definition.	sharpened.

6. Your Future Works and Area BCM

For the Philippine Institute of Volcanology and Seismology, we have integrated some of the concepts proposed in the Area BCM, in particular the aspect of disaster imagination, in our communication strategy.

Another concept our institute adopted is the Recovery Time Objective, which we included in an assessment tool we used for a workshop of an information project (Annex 1: Report ABCP_Melosantos_Annex_2014oct)

Discussions in Items 3 and 5 point to areas where PHIVOLCS can further pursue or participate to develop the concept of Area-BCP.

7. Conclusions

Since ABCP is a developing concept, literatures are still very scarce. One of the limitations recognized by the participants is the lack of a formal definition and scope of ABCP. This field of practice invites the present handful of ABCP knowledge bearers to expand the reach of the concept by publishing articles, such as conceptual and case study papers based on results of the pilot area implementation.

Activity Report of Junior Researcher

Nguyen Phuong Nhung
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1. Introduction

Objectives of junior researchers training:

- Understand concept of Area BCM. Know content of the project and research methods, approaches used for development of Area BCP.

- Help to connect the project and stakeholders, invited guests.

- Follow process of the project and take part in meetings, workshops. Assist the project and contribute suggestions to develop and complete the project.

- Can integrate Area BCM and approaches used for development of Area BCP into your research and interests in future.

2. Research Topics and Interests

My subject is Hydrology so my interests are disaster risks and especially impacts of flood to human and social economy.

My current research topic is “Flood vulnerability assessment to economic and social sectors in the context of climate change, and proposing response solutions”.

Method to assess Flood vulnerability:

- Vulnerability = Exposure – Coping capacity
- Exposure: represents revelation of assets and people at risk of flooding.
- Coping capacity: characterizes measures that people use to against damages caused by floods.

Figure 1 below shows conceptual framework for flood vulnerability assessment

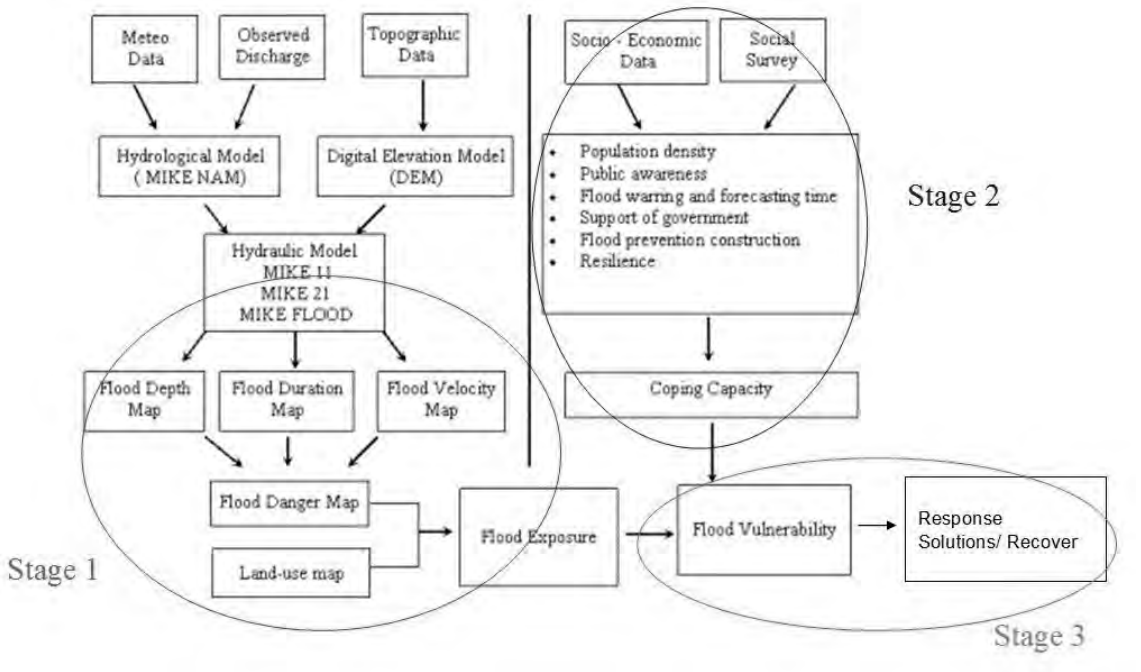

Figure 1. Conceptual framework for flood vulnerability assessment

3. Relationship between Area BCM and Research Topics

My current research above met with some problem. There are:

1) Results of the research are not really suitable with the reality of the research area.

2) Application of results and solutions of the research in reality is not effective.

Applying the approaches used for development of Area BCP can help to solve these problems. Specifically, we can apply the approaches through working group into three stages of framework for flood vulnerability assessment (Figure 1).

- Then, information, results of calculation and risk assessment are provided by researchers.
- After that, through meetings and workshops, developing and improving these results and building solutions can be done by working group between stakeholders.

Why do the approaches can help to solve these problems?

1) When working group → collecting ideas, opinions of many stakeholders
→ make the results of the researcher more objective and real
=> Solving problem 1!

2) Advantages got from working group:
- Better awareness of stakeholder about flood risk.
- Help everyone to share their knowledge, problems and ideas.
- Understand their responsibility and agree with solutions of the research.
- Promote their cooperation in carrying out the response solutions when flood occur.

→ Make applying more effectively
=> Solve Problem 2!

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4. Activities during the Project

Table 1. Summary of Activities

Date	Event	Your Role or Activities
September 19, 2013	Meeting	- Help to prepare documents - Assist when Meeting was carried out - Explain for stakeholders to understand about the project, information provided by team members.
December 11, 2013	Workshop 1	- Help to prepare documents - Assist when workshop was carried out - Work as facilator - Contribute suggestions about disaster scenario and hazard maps.
December 13, 2013	Progress Seminar	- Help to prepare documents - Assist when Seminar was carried out - Answer questions of invited guests about the project. - Try to make invitees know clearly and more interested in the project.
February 24, 2014	Practitioner Seminar	- Help to prepare documents - Assist when Seminar was carried out - Answer questions of invited guests about the project.
February 28, 2014	Workshop 2	- Help to prepare documents - Assist when workshop was carried out - Work as facilator
June 3, 2014	Workshop 3	- Help to prepare documents - Assist when workshop was carried out - Work as facilator - Join in and suggest ideas in discussion of team members after workshop
June 20, 2014	3rd Panel Meeting	- Help to prepare documents - Assist when Meeting was carried out - Answer questions of invited guests about the project.
August 19, 2014	Seminar for Pilot Site	- Help to prepare documents - Help to edit list of invitees - Assist when Seminar was carried out
August 21, 2014	Seminar for National level	- Help to prepare documents - Help to contact with invitees - Assist when Seminar was carried out

5. Lesson learned from the Project

* I met with some challenges during carrying out my roles:

- Many people I haven't met before so I don't know much about them and their work, subjects.

- Lack of knowledge about some subjects or sectors relating to the project such as law, management mechanism.

* After the project, I have learned many effective things:

- I understand concept of Area BCP.

- I know about new and effective approaches to development a plan for solving a problem.

- I know more people in many sectors; get more knowledge about many sectors.

* My suggestions for improving Area BCM:

- Make stokeholds understand the benefits they will receive from the project, then they will be more interested and take part in the project actively.

- Make sure that they understand the guideline book as well as their responsibility when disasters occur.

6. My Future Works and Area BCM

- I will try to integrate approaches used for development of Area BCP into my future research, especially apply the approaches through working group into three stages of framework for flood vulnerability assessment.

- In the present, it's a pity that I haven't had enough conditions and dates to write papers related to Area BCM in my research fields.

- I intend to disseminate the concept of Area BCM and approaches used for development of Area BCP to my colleagues and students in my university through seminars and discussions.

7. Conclusions

In summary, through the project especially the role of junior researcher of the project, I understood the concept of Area BCM and approaches used for development of Area BCP. These are new concepts and methods, which have many advantages. I have learned more effective knowledge and skills, as well as have more relationship with people in different fields. I will try to relate and apply Area BCM and approaches used for development of Area BCP in my future researches and interests. Concurrently, I will also try to disseminate the concept of Area BCM and the new effective approaches to more and more people.

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A10 Guidebook on GIS Database

A10.1_Guidebook on GIS Data base for Component1
A10.2_Guidebook on GIS Data base for Component2

JICA – AHA Centre Joint Project on Areal BCP

Data Collection Survey on Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region

GUIDEBOOK ON GIS DATABASE FOR COMPONENT 1

<ASEAN Nationwide DATA >

Natural Hazards, Infrastructures, Social Condition and Economics

March 2014

AHA Centre
Japan International Cooperation Agency

OYO International Corporation
Mitsubishi Research Institute, Inc.
CTI Engineering International Co., Ltd.

Table of Contents

1 Purpose and Data Structure

1.1 Purpose

- ✓ To grasp the occurrence of natural disasters in each country of ASEAN, to extract hot spots
- ✓ To assess overall risks by overlaying the natural hazards and social conditions on GIS map

1.2 GIS Platform and Database Format

(a) GIS Platform: ESRI ArcGIS Desktop 10.1

The GIS application software is one of the global standard software. AHA Centre has adopted it as main GIS in the office. Thus we also adopted it as the GIS platform in the project.

(b) Database Format: Personal Geodatabase

Personal Geodatabase (*.mdb) is adopted in order to manage both data tables and GIS features in one database. The mdb database format corresponds to Microsoft Access previous version.

1.3 Database Structure

The database for Component 1 is designed as following figure in the next page. Top folder is **Component 1**, **Existing Hazard Maps** and **MapImage**.

Component 1 consists of four primary folders as follows,

- *Natural Hazards* (explained in the Chapter 2)
- *Built Environment* (explained in the Chapter 3)
- *ASEAN Base Map* (explained in the Chapter 4)
- *PDF Disaster Study* (explained in the Chapter 5)

ASEAN Base Map folder stores administrative boundary and water body.

Existing Hazard Maps folder is prepared for existing natural hazard data in ASEAN wide region collected in this project.

MapImage is prepared for map images exported from GIS.

Natural Hazards consists of four databases, namely

- ➢ Earthquake (this database also contains volcano and tsunami data.)
- ➢ Cyclone
- ➢ Landslide and
- ➢ Flood

Built Environment consists of two databases, namely Infrastructure and Social Economics. These two primary folders are explained in the following chapter 2 and 3.

PDF Natural Disaster Study folder stores summary sheets of natural disaster studies. Chapter 5 explains how to show the summary sheet on the map of ArcGIS.

Additionally, Document and Reference folders are added. Document folder contains the guidebook. Reference folder stores some source data or document which cannot be linked through internet access.

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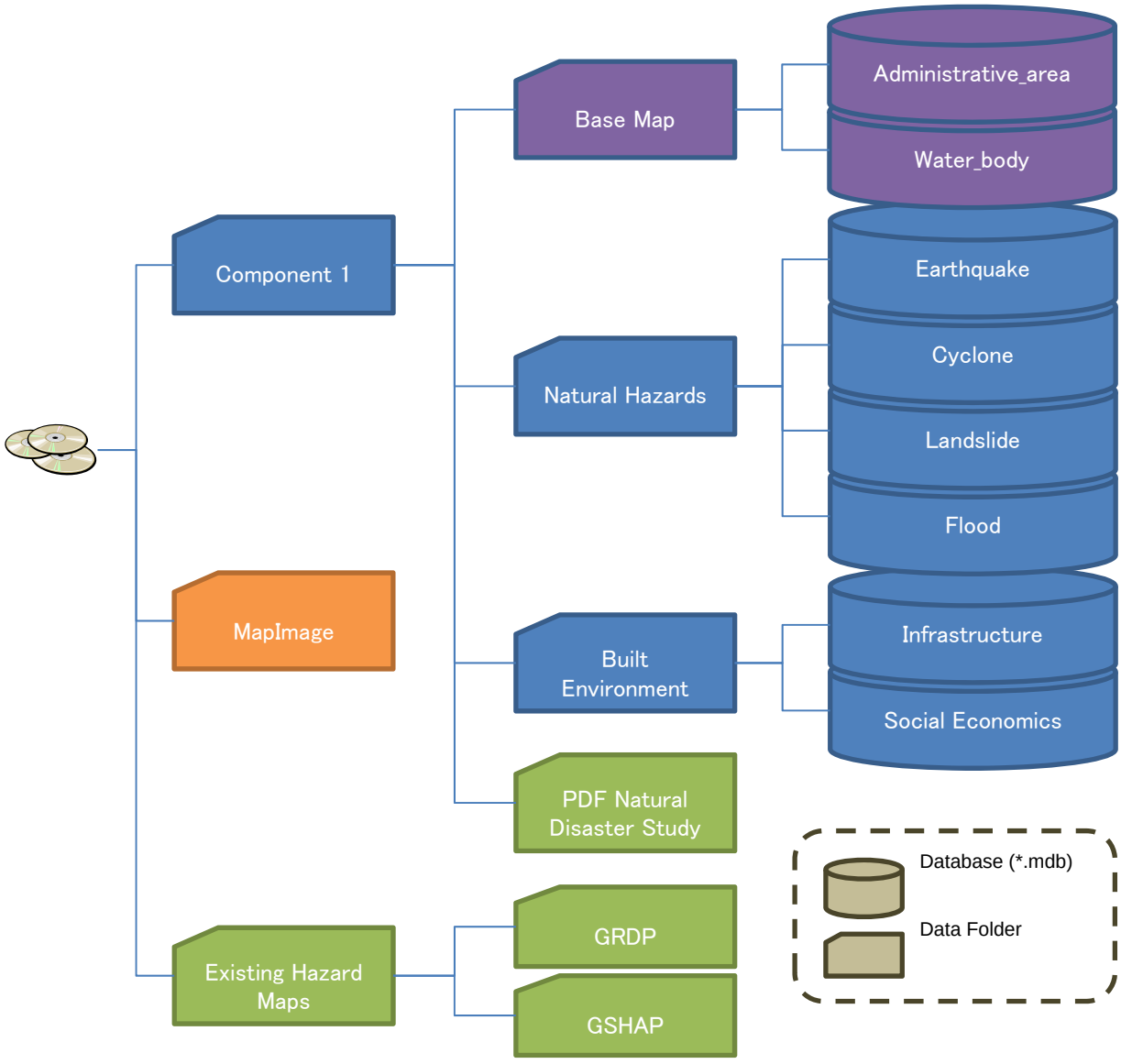

Figure 1.1 Database Structure for Component 1 and additional folders

1.4 How to Create GIS Database

There are some steps to create GIS database that includes their locations as follows.

(One example for Natural Hazards)

- Input data into Excel formatted sheet by countries respectively
- Import the Excel sheet into MS Access database
- Merge these data sheets by countries into one table in Access database
- Create point feature using longitude and latitude information in Arc Map

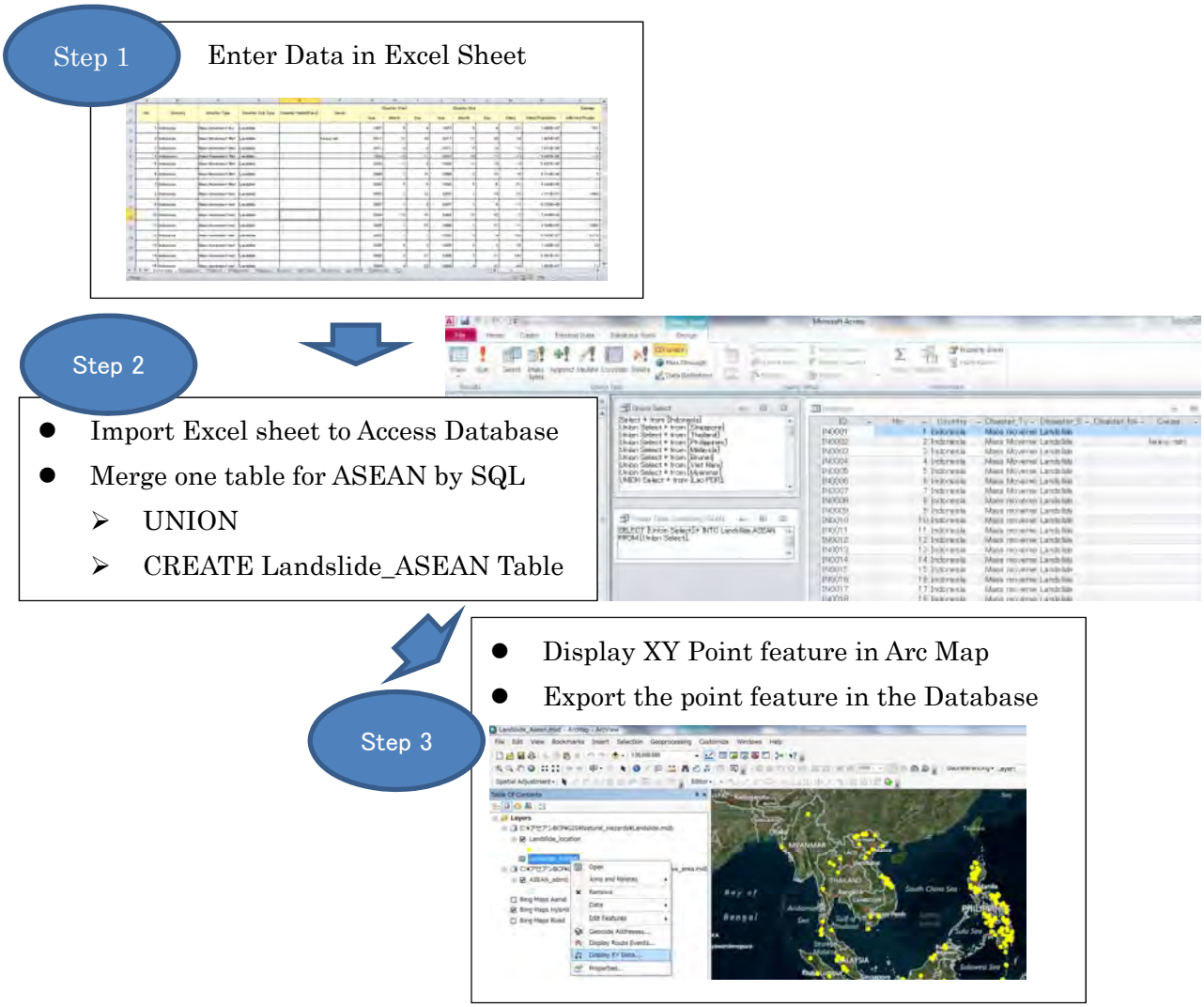

Figure 1.2 How to Create GIS point feature from Data Table

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2 Database on Natural Hazards

2.1 Type of Natural Disaster

(a) Type of Natural Disaster

- Earthquake
- Tsunami
- Volcano
- Landslide
- Flood
- Cyclone

2.2 Major Attribute

(a) Natural Hazards Location

Database Format

File Type : Personal Geodatabase (mdb)

File Name and Layer Name with Type:

Earthquake.mdb		
	Earthquake_Location	Vector (point)
	Tsunami_Location	Vector (point)
	Volcano_Location	Vector (point)
Flood.mdb		
	Flood_Location	Vector (point)
Landslide.mdb		
	Landslice_Location	Vector (point)
Cyclone.mdb		
	Cyclone_Location	Vector (point)

Arc Map Document:

Earthquake_Tsunami_Volcano_ASEAN.mxd
Earthquake_Killed_ASEAN.mxd
Earthquake_LossP_ASEAN.mxd
Flood_ASEAN.mxd
Flood_Killed_ASEAN.mxd
Flood_LossP_ASEAN.mxd
Landslide_ASEAN.mxd
Landslide_Killed_ASEAN.mxd
Landslide_LossP_ASEAN.mxd
Cyclone_ASEAN.mxd
Cyclone_killed_ASEAN_G5.mxd
Cyclone_LossP_ASEAN_G5.mxd

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Major Attribtute

Field Name	Data Type	Explanation
ID	Text	Unique code xxnnnn (xx:country code, nnnn: number)
No_	Double	Serial number
Country	Text	Name of country
Disaster_Type	Text	Disaster type
Disaster_Sub_Type	Text	Disaster sub type
Disaster_Name	Text	Name or code of the disaster
Cause	Text	Cause of the disaster
Disaster_St_Year	Long Integer	Year that the disaster started
St_Month	Long Integer	Month that the disaster started
St_Day	Long Integer	Day that the disaster started
Disaster_Ed_Year	Long Integer	Year that the disaster ended
Ed_Month	Long Integer	Month that the disaster ended
Ed_Day	Long Integer	Day that the disaster ended
Killed	Double	Number of killed people in the disaster
Affected_People	Double	Number of affected people during the disaster
Amount_Million_USD	Double	Amount of loss in million USD
GDP_PPP	Double	Amount of GDP
Amount_GDP_PPP	Double	Ratio of loss to GDP
East	Double	Longitude of disaster location
North	Double	Latitude of disaster location
Hazard_Situation	Double	Explanation showing disaster scale
Affected_km	Double	Radius of affected area (km)
Main_Cause	Text	Main cause of the disaster
Affected_Region	Text	Name of region affected by the disaster
Reference	Text	Reference material
Mag	Text	Magnitude (EQ_All, TN_All, VE_All)
Shape	Geometry	Type of geometry (point, line, polygon)

(b) Cyclone Track Line

Database Format

File Type : Personal Geodatabase (mdb)

Database and Layer Name with Type

Cyclone.mdb

RSMC_Track_Line_1993_2012_G6_7	(Vector, polyline)
RSMC_Track_Line_1993_2012_G3_5	(Vector, polyline)
RSMC_Track_Pt_1993_2012_G6_7	(Vector, point)
RSMC_Track_Pt_1993_2012_G3_5	(Vector, point)
NorthIndia_Track_Line_CS	(Vector, polyline)
NorthIndia_Track_Line_SUCS	(Vector, polyline)

Major Attribtute

Field Name	Data Type	Explanation
ID2	Long Integer	Unique International number ID
Year_ID	Short Integer	Year of occurrence of the cyclone

(c) Cyclone Track Point

Database Format

File Type : Personal Geodatabase (mdb)

Database and Layer Name with Type

Cyclone.mdb

RSMC_Track_Pt_1993_2012_G3_5	(Vector, point)
RSMC_Track_Pt_1993_2012_G6_7	(Vector, point)

Major Attribtute

Field Name	Data Type	Explanation
ID	Long Integer	Unique International number ID **(It corresponds to ID2 of RSMC_Track_Line)**
Ind	Text	Indicator '002'
Name	Text	Name of the cyclone
Time_	Text	Time of analysis (UTC: yymmddhh)
Grade	Long Integer	Grade (1: Not used, 2: Tropical Depression [TD], 3: Tropical Storm [TS], 4: Severe Tropical Storm [STS], 5: Typhoon [TY]), 6: Extra-tropical Cyclone [L], 7: Just entering into the responsible area of JMA, 8: Not used, 9: Tropical Cyclone of TS intensity or higher
Cpress	Double	Center pressure in hPa
Lat	Double	Latitude of the center in 0.1 degree
Lon	Double	Longitude of the center in 0.1 degree

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MaxWindSp	Long Integer	Maximum sustained wind speed in knot (kt)
D5	Long Integer	Direction of the longest radius of 50kt winds or greater (1: NE, 2: E, 3: SE, 4: S, 5: SW, 6: W, 7: NW, 8: N, 9: (symmetric circle)
D3	Long Integer	Direction of the longest radius of 30kt winds or greater (1: NE, 2: E, 3: SE, 4: S, 5: SW, 6: W, 7: NW, 8: N, 9: (symmetric circle)
R5L	Long Integer	The longest radius of 50kt winds or greater in nautical mile (nm)
R5S	Long Integer	The shortest radius of 50kt winds or greater in nautical mile (nm)
LF	Text	Indicator of landfall or passage
R3L	Long Integer	The longest radius of 30kt winds or greater in nautical mile (nm)
R3S	Long Integer	The shortest radius of 30kt winds or greater in nautical mile (nm)

Data Sources for Natural Disaster History

No	Source	URL
1	Emergency Disasters Database (EM-DAT)	http://www.em-dat.net/links/disasterdbs.html
2	National Geophisical Data (NOAA)	http://www.ngdc.noaa.gov/hazard/
3	Pacific Rim Coordination Centre (PRCC)	http://www.data.pacificrimnetwork.org
4	Asian Disaster Reduction Ceter (ADRC)	http://www.adrc.asia/latest_disaster.php
5	Dartmouth Flood Observatory	http://www.dartmouth.edu/~floods/index.html

Data Sources for Cyclone Best Track

No	Source	URL
1	Japan Meteorological Agency (JMA)	http://www.jma.go.jp/jma/jma-eng/jma-center/rsmc-hp-pub-eg/besttrack.html
2	Indian Meteorological Department (IMD)	http://www.imd.gov.in/

2.3 Map Images

Some sample map images on natural disaster are shown as follows.

Figure 2.1 Distribution of Earthquake Epicenter (Loss by GDP)

Figure 2.2 Distribution of Tsunami Damage (Killed)

Figure 2.3 Distribution of Volcano (Label: Year of Disaster)

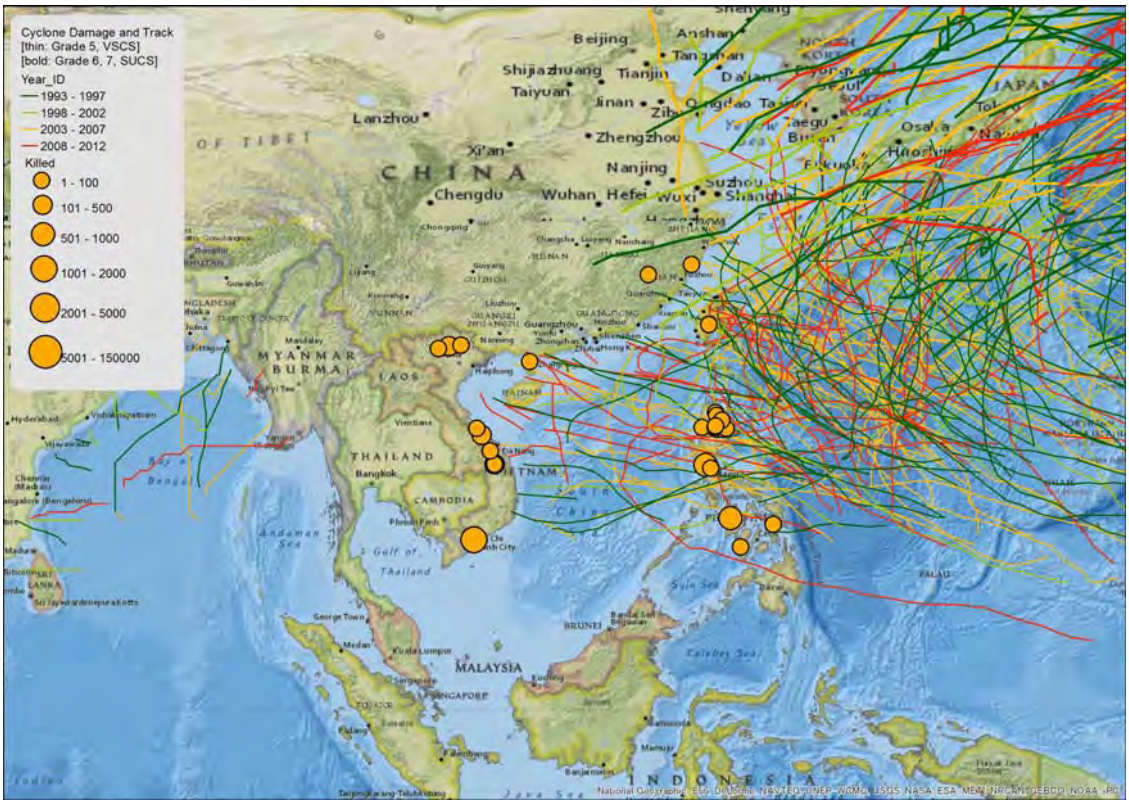

Figure 2.4 Cyclone Disaster (Killed and best track)

Figure 2.5 Distribution of Landslide Disaster

Figure 2.6 Distribution of Flood Disaster

3 Database on Infrastructures, Social Condition and Economics

3.1 Type of Infrastructure, Social Condition and Economics

(a) Infrastructure

- Road
- Railway
- International Airport
- Port
- Dam
- Power Station

(b) Social Economics

- Logistics Performance Index (LPI)
- Import/Export by Container
- GDP
- Road (Paved/Unpaved)
- City Population
- Monthly Basic Pay
- Industrial Parks

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3.2 Major Attribute

(a) Road, Railway

Source: DIVA-GIS (Road & Railway: Digital Chart of the World,1992)

URL: http://www.diva-gis.org/gdata

File Type: Personal Geodatabase (mdb)

File Name: Infrastructure.mdb

Layer Name with Type:

Road_main_**	(Vector, polyline)	: Major Road (Primary and Secondary)
Railway_ope_**	(Vector, polyline)	: Railway in operational

(**: Country Code)

Country Code: PH (Philippines), ID (Indonesia), SG (Singapore), MM (Myanmar), LA (Lao PDR), KH (Cambodia), BR (Brunei), MY (Malaysia), TH (Thailand), VN (Viet Nam)

Major Attribute

Field Name	Data Type	Explanation
MED_DESCRI	Text	Median of the road (Without Median, Unknown)
RTT_DESCRI	Text	Type of Road (Primary / Secondary)
F_CODE_DES	Text	Type of Infra (Railway / Railroad)
EXS_DESCRI	Text	Type of Operation (Operational)

(b) International Airport

Source: Wikipedia: List of international airports by country

URL: http://en.wikipedia.org/wiki/List_of_international_airports_by_country

File Type: Personal Geodatabase (mdb)

File Name: Infrastructure.mdb

Layer Name with Type: Airport_Location_ASEAN (Vector, point)

Arc Map Document: Airport_ASEAN.mxd

Major Attribute

Field Name	Data Type	Explanation
Airport_Name	Text	Name of the Airport
Type_	Text	Type of the Airport (Public / Military)
Operator	Text	Name of Operator
Runways_m	Double	Length of Runway in meter
Passenger	Double	Number of annual passeger
Airfreight_t	Double	Amount of Air freight in ton
Cargo_Traffic	Double	Amount of cargo traffic in ton

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(c) Port

Source: World Port Source

URL: http://www.worldportsource.com/

File Type: Personal Geodatabase (mdb)

File Name: Social_Economics.mdb

Layer Name with Type: Port_Location_ASEAN (Vector, point)

Link Table: Port_Detailed_ASEAN

Arc Map Document: Port_DetailedData_ASEAN.mxd

Major Attribute

Field Name	Data Type	Explanation
Administration	Text	Name of Administration
Channel_Depth_m	Double	Depth of Channel in meter
Berths_Length_m	Double	Length of Berths in meter
Total_Container	Double	Capacity of Total Container in m2
Storage_Area_m2	Double	Storage Area of the Port in m2

(d) Port Container (Thematic Map)

Source: IHS Global Insight, World Trade Service

File Type: Personal Geodatabase (mdb)

File Name with Type: Social_Economics.mdb (Vector, point)

Link Table: Port_Cargo_Container

Arc Map Document: Port_Cargo_ASEAN.mxd

Major Attribute

Field Name	Data Type	Explanation
Port_Name	Text	Name of the Port
Cargo_Ton	Double	Amount of Cargo in ton
Container_TEU	Double	Amount of Container in TEU

(e) Dam

Source: Wikipedia: List of dams and reservoirs

URL: http://en.wikipedia.org/wiki/List_of_dams_and_reservoirs

File Type: Personal Geodatabase (mdb)

File Name: Infrastructure.mdb

Layer Name with Type: Dam_Location_ASEAN (Vector, point)

Link Table: DAM_ASEAN

Arc Map Document: DAM_ASEAN.mxd

Major Attribute

Field Name	Data Type	Explanation
Official_Name	Text	Name of the Dam
Type of Dam	Text	Type of Dam
Capacity_m3	Double	Capacity of the Dam in m3
Active_Capacity	Double	Active Capacity of the Dam in m3

(f) Power Station

Source: Wikipedia: List of power stations by country

Enipedia: Country / power plants

URL: http://en.wikipedia.org/wiki/Category:Lists_of_power_stations_by_country

http://enipedia.tudelft.nl/wiki/Main_Page

File Type: Personal Geodatabase (mdb)

File Name: Infrastructure.mdb

Layer Name with Type: Power_Station_Location_ASEAN (Vector, point)

Arc Map Document: PowerStation_ASEAN.mxd

Major Attribute

Field Name	Data Type	Explanation
Installed_Capacity_MW	Double	Capacity of the power station
Official_Name	Text	Name of the power station
Operator	Text	Name of operator of the power station
Annual_Generation_GWh	Text	Amount of annual generation in GWh
Type	Text	Type of power station

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(g) LPI (Logistics Performance Index) Values in 2012 for Countries

File Type: Personal Geodatabase (mdb)

File Name: Social_Economics.mdb

Link Table: Country_LPI

Layer Name with Type: ASEAN_adm0_Dissolve (country boundary in BaseMap) (Vector, polygon)

Arc Map Document: Country_LPI_ASEAN.mxd

Major Attribute

Field Name	Data Type	Explanation
Rank	Double	Rank of LPI in the world
LPI	Double	Value of LPI in 2012
Customs	Double	Index of Efficiency of Customs formality
Infrastructure	Double	Index of Infrastructure with Physical Distribution
International_Shipment	Double	Index of Ease of Transportation Reservation
LogisticsCompetence	Double	Index of Quality of Transportation services
Tracing_Tracking	Double	Index of Management of Cargo Track
Timeliness	Double	Index of delivery in time

(Report 1 Table 13.4.3)

(h) Import / Export by Container for Countries

File Type: Personal Geodatabase (mdb)

File Name: Social_Economics.mdb

Link Table: Container_Import_Export

Layer Name with Type: ASEAN_adm0_Dissolve (country boundary in BaseMap) (Vector, polygon)

Arc Map Document: Country_Import_Export_Container_ASEAN.mxd

Major Attribute

Field Name	Data Type	Explanation
Export_2009	Float	Amount of Export Container in 2009
Export_2010	Float	Amount of Export Container in 2010
Import_2009	Float	Amount of Import Container in 2009
Import_2010	Float	Amount of Import Container in 2010
Total_2009	Float	Amount of Import & Export Container in 2009
Total_2010	Float	Amount of Import & Export Container in 2010

(Report 1 Table 13.5.10, 11)

(i) GDP per capita, Population, Monthly Basic Pay for Mega Cities

File Type: Personal Geodatabase (mdb)

File Name: Social_Economics.mdb

Layer Name with Type: City_Location_ASEAN (Vector, point)

Link Table: City_GDP_Per_Capita

Arc Map Document: City_GDP_ASEAN.mxd, City_Population_ASEAN.mxd, City_MonthlyPay_ASEAN.mxd

Major Attribute

Field Name	Data Type	Explanation
City_Name	Text	Name of the Capital City
Population_City	Double	Population of City
GDP_Per_Capita_City	Double	Amount of GDP Per Capita in the City
Monthly_BasicPayUSD_City	Float	Montly basic Pay (USD) in the City
Name_Country	Text	Name of the Country
Population_Country	Double	Population of the Country
GDP_Mil_USD	Double	Amount of GDP of the Country
GDP_Per_Capita_Country	Double	Amount of GDP Per Capita in the Country

(Report 1 Table 13.4.7)

(j) Road Length (km) Paved / Unpaved for Countries

File Type: Personal Geodatabase (mdb)

File Name: Social_Economics.mdb

Link Table: Country_Road

Layer Name: ASEAN_adm0_Dissolve (country boundary in BaseMap)

Arc Map Document: Country_Road_ASEAN.mxd

Major Attribute

Field Name	Data Type	Explanation
Road_km_Paved	Long	Length of General Road paved (km)
Road_km_Unpaved	Long	Length of General Road unpaved (km)
Road_km_Total	Long	Length of General Road total (km)
Highway_Primary	Long	Length of Primary Highway (km)
Highway_Total	Long	Length of Total Highway (km)

(Report 1 Table 13.5.2)

(k) Industrial Aggregated Area (Industrial Park)

Total Data is 1337 records, in which 862 records has information of latitude and longitude.

File Type: Personal Geodatabase (mdb)

File Name: Social_Economics.mdb

Layer Name with Type: Industrial_Park_Location_ASEAN (Vector, point)

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Arc Map Document: Industrial_Park_ASEAN.mxd

Major Attribute

Field Name	Data Type	Explanation
ID	Text	Code for each Industrial Park
COUNTRY	Text	Name of Country
PARK_Name	Text	Name of Industrial Park
PROVINCE	Text	Name of Province at the Industrial Park
Address	Text	Address of Industrial Park
Latitude	Double	Latitude of the Location of Industrial Park
Longitude	Double	Longitude of the Location of Industrial Park
Short_List	Text	Code for Short List of the Industrial Park
Long_List	Text	Code for Long List of the Industrial Park

* List of Second sources is shown in the next page.

Data Sources for Infrastructure, Social Condition and Economics

No	Source	URL
1	(a) Road, Railway DIVA-GIS (Road & Railway: Digital Chart of the World,1992)	http://www.diva-gis.org/gdata
2	(b) International Airport Wikipedia: List of international airports by country	http://en.wikipedia.org/wiki/List_of_international_airports_by_country
3	(c) Port World Port Source	http://www.worldportsource.com/
4	(d) Port Container IHS Global Insight, World Trade Service	http://www.ihs.com/ja/jp/products/global-insight/index.aspx
5	(e) Dam Wikipedia: List of dams and reservoirs	http://en.wikipedia.org/wiki/List_of_dams_and_reservoirs
6	(f) Power Station Wikipedia: List of power stations by country Enipedia: Country / power plants	http://en.wikipedia.org/wiki/Category:Lists_of_power_stations_by_country http://enipedia.tudelft.nl/wiki/Main_Page
7	(g) LPI values in 2012 World Bank	http://documents.worldbank.org/curated/en/2012/01/16461597/connecting-compete-2012-trade-logistics-global-economy
8	(h) Import / Export by container IHS Global Insight, World Trade Service	http://www.ihs.com/ja/jp/products/global-insight/index.aspx
9	(i) GDP per capita for Country World Bank 2011	http://data.worldbank.org/indicator/NY.GDP.MKTP.CD
10	(i) GDP per capita for Mega Cities Mizuho Short Industry Focus (Japanese)	See Reference folder. Mizuho_Short_Industry_Focus_Jp_2012Oct.pdf
11	(i) Country Population Statistical Yearbook for Asia and the Pacific, ESCAP	http://www.unescap.org/stat/data/statdb/DataExplorer.aspx
12	(i) Mega City Population Nikkei News Paper 2013.02.19 (Japanese) Demographia World Urban Areas	See Reference folder. Nikkei_NewsPaper_Jp_2013Feb19.pdf http://demographia.com/db-worldua.pdf
13	(i) Monthly Basic Pay for Mega Cities JETRO 2011	http://www.jetro.go.jp/jfile/report/07000952/62958cc730b330b930c88abf67fb-20115e745ea6-rev.121012.pdf
14	(j) Road Length Paved / Unpaved for Countries The World Fact book by CIA (2012)	https://www.cia.gov/library/publications/the-world-factbook/

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Data Sources for Industrial Park

No	Country	Organization	URL
1	Brunei	Brunei Industrial Development Authority	http://www.bina.gov.bn/pdf/Industrial%20Site%20update%2022-May%202012.pdf
		Brunei Economic Development Board	http://www.bedb.com.bn/keyindustrialsites.html
2	Cambodia	The Council for the Development of Cambodia	http://webcache.googleusercontent.com/search?q=cache:aLLvSVxPHFUJ:www.cambodiainvestment.gov.kh/list-of-sez.html&hl=ja&gl=jp&strip=1
3	Indonesia	The Investment Coordinating Board of Indonesia	http://www6.bkpm.go.id/contents/general/117110/industrial-zones
4	Laos	Lao National Committee for Special Economic Zone	http://www.sncsez.gov.la/index.php/en/#lvsez
5	Malaysia	Economic Planning Unit	http://www.epu.gov.my/en/study-on-industrial-estates-development-in-malaysia
		Penang Development Corporation	http://www.pdc.gov.my/index.php/English/2013-02-20-03-20-51/2013-02-20-03-22-21/industrial-development/mm-industrial-land
		East Coast Economic Region	http://www.ecerdc.com.my/ecerdc/downloads/DUEEAST2010.pdf
6	Myanmar	Union of Myanmar Federation of Chambers of Commerce and Industry	contacted directly
7	Philippines	Philippine Economic Zone Authority	http://www.peza.gov.ph/index.php?option=com_content&view=article&id=116&Itemid=161
8	Singapore	HDB	http://www.hbiz.gov.sg/web/aa17/corporate/properties/developmentGallery.en.html
		JTC	http://www.jtc.gov.sg/Pages/default.aspx
9	Thailand	Thailand Board of Investment	http://www.boi.go.th/index.php?page=where_to_invest&view_id=00011&_forwardurl=http%3A%2F%2Fwww.boi.go.th%2Findex.php%3Fpage%3Dwhere_to_invest2%26view_id%3D14&_random=0.9066509939730167
10	Vietnam	Indochina International Consulting Co. Ltd.	http://viipip.com/homeen/?module=research&searchcompro=&search_ip=&txtsearchflfrom=&txtsearchflto=&txtsearchareafrom=&txtsearchareato=&txtsearchfsfrom=&txtsearchfsto=&txtsearchareasfrom=&txtsearchareasto=&comsearchcareer=&comsearchcareertype=&comtrantype=&txtmingaip=&incom=&txtsnameip=Khanh+Phu&comorder=7&comtype=2
11	ASEAN	ASEAN-Japan Centre	http://www.asean.or.jp/ja/asean/know/country/***/invest/industrialestate/ (***: brunei, cambodia, indonesia, laos, malaysia, myanmar, philippines, singapore, thailand, vietnam)

3.3 Map Images

(a) Infrastructure

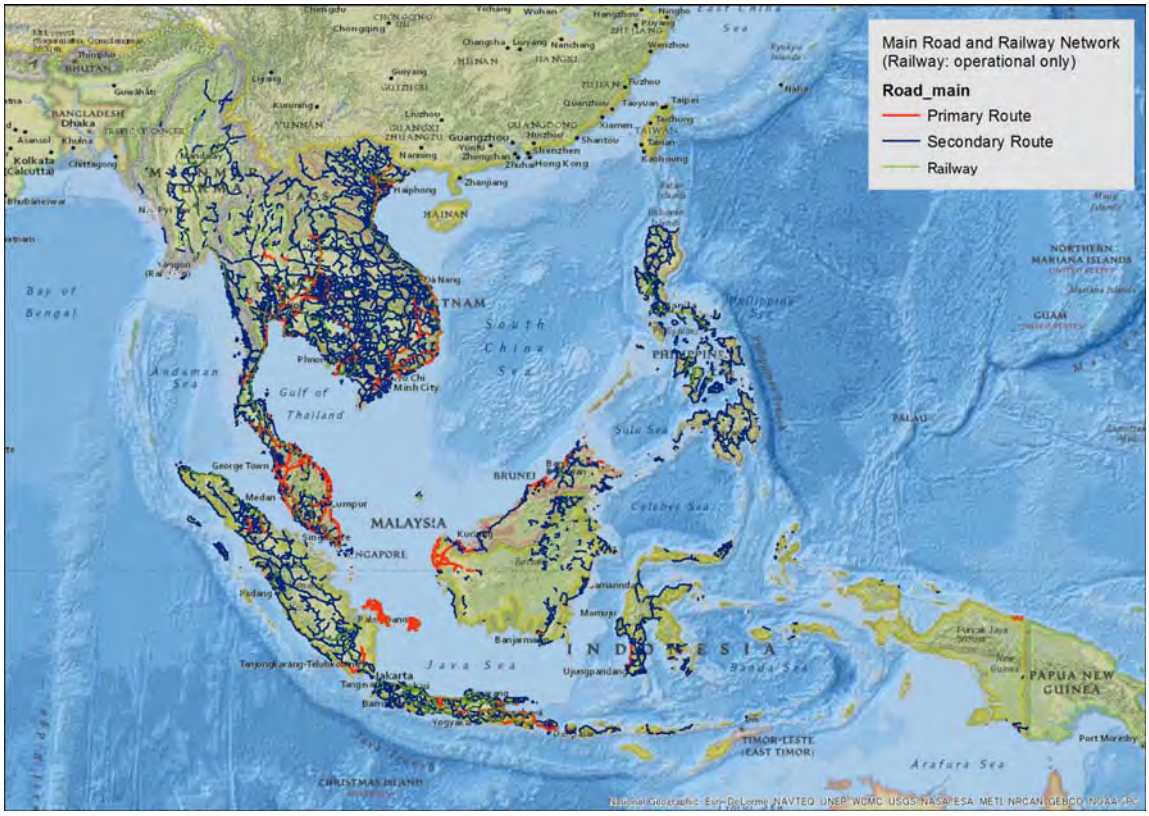

Figure 3.1 Road, Railway

Figure 3.2 International Airport

Figure 3.3 Distribution of Port

Figure 3.4 Amount of Cargo (ton) for Ports

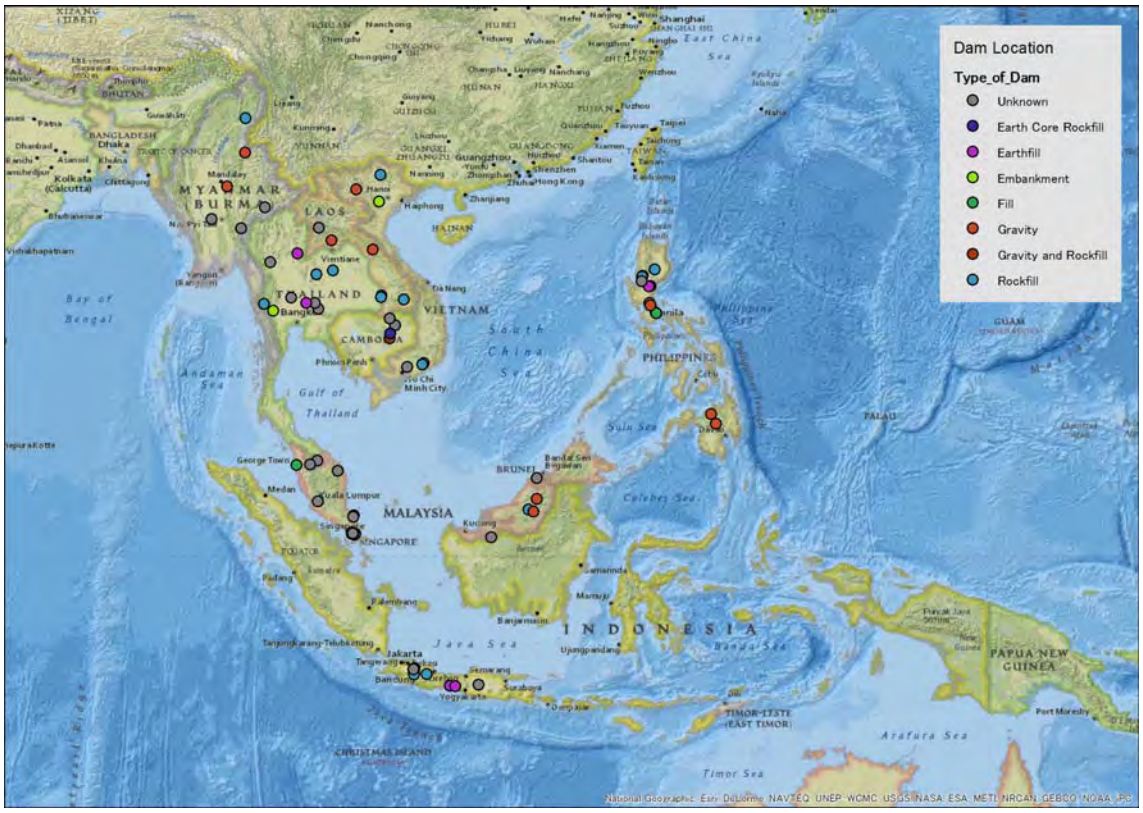

Figure 3.5 Distribution of Dam

Figure 3.6 Distribution of Power Station

(b) Social Economics

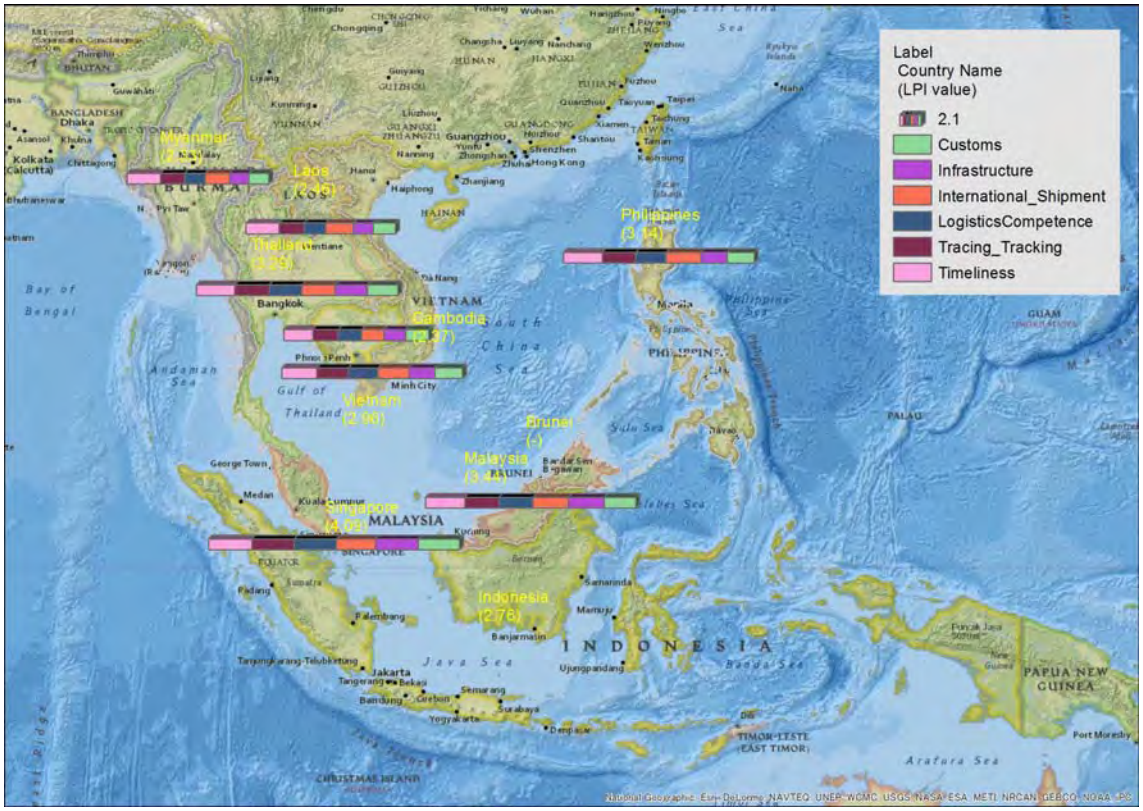

Figure 3.7 Logistics Performance Index (for countries)

Figure 3.8 Import / Export by Container (for countries)

(a) GDP per Capita

(b) Population

(c) Monthly Basic Pay

Figure 3.9 Information for Mega Cities

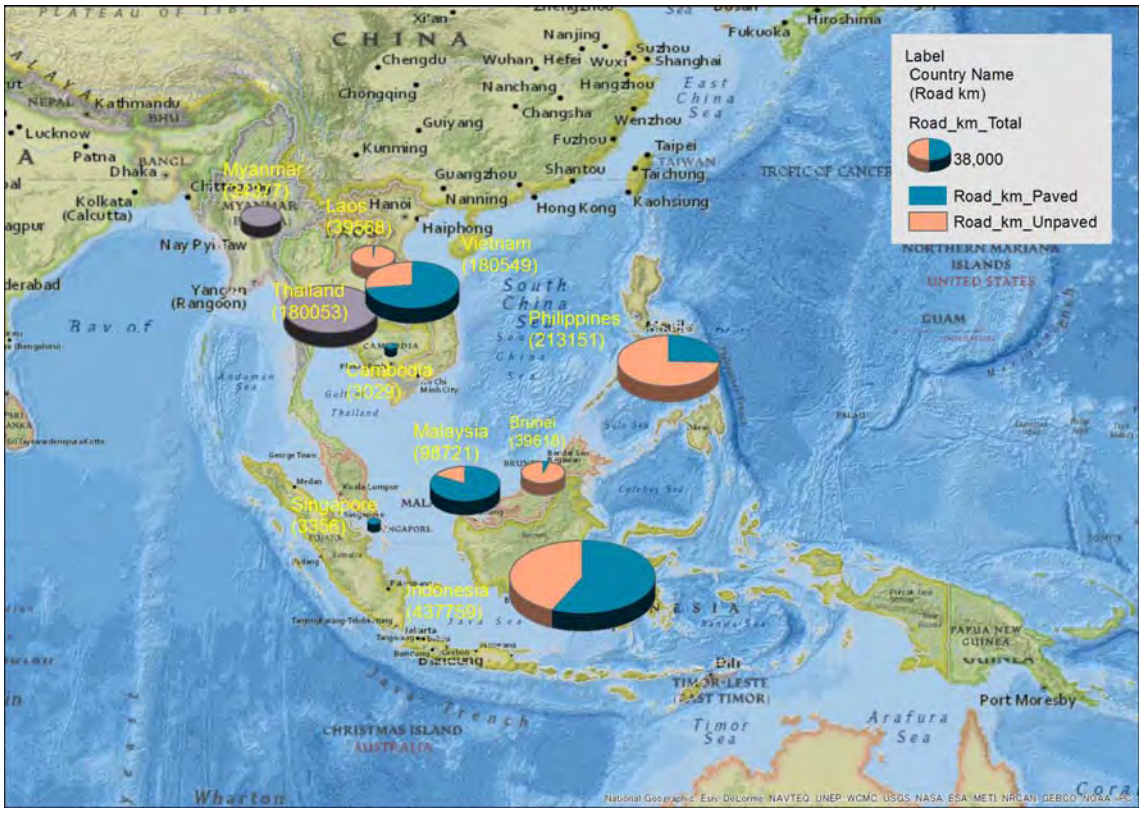

Figure 3.10 Road Length (km) in Paved / Unpaved (for countries)

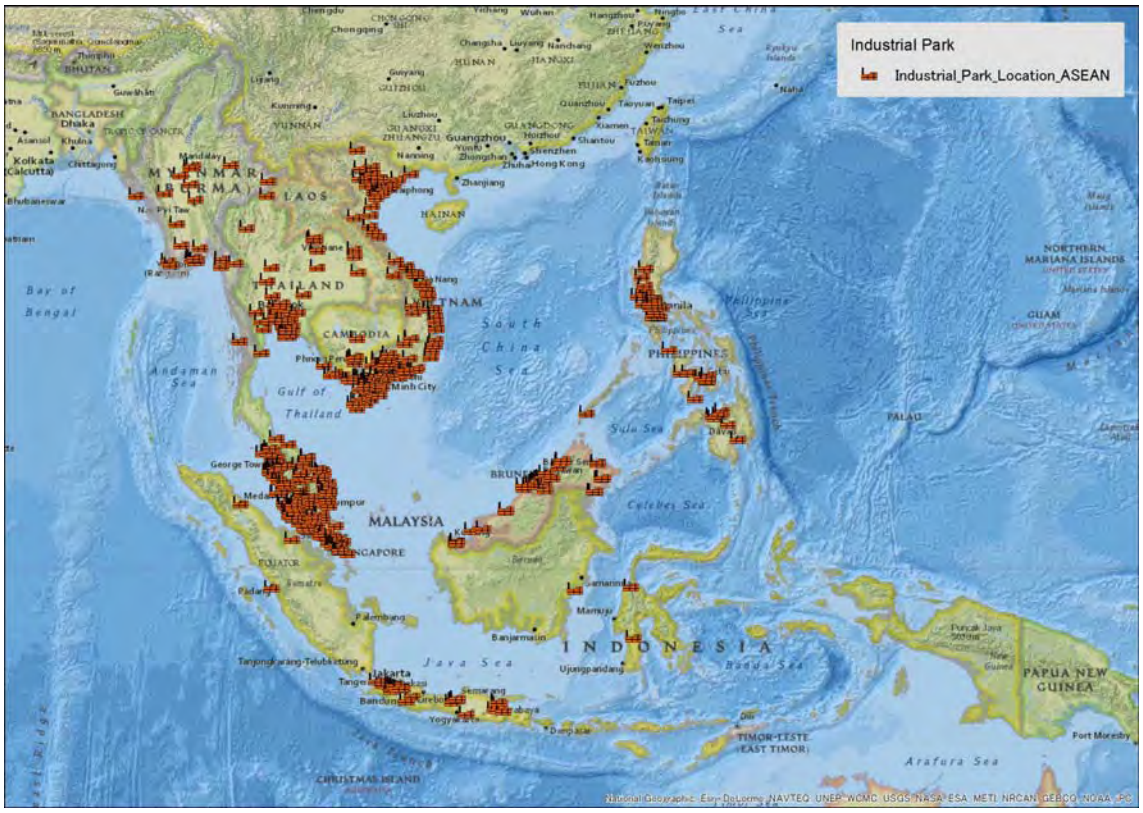

Figure 3.11 Distribution of Industrial Park

4 Base Map

4.1 Type of Base Map

- Administrative Boundary,
- Water body
- ESRI National Geographic World Map

4.2 Major Attribute

(a) Administrative boundary

File Type: Personal Geodatabase (mdb)

File Name: Administrative_area.mdb

Layer Name with Type:

***_adm*x* : Administrative boundary (*x*: 1 [primary] to 4[quaternary])
(***: Country Code) (Vector, polygon)

Country Code: PHL (Philippines), IDN (Indonesia), SGP (Singapore), MMR (Myanmar), LAO (Lao PDR), KHM (Cambodia), BRN (Brunei), MYS (Malaysia), THA (Thailand), VNM (Viet Nam)

Arc Map Document: Road_Railway_ASEAN.mxd, BaseMap.mxd

Major Attribute

Field Name	Data Type	Explanation
ISO	Text	Code of the Country with 3 characters
NAME_0	Text	Name of the Country
NAME_1	Text	Name of the primary administration (Province)
NAME_2	Text	Name of the secondary administration (District)
NAME_3	Text	Name of the tertiary administration (Village)

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(b) Water body

File Type: Personal Geodatabase (mdb)

File Name: Water_body.mdb

Layer Name with Type:

***_Water_Areas	: Water body data by polygons	(Vector, polygon)
***_Water_Lines	: Water body data by polylines	(Vector, polyline)
	(***: Country Code)	

Arc Map Document: Water_body_ASEAN.mxd

Country Code: PHL (Philippines), IDN (Indonesia), SGP (Singapore), MMR (Myanmar), LAO (Lao PDR), KHM (Cambodia), BRN (Brunei), MYS (Malaysia), THA (Thailand), VNM (Viet Nam)

Major Attribute

Field Name	Data Type	Explanation
ISO	Text	Code of the Country with 3 characters
COUNTRY	Text	Name of the Country
F_CODE_DES	Text	Inland Water / Land Subject to Inundation
HYC_DESCRI	Text	Permanent / Intermittent / Fluctuating
NAME	Text	Name of Water body

(c) ESRI National Geographic World Map

Source: National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, iPC

URL: http://goto.arcgisonline.com/maps/NatGeo_World_Map.html

File Type: ArcGIS Online Layer

Explanation: This map is designed to be used as a general reference map for informational and educational purposes as well as a base map by GIS professionals and other users for creating web maps and web mapping applications. The map was developed by National Geographic and Esri and reflects the distinctive National Geographic cartographic style in a multi-scale reference map of the world. The map was authored using data from a variety of leading data providers, including DeLorme, NAVTEQ, UNEP-WCMC, NASA, ESA, USGS, and others. This reference map includes administrative boundaries, cities, protected areas, highways, roads, railways, water features, buildings and landmarks, overlaid on shaded relief and land cover imagery for added context. The map currently includes global coverage down to ~1:144k scale and more detailed coverage for North America down to ~1:9k scale.

Data Sources for Base Map Layers

No	Source	URL
1	(a) Administrative boundary DIVA-GIS (Administrative areas,GADM, 2012)	http://www.diva-gis.org/gdata
2	(b) Water body DIVA-GIS (Digital Chart of the World, 1992)	http://www.diva-gis.org/gdata

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4.3 Map Images

Figure 4.1 Administrative boundary

Figure 4.2 Water body (ASEAN)

Figure 4.3 Water body (Cambodia)

Figure 4.4 National Geographic World Map

5 Hyper Link to summary sheet of Natural Disaster Study

5.1 Type of Natural Disaster and How to use Hyper Link

There're six point features (GIS layers) with location of study report on natural disaster as follows,

Type of Disaster	Name of Layer
✧ Earthquake	Earthquake_Study_Location
✧ Tsunami	Tsunami_Study_Location
✧ Volcano	Volcano_Study_Location
✧ Flood	Flood_Study_Location
✧ Cyclone	Cyclone_Study_Location
✧ Landslide	Landslide_Study_Location

- These point features have links to PDF summary sheets, which are stored in the following folder,
  (Folder location) ¥Component 1¥PDF_NaturalDisaster_Study

An Example of How to Use the Hyper Link tool in ArcMap

1. Execute (Double click) ***_Study_****.mxd. (*** is disaster type, **** is area name.)
2. After Arc Map is opened, click the Hyper Link button ( ). After that you will find the pointer is changed to Hyper Link pointer.
3. You can click study point features with Natural Disaster Symbol ( ).

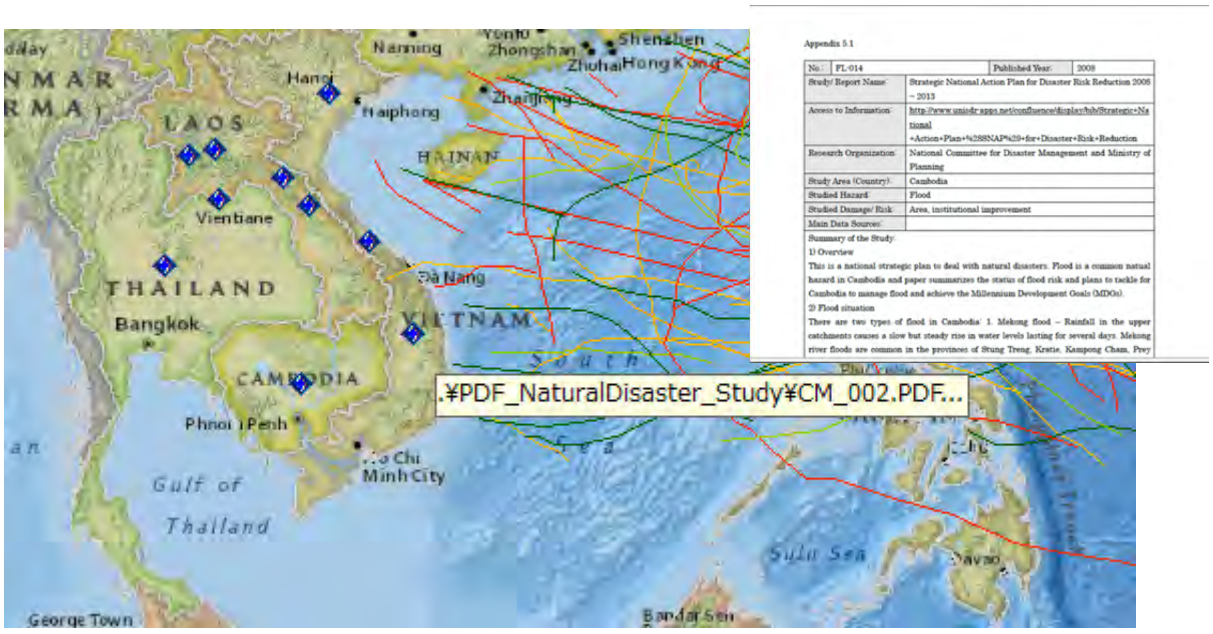

Figure 5.1 Sample Image on How to Open Summary Study PDF on the Maps

Remarks: Some study locations are for nationwide or ASEAN wide area. In such cases, the locations were detected in the center of the large areas or outside of the countries.

5.2 Major Attributes

(a) Map Document

1. ASEAN scale

- Earthquake_Study_ASEAN.mxd (including Tsunami and Volcano)
- Flood_Study_ASEAN.mxd
- Cyclone_Study_ASEAN.mxd
- Landslide_Study_ASEAN.mxd
- Existing_Study_ASEAN.mxd

2. Country scale

- Existing_Study_BN.mxd (for Brunei)
- Existing_Study_ID.mxd (for Indonesia)
- Existing_Study_MY.mxd (for Malaysia)
- Existing_Study_SG.mxd (for Singapore)
- Existing_Study_TH.mxd (for Thailand)
- Existing_Study_MM.mxd (for Myanmar)
- Existing_Study_KH.mxd (for Cambodia)
- Existing_Study_LA.mxd (for Lao PDR)
- Existing_Study_VN.mxd (for Vietnam)
- Existing_Study_PH.mxd (for Philippines)

(b) Major Attribute

Field Name	Data Type	Explanation
No_	Double	Serial number
Country	Text	Name of country
Province_City	Text	Name of province or city
Lati	Double	Latitude of disaster location
Longi	Double	Longitude of disaster location
Scenario	Text	on Disaster Scenario (○inclusive / ×not)
Probabilistic	Text	on Probabilistic Estimation (○inclusive / ×not)
Methodology	Text	on Methodology Description (○inclusive / ×not)
Risk_Area	Text	on Risk Assessment by Area (○inclusive / ×not)
Risk_Population / Huma_Loss	Text	on Human Loss Assessment (○inclusive / ×not)
Economic_Loss	Text	on Economic Loss Assessment (○inclusive / ×not)
Vulnerability_Assessment	Text	on Vulnerability Assessment (○inclusive / ×not)
Organization_Produced	Text	Name of Organization that produced data source
Document_No_in_A5	Text	No in Appendix A5.x in the Report 1
PDF_path	Text	Path for each study summary sheet in PDF
WideArea_Flag	Short	Flag for Nationwide study (1: yes, blank: no)

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5.3 Map Images

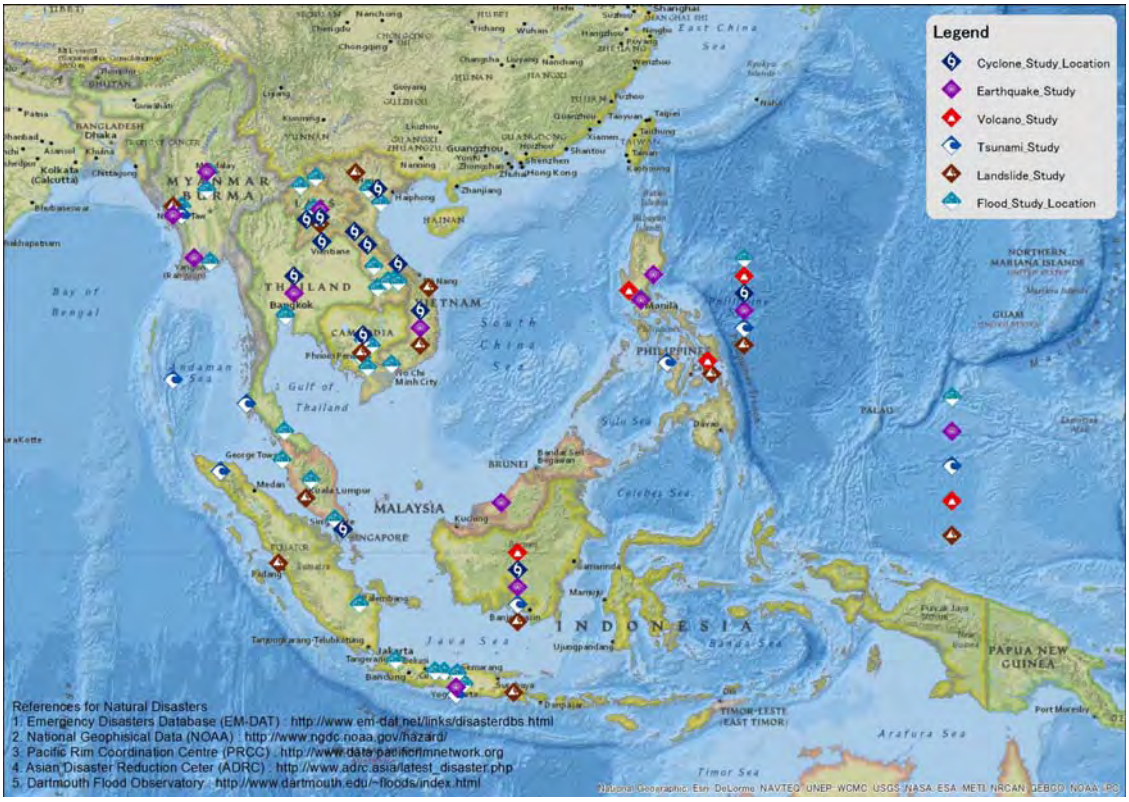

Figure 5.2 Distribution of Existing Natural Disaster Study in ASEAN

Figure 5.3 Distribution of Existing Natural Disaster Study in Malaysia

6 Existing GIS Hazard Maps for ASEAN

This data is stored in the folder "Existing Hazard Maps" which is parallel to Component 1.

6.1 Type of Hazard Maps

Two folders are created, GRDP and GSHAP to store data respectively.

(a) Global Risk Data Platform (GRDP)

Source: http://preview.grid.unep.ch/

Type of Natural Disaster

- Earthquake
- Tsunami
- Landslide
- Flood
- Cyclone

Database Format

File Type: Personal Geodatabase (mdb)

Layer Type: Raster Data Set, Cell size (0.0083333333, 0.0083333333)

File Name and Layer Name:

EQ.mdb (Earthquake)
- Sm5_freq_ASEAN
- Sm7_freq_ASEAN
- Sm8_freq_ASEAN
- Sm9_freq_ASEAN

TS.mdb (Tsunami)
- Ts_frequency_ASEAN

FL.mdb (Flood)
- Fl_frequency_ASEAN

LS.mdb (Landslide)
- Ls_freq_eq_ASEAN
- Ls_freq_pr_ASEAN

CY.mdb (Cyclone)
- Cs_frequency_ASEAN
- Cw_0_freq_ASEAN
- Cw_1_freq_ASEAN
- Cw_2_freq_ASEAN
- Cw_3_freq_ASEAN
- Cw_4_freq_ASEAN
- Cw_5_freq_ASEAN

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Arc Map Document:

GRDP_Cyclone_surge_frequency_ASEAN.mxd

GRDP_Cyclone_wind_frequency_ASEAN.mxd

GRDP_Earthquake_frequency_ASEAN.mxd

GRDP_Flood_frequency_ASEAN.mxd

GRDP_Landslide_Eq_frequency_ASEAN.mxd

GRDP_Landslide_Pr_frequency_ASEAN.mxd

GRDP_Tsunami_frequency_ASEAN.mxd

(b) Global Seismic Hazard Assessment Program (GSHAP)

Source: http://www.seismo.ethz.ch/static/gshap/swpacific/

Type of Natural Disaster

- Earthquake

Database Format

This data is originally Text file. The text file is converted into GIS raster in this project.

File Type: Personal Geodatabase (mdb)

Layer Type: Raster Data Set, Cell size (0.1, 0.1)

File Name and Layer Name:

GSHAP.mdb

GSHAP_Asean

Arc Map Document: GSHAP_ASEAN.mxd

6.2 Data Explanation

(a) Global Risk Data Platform (GRDP)

Earthquake Frequency

This dataset includes an estimate of earthquake frequency of MMI four categories over the period 1973-2007.

1) Sm5_fr: MMI 5 and 6
2) Sm7_fr: MMI 7
3) Sm8_fr: MMI 8
4) Sm9_fr: MMI higher than 9

It is based on Modified Mercalli Intensity map available in the Shake map Atlas from USGS. Unit is expected average number of events per 1000 years. This product was compiled by UNEP / GRID-Europe for the Global Assessment Report on Risk Reduction (GAR). It was modeled using global data.

Tsunami Frequency

This dataset includes an estimate of tsunami frequency. It is based on two sources:

1) A comprehensive list of reports and scientific papers compiled and utilized in producing tsunami hazard maps as well as finding return periods of future events.
2) Applying numerical tsunami models and zooming on selected areas.

Unit is expected affected percentage of each pixel over a minimum return period of 500 years. This product was designed by International Centre for Geohazards / NGI for the Global Assessment Report on Risk Reduction (GAR). It was modeled using global data.
Global Risk Data Platform

Flood Frequency

This dataset includes an estimate of flood frequency. It is based on three sources:

1) A GIS modeling using a statistical estimation of peak-flow magnitude and a hydrological model using Hydro SHEDS dataset and the Manning equation to estimate river stage for the calculated discharge value.
2) Observed flood from 1999 to 2007, obtained from the Dartmouth Flood Observatory (DFO).
3) The frequency was set using the frequency from UNEP/GRID-Europe PREVIEW flood dataset. In area where no information was available, it was set to 50 years returning period.

Unit is expected average number of event per 100 years. This product was designed by UNEP / GRID - Europe for the Global Assessment Report on Risk Reduction (GAR). It was modeled using global data.

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Landslide Frequency

1) LS_Eq (triggered by Earthquake)

This dataset includes an estimate of the annual frequency of landslide triggered by earthquakes. It depends on the combination of trigger and susceptibility defined by six parameters: slope factor, lithological (or geological) conditions, soil moisture condition, vegetation cover, precipitation and seismic conditions. Unit is expected annual probability and percentage of pixel of occurrence of a potentially destructive landslide event x 1000000.

This product was designed by International Centre for Geohazards /NGI for the Global Assessment Report on Risk Reduction (GAR). It was modeled using global data.

2) LS_Pr (triggered by Precification)

This dataset includes an estimate of the annual frequency of landslide triggered by precipitations. It depends on the combination of trigger and susceptibility defined by six parameters: slope factor, lithological (or geological) conditions, soil moisture condition, vegetation cover, precipitation and seismic conditions. Unit is expected annual probability and percentage of pixel of occurrence of a potentially destructive landslide event x 1000000.

This product was designed by International Centre for Geohazards /NGI for the Global Assessment Report on Risk Reduction (GAR). It was modeled using global data.

Cyclones Frequency

1) Cyclone Surges

This dataset includes an estimate of surges triggered by tropical cyclone frequency of Saffir-Simpson category 1. It is based on three sources:

1) A compilation of best tracks dataset from WMO Regional Specialised Meteorological Centres (RSMCs) and Tropical Cyclone Warning Centres (TCWCs). As well as personal communication with Dr. Varigonda Subrahmanyam, Dr. James Weyman, Kiichi Sasaki, Philippe CAROFF, Jim Davidson, Simon Mc Gree, Steve Ready, Peter Kreft, Henrike Brecht.
2) A GIS modeling based on an initial equation from Greg Holland, which was further modified to take into consideration the movement of the cyclones through time.
3) A Digital Elevation Model (SRTM).

Unit is expected average number of event per 1000 years.

This product was designed by UNEP/GRID-Europe for the Global Assessment Report on Risk Reduction (GAR). It was modeled using global data.

The values are annual frequencies (average 30 years) multiplied by 100 (Nb of pixel 90 m for km) and 1000 (to keep the decimal digits). To obtain the real values of frequency will thus be necessary to divide by 100,000.

2) Cyclone Winds

This dataset includes an estimate of tropical cyclone frequency of Saffir-Simpson category 5.

- categories 0 (tropical storm)
- categories I
- categories II
- categories III
- categories IV
- categories V

It is based on two sources:

1) IBTrACS v02r01 (1969 - 2008, http://www.ncdc.noaa.gov/oa/ibtracs/), year 2009 completed by online data from JMA, JTWC, UNISYS, Meteo France and data sent by Alan Sharp from the Australian Bureau of Meteorology.
2) A GIS modeling based on an initial equation from Greg Holland, which was further modified to take into consideration the movement of the cyclones through time.

Unit is expected average number of event per 100 years multiplied by 100.

This product was designed by UNEP/GRID-Europe for the Global Assessment Report on Risk Reduction (GAR). It was modeled using global data.

(b) Global Seismic Hazard Assessment Program (GSHAP)

The Global Seismic Hazard Assessment Program (GSHAP) was launched in 1992 by the International Lithosphere Program (ILP) with the support of the International Council of Scientific Unions (ICSU), and endorsed as a demonstration program in the framework of the United Nations International Decade for Natural Disaster Reduction (UN/IDNDR). The GSHAP project has terminated in 1999.

This data is originally Text file. The text file is converted into GIS raster in this project.

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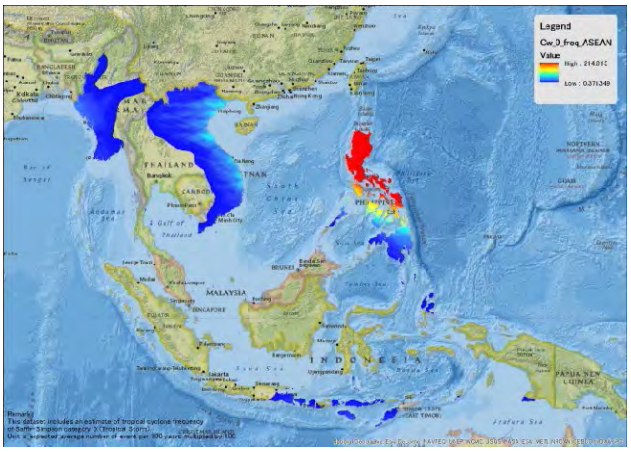
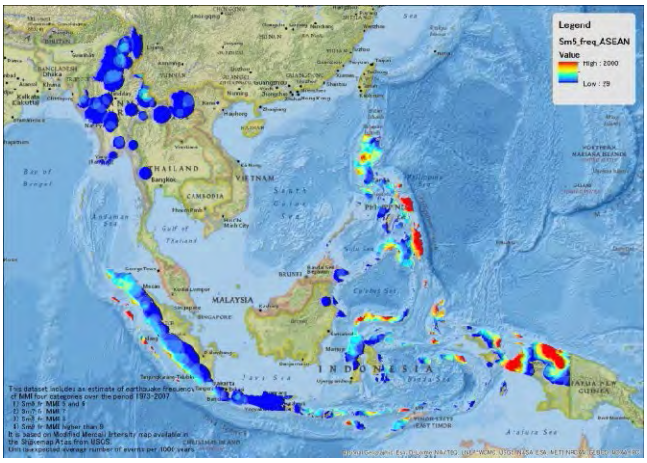
6.3 Map Images

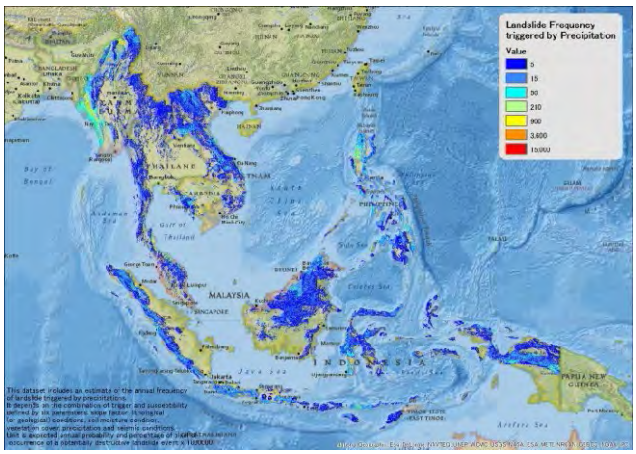


1) GRDP (Cyclone Wind)

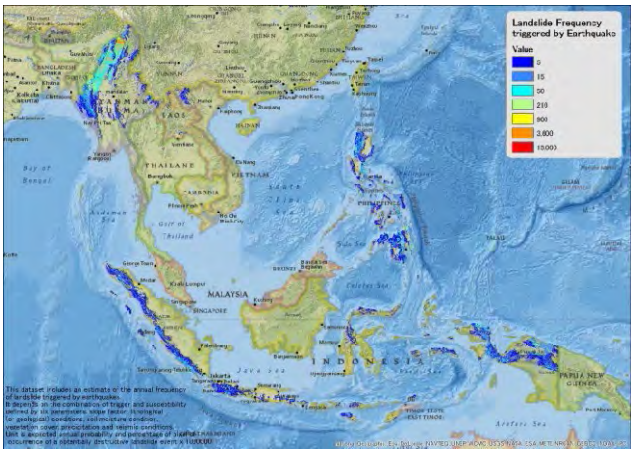


2) GRDP (Earthquake Sm5)

3) GRDP (Flood)



4) GRDP (Landslide triggered by precipitation)



5) GRDP (Landslide triggered by earthquake)

6) GRDP (Tsunami)

Figure 6.1 Examples of GRDP GIS Data

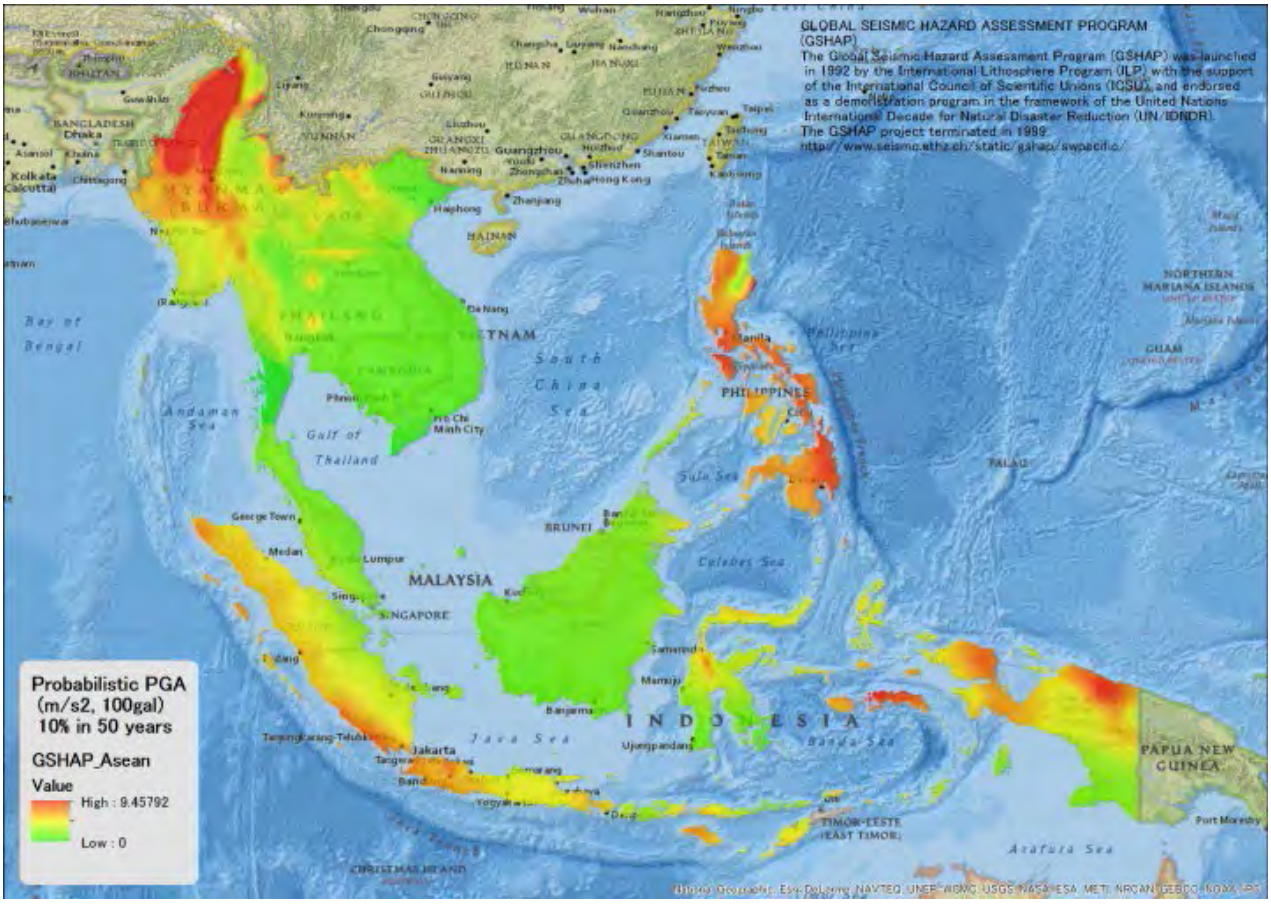


Figure 6.2 GSHAP GIS Data

JICA – AHA Centre Joint Project on Areal BCP

Data Collection Survey on Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region

GUIDEBOOK ON GIS DATABASE FOR COMPONENT 2

<Hazard Simulation & Facilities for Area BCP in Pilot Area>

Earthquake, Flood, Storm Surge and Tsunami

August 2014

AHA Centre
Japan International Cooperation Agency

OYO International Corporation
Mitsubishi Research Institute, Inc.
CTI Engineering International Co., Ltd.

Table of Contents

II. Component 2

1 Data Structure

1.1 GIS Platform and Database Format

(a) GIS Platform: ESRI ArcGIS Desktop 10.1

The GIS application software is one of the global standard software. AHA Centre has adopted it as main GIS in the office. Thus we also adopted it as the GIS platform in the project.

(b) Database Format: Personal Geodatabase

Personal Geodatabase (*.mdb) is adopted in order to manage both data tables and GIS features in one database. The mdb database format corresponds to Microsoft Access previous version.

1.2 Database Structure

The database for Component 2 is designed as following figure in the next page. Top folder is **Component 2** and **MapImage**.

Component 2 consists of four primary folders as follows,

- *Built Environment* (explained in the Chapter 2)
- *Hazard Simulation* (explained in the Chapter 3)
- *Existing Hazard Maps* (explained in the Chapter 4)

MapImage folder is prepared for map images exported from GIS.

Built Environment consists of two folders, namely **Collected data** and **for Area BCP**. These two primary folders are explained in the following chapter 2 and 3.

Hazard Simulation folder consists of two folders, namely **Data** and **Outputs**. Chapter 4 and 5 explains them briefly. This document doesn't explain how to simulate. If you want to know the details of each simulation, you have to ask experts who conducted

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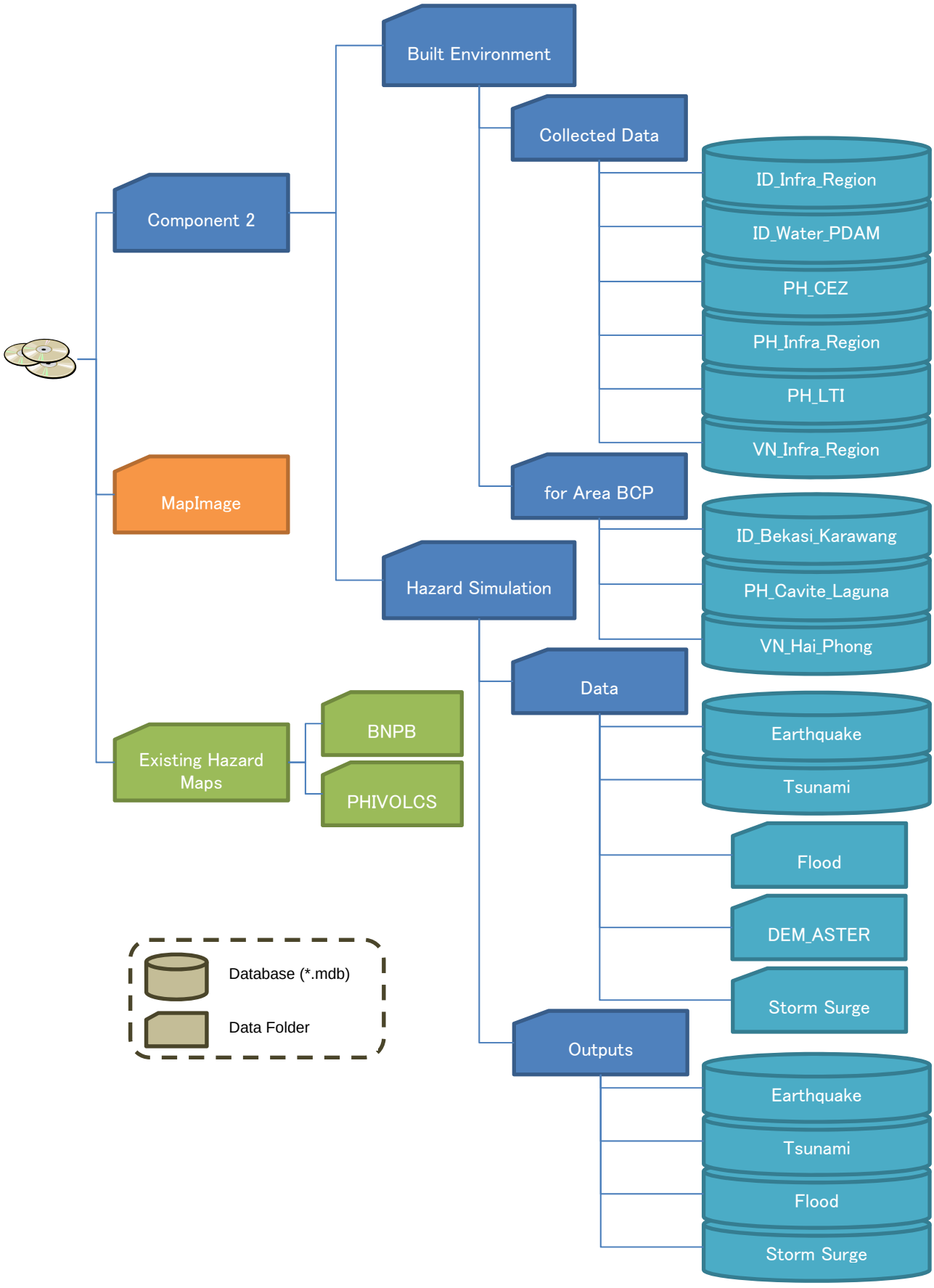

Figure 1.1 Database Structure for Component 2 and additional folders

1.3 How to Collect Data

There are some differences to collect data for BCP and Data for hazard simulation.

- **Collected Data** is mainly composed of Facilities that is collected through local consultants in Jakarta, Hanoi and Manila. Open level for the collected data is different to their sources. It is summarized in the **Table 2.1 (a) to (c) Data Source for Collected Data**.
- **Data for Area BCP** is arranged by referring facility data. Some facilities were supplemented originally. The main expert for this part belongs to OYO International Corporation.
- A set of data for **Hazard Simulation** were composed of **Data for Simulation** and **Outputs**. Data for Simulation is collected and Outputs were created by respective experts. Main experts for Flood and Storm Surge simulation belong to CTI Engineering International Co., Ltd. Those for Earthquake and Tsunami simulation belong to OYO International Corporation.
- **Existing Hazard Maps** for the pilot areas were also collected. PHIVOLCS in the Philippines and BNPB in Indonesia is the data provider. Contact persons or advisors in these organizations are presented in the below.

Contact Person

CTI Engineering International Co., Ltd.

- **Hajime TANAKA**, h-tanaka@ctii.co.jp (Hazard Simulation)
- **Toyohiro TAKAGI**, takagi@ctii.co.jp (Facilities)

OYO International Corporation

- **Shukyo SEGAWA**, segawa@oyointer.com (Hazard Simulation, Facilities for Area BCP)
- **Koichi HASEGAWA**, hasegawa@oyointer.com (GIS / Database arrangement)

BNPB

- **Dian Oktiari**, Kepala Sub Bidang Pengelolaan Data Spasial, dian.oktiari@bnpb.go.id
- **Yoshio TOKUNAGA**, JICA Expert on Disaster Management Policy, tokunaga-y2ag@nifty.com
- **Noel Pitoy**, Konsultan Ahli Teknologi Informasi dan Komunikasi, noel_pitoy@hotmail.com

PHIVOLCS

- **MA. LYNN PALADIO-MELOSANTOS**, Geology & Geophysics Research & Development Division, lynn.melosantos@gmail.com

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2 Database on Built Environment

2.1 Database of Collected and for Area BCP

Database Format

File Type: Personal Geodatabase (mdb)

File Name:

2.1.1 Collected Data

Folder: Component 2¥Built Environment¥Collected Data

A) **ID Infra Region.mdb**
B) **ID Water PDAM.mdb**
C) **PH CEZ.mdb**
D) **PH Infra Region.mdb**
E) **PH LTI.mdb**
F) **VN Infra Region.mdb**

2.1.2 For Area BCP

Folder: Component 2¥Built Environment¥for Area BCP

A) **ID Bekasi Karawang.mdb**
B) **PH Cavite Laguna.mdb**
C) **VN Hai Phong.mdb**

2.2 GIS Layers

2.2.1 Collected Data

File Name and Layer Name with GIS Data Type:

ID_Infra_Region.mdb

Infrastructure_Pt_Bekasi_Karawang_WGS84	Vector (point)
Electricity_Pt_WGS84	Vector (point)
Gas_Pt_WGS84	Vector (point)
Garbage_Pt_WGS84	Vector (point)
Hospital_Pt_WGS84	Vector (point)
School_Pt_WGS84	Vector (point)
Electricity_Cable_Network_WGS84	Vector (polyline)
Gas_Pipeline_Network_WGS84	Vector (polyline)
Road_Bekasi_Karawang_WGS84	Vector (polyline)
Road_Local_Bekasi_Karawang_WGS84	Vector (polyline)
RegionalPlanning_Bekasi_Karawang_WGS84	Vector (polygon)

ID_Water_PDAM.mdb

PDAM_Bekasicity_WGS84	Vector (point)
PDAM_Bekasiregency_WGS84	Vector (point)
PDAM_Karawangregency_WGS84	Vector (point)
PDAM_ServiceMap_Bekasi_WGS84	Vector (polygon)
WaterPipe_Network_Bekasicity_WGS84	Vector (polyline)
WaterPipe_Network_Bekasiregency_WGS84	Vector (polyline)
WaterPipe_Network_Karawangregency_WGS84	Vector (polyline)

PH_CEZ.mdb

CEZ_Boundary_WGS84	Vector (polygon)
CEZ_Symbols_WGS84	Vector (point)
CEZ_WaterSupply_WGS84	Vector (point)

PH_Infra_Region.mdb

Airport_WGS84	Vector (point)
Hospitals_WGS84	Vector (point)
Laguna_Cavite_WGS84	Vector (polygon)
OilDepot_WGS84	Vector (point)
Port_Manila_WGS84	Vector (point)
PowerPlant_WGS84	Vector (point)
Pumping_WGS84	Vector (point)
Railway_WGS84	Vector (polyline)
Reservoir_WGS84	Vector (point)
Roads_Motor_Trunk_Primary_WGS84	Vector (polyline)
Roads_WGS84	Vector (polyline)

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School_WGS84	Vector (point)
PH_LTI.mdb	
LTI_Boundary_WGS84	Vector (polygon)
LTI_Waterworks_WGS84	Vector (point)
VN_Infra_Region.mdb	
Airports_Cargo_WGS84	Vector (point)
Airports_Domestic_WGS84	Vector (point)
Airports_International_WGS84	Vector (point)
Aquaric_Facilities_WGS84	Vector (point)
Disaster_Prevention_Dept_WGS84	Vector (point)
Garbage_WGS84	Vector (point)
Haiphong_Region_WGS84	Vector (polygon)
Haiphong_Districts_WGS84	Vector (polygon)
Haiphong_Wards_WGS84	Vector (polygon)
Hospitals_WGS84	Vector (point)
Industrial_Zones_WGS84	Vector (point)
Ports_WGS84	Vector (point)
Railways_WGS84	Vector (polyline)
Railways_Vietnam_WGS84	Vector (polyline)
Roads_Vietnam_WGS84	Vector (polyline)
Roads_WGS84	Vector (polyline)
Sewerage_WGS84	Vector (point)
Schools_WGS84	Vector (point)
Sub_stations_WGS84	Vector (point)
Water_supply_WGS84	Vector (point)

Arc Map Document:

ID_Infra_Bekasi_Karawan.mxd

ID_WaterPipes_Bekasi_Karawan.mxd

PH_Infra_Cavite_Laguna.mxd

VN_Infra_HaiPhong.mxd

2.2.2 For Area BCP

File Name and Layer Name with GIS Data Type:

ID_Bekasi_Karawang.mdb	**(for pilot area in Indonesia)**
Airport	Vector (point)
Dam	Vector (point)
Industrial_Park	Vector (point)
JC_TollRoad	Vector (polyline)
KIIC_area	Vector (polygon)
KIIC_Facility	Vector (point)
Port	Vector (point)
Power_Plant	Vector (point)
Road	Vector (polyline)
Substation	Vector (point)
Tarum_Barat	Vector (polyline)
PH_Cavite_Laguna.mdb	**(for pilot area in the Philippines)**
Airport	Vector (point)
CEZ_area	Vector (polygon)
CEZ_Facility	Vector (point)
CEZ_watersupply	Vector (point)
Industrial_Park	Vector (point)
LTI_area	Vector (polygon)
Port	Vector (point)
Power_Plant	Vector (point)
Road	Vector (polyline)
Substation	Vector (point)
VN_Hai_Phong.mdb	**(for pilot area in Vietnam)**
Airport	Vector (point)
Freeway	Vector (polyline)
Highway	Vector (polyline)
Industrial_Park	Vector (point)
Nomura_area	Vector (polygon)
Nomura_Facility	Vector (point)
Port	Vector (point)
Power_Plant	Vector (point)
Substation	Vector (point)
Trunk_Road	Vector (polyline)
Water_HaiPhong	Vector (polygon)
Water_Treatment	Vector (point)

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Arc Map Document:

ID_Bekasi_Karawan_BCP_Facility.mxd

PH_Manila_BCP_Facility.mxd

VN_HaiPhong_BCP_Facility.mxd

2.3 Major Attributes

2.3.1 Collected Data

ID_Infra_Region.mdb

Electricity_Cable_Network_WGS84, Electricity_Pt_WGS84

Field Name	Data Type	Explanation
Element	Text	Type of electricity cable, Type of facility

Gas_Pipeline_WGS84

Field Name	Data Type	Explanation
Diameter	Text	Diameter of pipeline

Gas_Pt_WGS84

Field Name	Data Type	Explanation
Name	Text	Name of gas facility
Note_	Text	Type of gas facility

Garbage_Pt_WGS84

Field Name	Data Type	Explanation
Garbage	Text	Name of garbage facility
Processing	Text	Type of garbage facility
Capacity	Text	Capacity of garbage processing

Hospital_Pt_WGS84, School_Pt_WGS84

Field Name	Data Type	Explanation
NAME_OF_HO	Text	Name of the hospital / school
PUBLIC_FAC	Text	Type of school
ADDRESS	Text	Address of the hospital / school
PHONEEMAIL	Text	Phone number of the hospital

Infrastructure_Pt_Bekasi_Karawang_WGS84

Field Name	Data Type	Explanation
Explain	Text	Name of infrastructure

RegionalPlanning_Bekasi_Karawang_WGS84

Field Name	Data Type	Explanation
Area	Text	Name of region

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Road_Bekasi_Karawang_WGS84

Field Name	Data Type	Explanation
roads_note	Text	Type of road

Road_Local_Bekasi_Karawang_WGS84

Field Name	Data Type	Explanation
class	Text	Type of road
Road_name	Text	Name of the road

ID_Water_PDAM.mdb

PDAM_Bekasicity_WGS84

Field Name	Data Type	Explanation
Notes_	Text	Type of water facility

PDAM_Bekasiregency_WGS84

Field Name	Data Type	Explanation
Name	Text	Type of water facility
Note_	Text	Type of water pipe

PDAM_Karawangregency_WGS84

Field Name	Data Type	Explanation
Explain	Text	Name of water facility

PDAM_ServiceMap_Bekasi_WGS84

Field Name	Data Type	Explanation
Area	Text	Name of water supply service area
IPA	Text	Amount of supplied water
SR	Text	Unit of water supply amount

WaterPipe_Network_Bekasicity_WGS84

WaterPipe_Network_Bekasiregency_WGS84

WaterPipe_Network_Karawangregency_WGS84

Field Name	Data Type	Explanation
Diameter	Text	Diameter of water pipe (mm)
Regency	Text	Name of city & regency level

PH_CEZ.mdb

CEZ_Boundary_WGS84

Field Name	Data Type	Explanation
Name	Text	Name of the zone
Type	Text	Type of land use (Industry)

CEZ_Symbols_WGS84, CEZ_WaterSupply_WGS84

Field Name	Data Type	Explanation
ID	Integer	Code for Facilities (1: PLDT Office, 2: Admin Bld., 3: Bank, 4: Dump Site, 5: Fire St., 6: Police St., 7: Sewerage Treatment Plant, 8: Power Transco, 9: Water Supply
Decriptio	Text	Type of facility (water supply, PLDT office, NULL)
Name	Text	Name of the facility

PH_Infra_Region.mdb

Airport_WGS84, Hospitals_WGS84, OilDepot_WGS84

Port_Manila_WGS84, PwerPlant_WGS84

Pumping_WGS84, Reservoir_WGS84, School_WGS84

Field Name	Data Type	Explanation
Name	Text	Name of the facility

Laguna_Cavite_WGS84

Field Name	Data Type	Explanation
NAME_0	Text	Name of country (Philippines)
NAME_1	Text	Name of province (Laguna, Cavite)
NAME_2	Text	Name of municipality or city
ENGTYPE_2	Text	Type of administrative unit

Railway_WGS84

Field Name	Data Type	Explanation
name	Text	Name of railway
type	Text	Type of railway (rail, light rail)

Roads_WGS84, Roads_Motor_Trunk_Primary_WGS84

Field Name	Data Type	Explanation
name	Text	Name of road
type	Text	Type of road (primary, secondary, residential, etc)

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LTI_Boundary_WGS84

Field Name	Data Type	Explanation
name	Text	Name of the zone (Laguna Technopark Inc.)

LTI_Waterworks_WGS84

Field Name	Data Type	Explanation
Decriptio	Text	Type of facility (waterworks)

VN_Infra_Region.mdb

Airports_Cargo_WGS84, Airports_Domestic_WGS84, Airports_International_WGS84

Field Name	Data Type	Explanation
NAME	Text	Name of the facility
ADDRESS	Text	Address of the facility
Long_	Double	Longitude of the location
Lat	Double	Latitude of the location

Aquaric_facilities_WGS84

Field Name	Data Type	Explanation
Org	Text	Name of the facility
address	Text	Address of the facility
Phone	Text	Phone number of the facility
Fax	Text	Fax number of the facility
leader	Text	Name of the director of the facility
email	Text	Email address of the facility
Long_	Double	Longitude of the location
Lat	Double	Latitude of the location

Disaster_Prevention_WGS84

Field Name	Data Type	Explanation
Name	Text	Name of the facility
Address	Text	Address of the facility
Phone	Text	Phone number of the facility
Fax	Text	Fax number of the facility
email	Text	Email address of the facility
leader	Text	Name of the director of the facility
Long_	Double	Longitude of the location
Lat	Double	Latitude of the location

Governments_WGS84

Field Name	Data Type	Explanation
Name	Text	Name of the facility
Address	Text	Address of the facility
Phone	Text	Phone number of the facility
Fax	Text	Fax number of the facility
email	Text	Email address of the facility
leader	Text	Name of the director of the facility
Long_	Double	Longitude of the location
Lat	Double	Latitude of the location

Haiphong_Districts_WGS84

Field Name	Data Type	Explanation
HUYEN	Text	Name of district

Haiphong_Wards_WGS84

Field Name	Data Type	Explanation
XA	Text	Name of ward

Haiphong_Region_WGS84

Field Name	Data Type	Explanation
cname	Text	Name of the region (Haiphong)

Hospitals_WGS84

Field Name	Data Type	Explanation
Hospital	Text	Name of hospital
beds	Text	Number of beds
ADDRESS	Text	Address of the facility
PHONE	Text	Phone number of the facility
Long_	Double	Longitude of the location
Lat	Double	Latitude of the location

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Industrial_zones_WGS84, Sub_stations_WGS84

Schools_WGS84

Field Name	**Data Type**	**Explanation**
NAME	Text	Name of the facility
ADDRESS	Text	Address of the facility
PHONE	Text	Phone number of the facility
Long_	Double	Longitude of the location
Lat	Double	Latitude of the location

Ports_WGS84

Field Name	**Data Type**	**Explanation**
NAME	Text	Name of the facility
berths	Double	Number of berths
depth	Double	Depth of the port
length	Double	Length of the port
cargo	Text	Type of cargo
Conyard_m2	Double	Area of the container yard (m2)
ConFS_m2	Double	Area of the Container Freight Station (m2)
Long_	Double	Longitude of the location
Lat	Double	Latitude of the location

Railways_WGS84, Railways_Vietnam_WGS84

Field Name	**Data Type**	**Explanation**
ID	Text	ID of the record (0)

Roads_Vietnam_WGS84

Field Name	**Data Type**	**Explanation**
TEN	Text	Name of the road (Road no 10)
LOAIKH	Text	Type of road
TINHCHAT	Text	Type of pavement (asphalted road)

Sewerage_WGS84

Field Name	Data Type	Explanation
Name	Text	Name of the facility (Haiphong Sewerage Company)
Address	Text	Address of the facility
Phone	Text	Phone number of the facility
Fax	Text	Fax number of the facility
email	Text	Email address of the facility
leader	Text	Name of the director of the facility
Long_	Double	Longitude of the location
Lat	Double	Latitude of the location

Water_supply_WGS84

Field Name	Data Type	Explanation
WSUPPLY	Text	Name of the water supplier
ADDRESS	Text	Address of the facility
PHONE	Text	Phone number of the facility
FAX	Text	FAX number of the facility
Long_	Double	Longitude of the location
Lat	Double	Latitude of the location

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2.3.2 For Area BCP

ID_Bekasi_Karawang.mdb

Airport, Dam, Industrial_Park, KIIC_area, KIIC_Facility
Port, Power_Plant, Road, Substation, Tarum_Barat

PH_Cavite_Laguna.mdb

Airport, CEZ_area, CEZ_Facility, CEZ_watersupply
Industrial_Park, LTI_area, Port, Power_Plant
Road, Substation

VN_Hai_Phong.mdb

Airport, Freeway, Highway, Industrial_Park
Nomura_area, Nomura_Facility, Port, Power_Plant
Substation, Trunk_road
Water_HaiPhong, Water_Treatment

All Layers

Field Name	Data Type	Explanation
Name	Text	Name of facility or region

2.4 Map Image

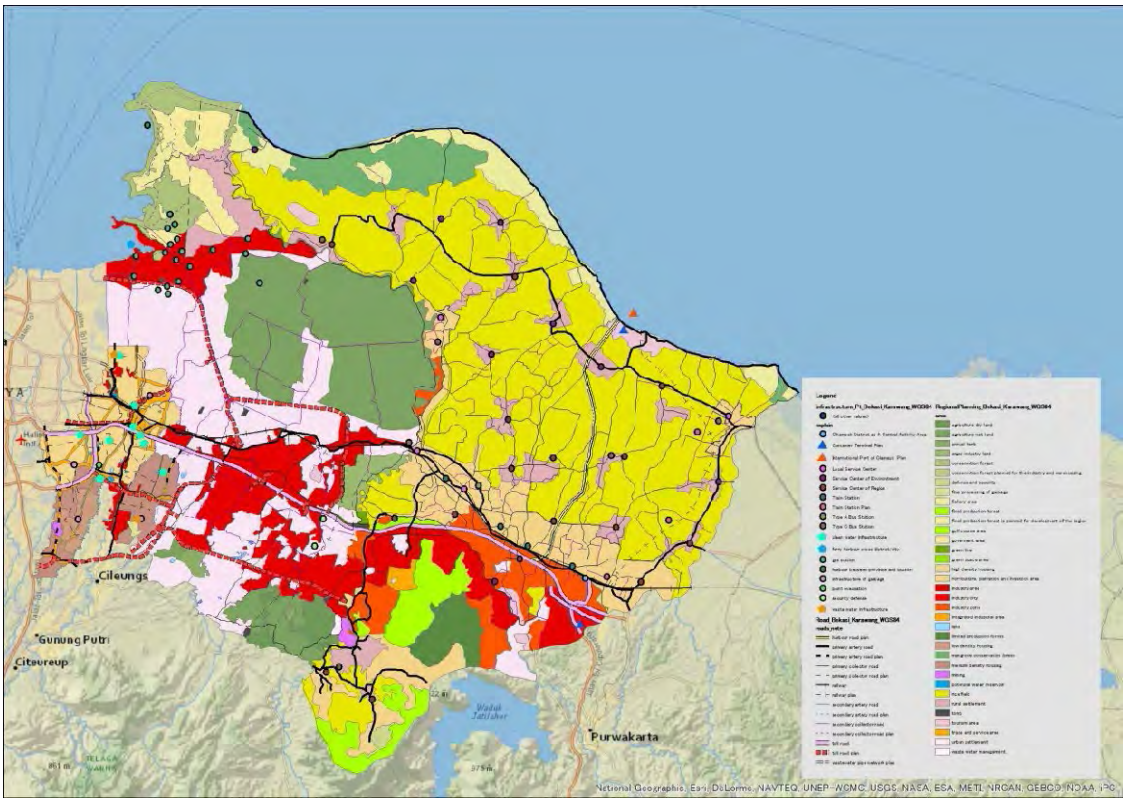

Figure 2.1 Distribution of Facilities on the landuse map in Bekasi and Karawang

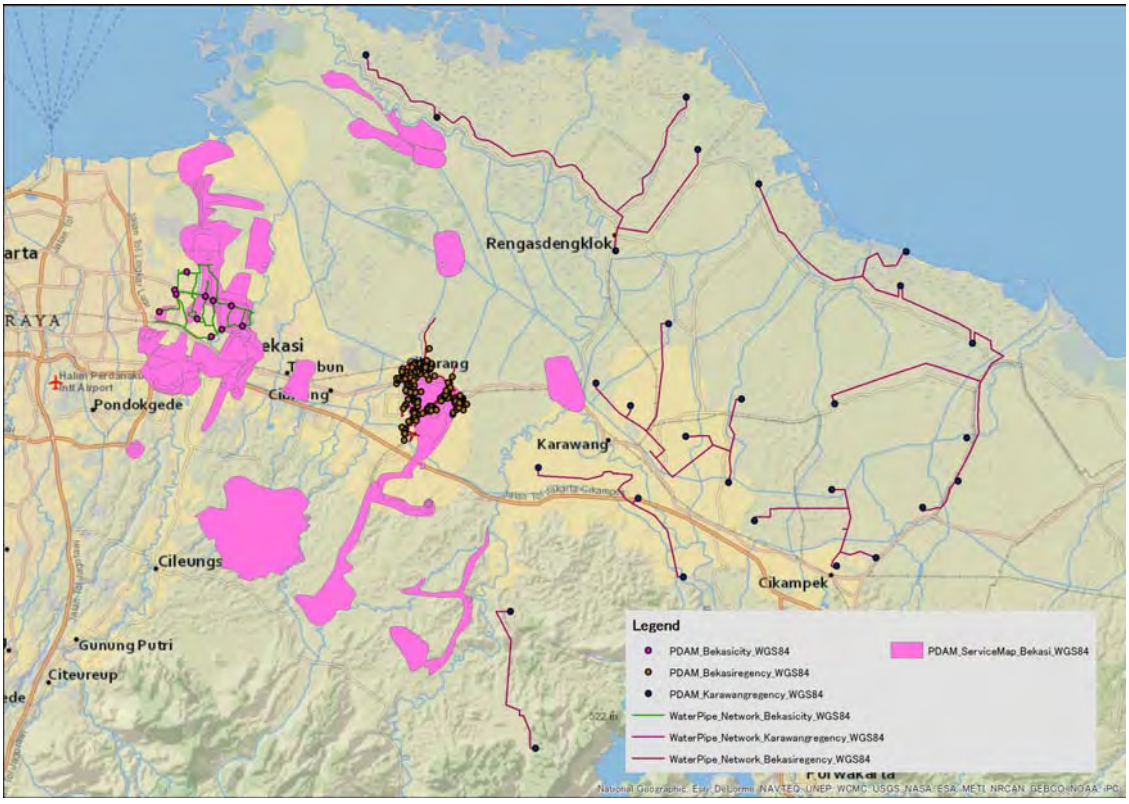

Figure 2.2 Distribution of Water Facilities in Bekasi and Karawang

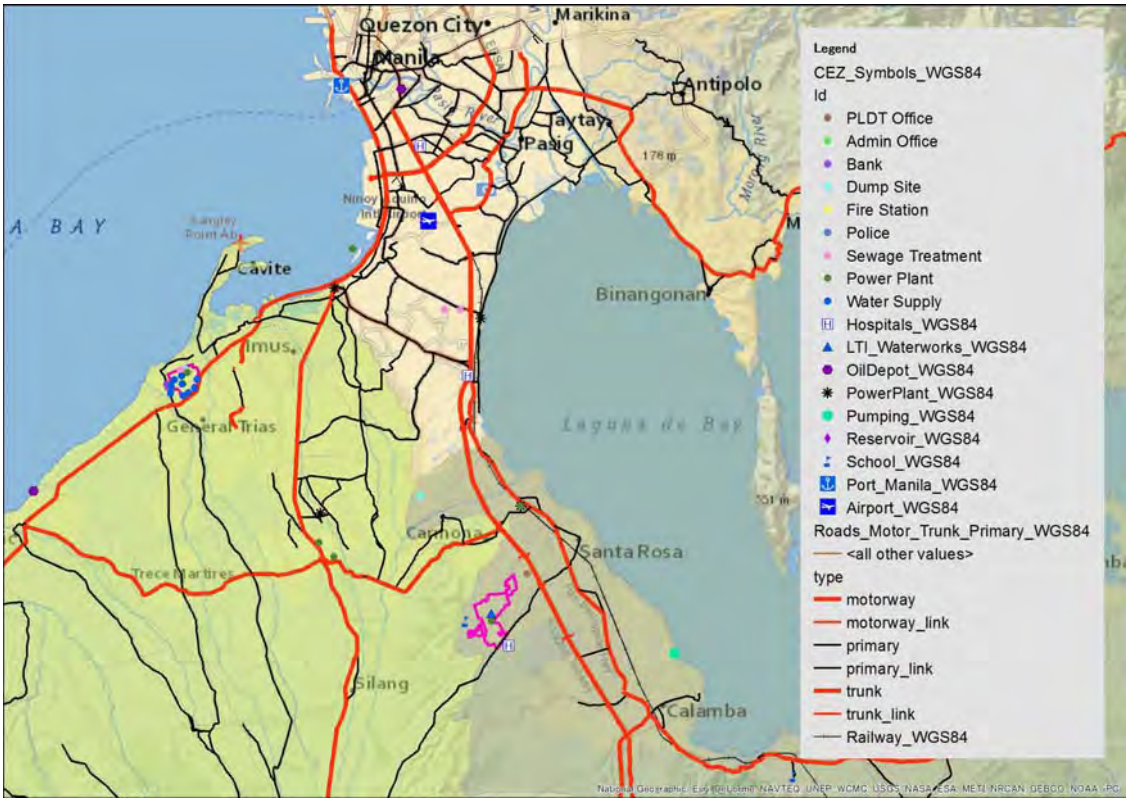

Figure 2.3 Distribution of Facilities in Laguna and Kavite

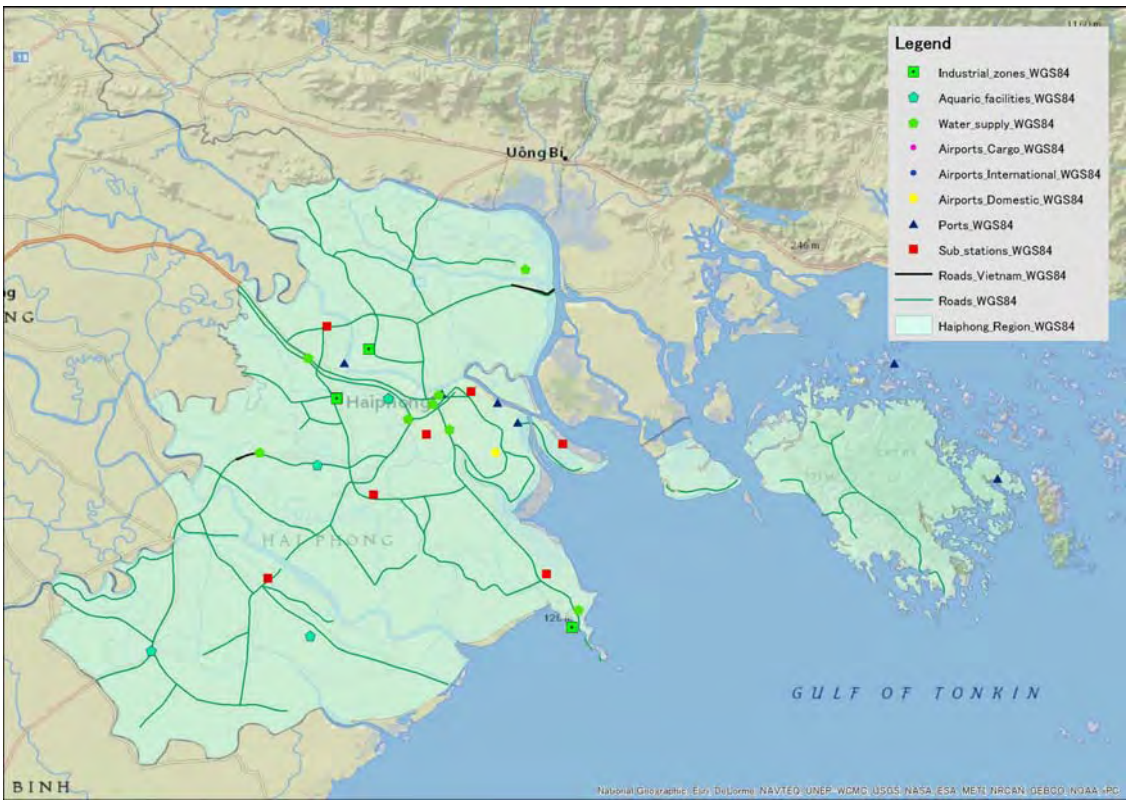

Figure 2.4 Distribution of Facilities in Hai Phong

Figure 2.5 Distribution of Facilities for Area BCP in Bekasi and Karwang

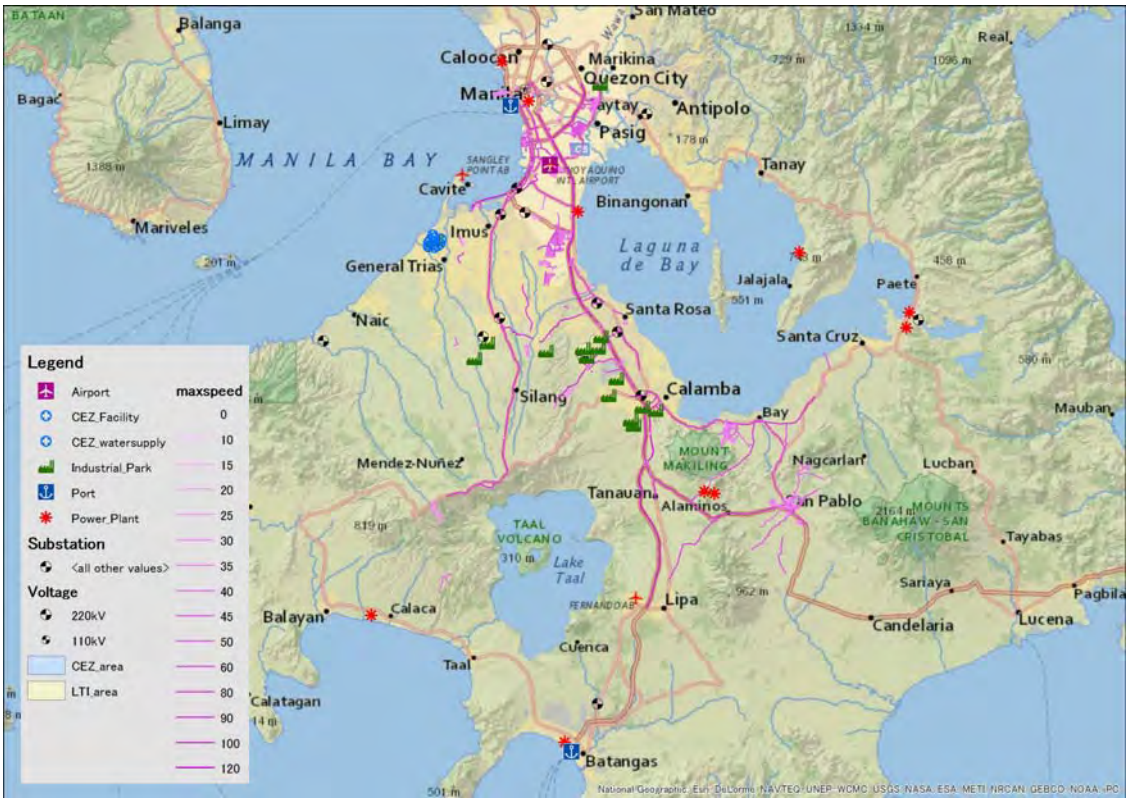

Figure 2.6 Distribution of Facilities for Area BCP in Laguna and Kavite

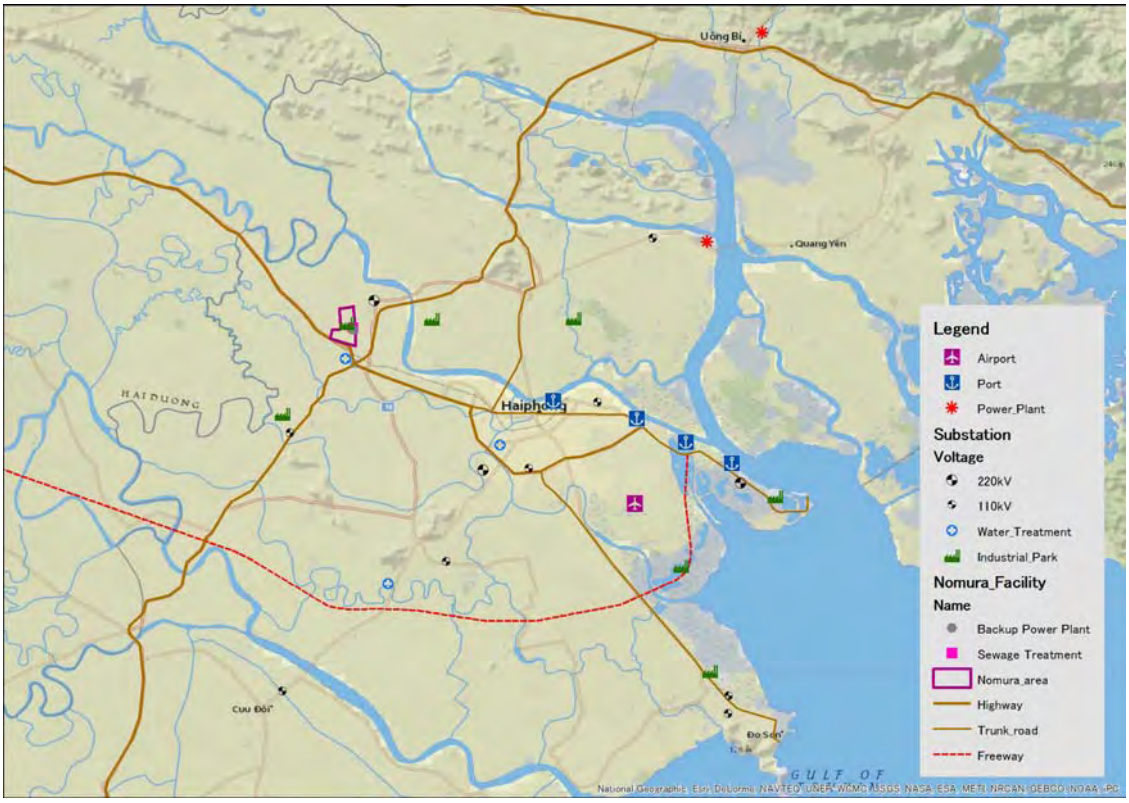

Figure 2.7 Distribution of Facilities for Area BCP in Hai Phong

2.5 Data Source for Collected Data

- **Data Copy Level**: *OK*: End user (AHA Centre, ASEAN) can copy the data and use them in their computers. *NG*: It is prohibited for end user to copy the data.
- **Data Open Level**: *A*: permitted to be downloaded from web sites or be shown on web maps. *B*: read only open is permitted in the web maps. *C*: prohibited to be open on web sites or web maps.

➢ **Table 2.1 Data Source for Collected Data**

(a) Indonesia

No	Data Layer	Data Source	Data Copy Level	Data Open Level
1	Infrastructure_Pt_Bekasi_Karawang_WGS84	tracking by GPS survey	*OK*	*A*
2	Road_Bekasi_Karawang_WGS84	BAPPEDA Karawang, BAPPEDA Bekaci, Pemda (Local Government) Bekasi City, BIG	*OK*	*A*
3	RegionalPlanning_Bekasi_Karawang_WGS84	BAPPEDA Karawang, BAPPEDA Bekaci, Pemda (Local Government) Bekasi City	*OK*	*A*
4	Hospital_Pt_WGS84	tracking by GPS survey	*OK*	*A*
5	Garbage_Pt_WGS84	tracking by GPS survey, Sanitary Department	*OK*	*B*
6	School_Pt_WGS84	tracking by GPS survey	*OK*	*A*
7	Road_Local_Bekasi_Karawang_WGS84	BIG	*OK*	*A*
8	Electricity_Pt_WGS84	BIG	*OK*	*C*
9	Electricity_Cable_Network_WGS84	BIG	*OK*	*C*
10	Gas_Pt_WGS84	state gas company,oil & gas downstream regulatory agency	*OK*	*C*
11	GAS_Pipeline_WGS84	state gas company,oil & gas downstream regulatory agency	*OK*	*C*
12	PDAM_Karawangregency_WGS84	regional drinking water company Karawang Regency, public company Jasa tirta	*OK*	*B*
13	WaterPipe_Network_Karawangregency_WGS84	regional drinking water company Karawang Regency, public company Jasa tirta	*OK*	*B*
14	WaterPipe_Network_Bekasiregency_WGS84	regional drinking water company, public company Jasa tirta	*OK*	*B*
15	PDAM_Bekasiregency_WGS84	regional drinking water company, public company Jasa tirta	*OK*	*B*
16	PDAM_Bekasicity_WGS84	regional drinking water company Bekasi city, public company Jasa tirta	*OK*	*B*
17	WaterPipe_Network_Bekasicity_WGS84	regional drinking water company Bekasi city, public company Jasa tirta	*OK*	*B*
18	PDAM_ServiceMap_Bekasi_WGS84	regional drinking water company Bekasi Regency, public company Jasa tirta	*OK*	*B*

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(b) Philippines

No	Data Layer	Data Source	Data Copy Level	Data Open Level
1	Airport_WGS84	google maps/google earth; secondary research	*OK*	*A*
2	Hospitals_WGS84	google maps/google earth; interview with CEZ/LTI representative	*OK*	*A*
3	School_WGS84	google maps/google earth; interview with CEZ/LTI representative	*OK*	*A*
4	LTI_Waterworks_WGS84	google maps/google earth; interview with LTI representative	*OK*	*A*
5	LTI_Boundary_WGS84	google maps/google earth; interview with LTI representative	*OK*	*A*
6	OilDepot_WGS84	google maps/google earth; interview with OIMB representatives	*OK*	*A*
7	Port_Manila_WGS84	google maps/google earth; secondary research	*OK*	*A*
8	PowerPlant_WGS84	google maps/google earth; secondary research	*OK*	*A*
9	Pumping_WGS84	google maps/google earth; secondary research	*OK*	*A*
10	Railway_WGS84	google maps/google earth; secondary research	*OK*	*A*
11	Reservoir_WGS84	google maps/google earth; secondary research	*OK*	*A*
12	Roads_Motor_Trunk_Primary_WGS84	google maps/google earth; secondary research	*OK*	*A*
13	Roads_WGS84	google maps/google earth; secondary research	*OK*	*A*
14	CEZ_Boundary_WGS84	google maps/google earth and CEZ masterplan map and interview	*OK*	*A*
15	CEZ_Symbols_WGS84	google maps/google earth and CEZ masterplan map and interview	*OK*	*A*
16	CEZ_WaterSupply_WGS84	google maps/google earth and CEZ masterplan map and interview	*OK*	*A*
17	Laguna_Cavite_WGS84	google maps/google earth; interview with Laguna province representative	*OK*	*A*

(c) Vietnam

No	Data Layer	Data Source	Data Copy Level	Data Open Level
1	Aquaric_Facilities_WGS84	www.haiphong.gov.vn	*OK*	*B*
2	Airports_Cargo_WGS84 Airports_Domestic_WGS84 Airports_International_WGS84	Airport Corporation of Vietnam and http://vietnamairport.vn/	*OK*	*B*
3	Disaster_Prevention_WGS84	canhsatpccc.haiphong.gov.vn	*OK*	*B*
4	Garbage_WGS84	Hai Phong URENCO	*OK*	*B*
5	Haiphong_Districts_WGS84	People Committee of Hai Phong and website: haiphong.gov.vn	*OK*	*B*
6	Haiphong_Region_WGS84	People Committee of Hai Phong and website: haiphong.gov.vn	*OK*	*B*
7	Haiphong_Wards_WGS84	People Committee of Hai Phong and website: haiphong.gov.vn	*OK*	*B*
8	Hospitals_WGS84	People Committee of Hai Phong and haiphonginfo.vn	*OK*	*B*
9	Industrial_Zones_WGS84	People Committee of Hai Phong and haiphonginfo.vn	*OK*	*B*
10	Railways_WGS84 Railways_Vietnam_WGS84	Vietnam Railways authority and http://vnra.mt.gov.vn/	*OK*	*B*
11	Roads_WGS84 Roads_Vietnam_WGS84	Directorate for roads of Vietnam	*OK*	*B*
12	Schools_WGS84	People Committee of Hai Phong and haiphonginfo.vn	*OK*	*B*
13	Sewerage_WGS84	Hai Phong Sewerage Company	*OK*	*B*
14	Sub_stations_WGS84	Hai Phong Station	*OK*	*B*
15	Water_Supply_WGS84	Hai Phong Water Supply Company	*OK*	*B*
16	Ports_WGS84	Port of Haiphong and http://www.haiphongport.com.vn/	*OK*	*B*

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3 Database on Hazard Simulation

In this section, data and outputs for the hazard simulations are described. For more details of simulation, please refer Report 4.

3.1 Outputs

Folder: Component 2¥Hazard_Simulation¥Outputs

Database Type: Personal Geodatabase (*.mdb)

Arc Map Document:

ID_Eq_PGA_200y.mxd

ID_Flood_MaxDep_200y.mxd

ID_Tsunami_M90.mxd

PH_Eq_PGA_200y.mxd

PH_Tsunami_M93.mxd

VN_Eq_PGA_200y.mxd

VN_Flood_MaxDep_200y.mxd

VN_StormSurge_MaxTideLvl_200y.mxd

VN_Tsunami_M93.mxd

File Name and Layer Name with GIS Data Type:

3.1.1 Earthquake

Database: **Earthquake.mdb**

*aa*_S_MMI_*bbb*y Raster

[Modified Mercari Intensity (MMI) at ground surface]

*aa*_S_PGA_*bbb*y Raster

[Peak Ground Acceleration (PGA) at ground surface]

Where, *aa*: Country (ID: Indonesia, PH: Philippines, VN: Vietnam)

bbb: Return period in years (050: fifty years, 100: one hundred years, 200: two hundred years, 500: five hundred years)

3.1.2 Flood

Database: **Flood.mdb**

*aa*_h_*bbb*y Raster

[Maximum Water Depth by Flooding in meters]

*aa*_t_*bbb*y Raster

[Duration of Flood in minutes]

Where, *aa*: Country (ID: Indonesia, VN: Vietnam)

bbb: Return period in years (050: fifty years, 100: one hundred years, 200: two hundred years, history: historical flood simulation)

3.1.3 Storm Surge

Database: **StormSurge.mdb**

VN_C3_200y	Raster
VN_C3_200y_Polygon	Vector (Polygon)

[Maximum Tide Level by Storm Surge in return period of 100 to 200 years]

3.1.4 Tsunami

Return period is estimated separately from Tsunami simulation using the earthquake catalog for the concerned country. Maximum wave height was simulated for each 50 meters grid cell. Raster layers for ArcGIS are created after the text outputs of the simulation.

Database: **Tsunami.mdb**

ID_Sunda_M90	Raster

[Maximum Water Level by Mw9.0 earthquake in return period of over 1000 years]

PH_Manila_M80	Raster

[Maximum Water Level by Mw8.0 eq in return period of 100 - 630 years]

PH_Philippines_M93	Raster

[Maximum Water Level by Mw9.3 eq in return period of 2000 - 13000 years]

VN_Vietnam_M93	Raster

[Maximum Water Level by Mw9.3 eq in return period of 2000 - 13000 years]

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3.2 Data for Simulation

Folder: Component 2¥Hazard_Simulation¥Data

There are three main folders and two geodatabases to stock data for hazard simulations.

Arc Map Document:

ID_Bathymetric_Depth.mxd
ID_DEM_Aster.mxd
ID_Eq_PGA_Baserock_200y.mxd
ID_Geologic_Map.mxd
PH_Bathymetric_Depth.mxd
PH_DEM_Aster.mxd
PH_Eq_PGA_Baserock_200y.mxd
PH_Geologic_Map.mxd
VN_Bathymetric_Depth.mxd
VN_DEM_Aster.mxd
VN_Eq_PGA_Baserock_200y.mxd
VN_Geologic_Map.mxd

Folder Name and File Name:

3.2.1 DEM_ASTER

This data folder contains the free Digital Elevation Model (ASTER GDEM) raster data for the following three countries. The raster data is used for flood and storm surge simulations.

A) ID
astgtms06e106 Raster

B) PH
astgtmn13e120 Raster

C) VN
astgtmn21e105 Raster

3.2.2 Flood

This folder contains

A) Cross Section
Auto CAD file for Citarum river in Indonesia.

B) Rainfall data
ID: Rain fall data and location map for gauging stations in Indonesia.
VN: Pressure, wind speed & direction and rainfall data in Vietnam.

C) Spot Elevation
Data sheet for spot elevation measured in the field survey.

D) Weir data

Height of water over the weirs in Bekasi and Karawang in Indonesia.

3.2.3 Storm Surge

A) Tidal data

PH: Hourly tidal height data at tidal stations in the Philippines.

VN: Hourly tidal level data at tidal stations in meter in Vietnam.

B) PH_NAMRIA Tide Station.mdb

Tide_St_01, Tide_St_02

Geodatabase Name and Layer Name with GIS Data Type:

3.2.4 Earthquake.mdb

A) Peak Ground Acceleration at base rock

*aa*_B_PGA_*bbb*y Raster

Where, *aa*: Country (ID: Indonesia, PH: Philippines, VN: Vietnam)

bbb: Return period in years (050: fifty years, 100: one hundred years, 200: two hundred years, 500: five hundred years)

B) Geologic Map

ID_Geologic_Map_Jakarta

PH_Geologic_Map_Manila

VN_Geologic_Map_HaiPhong

Geodatabase Name and Layer Name with GIS Data Type:

3.2.5 Tsunami.mdb

A) Bathymetric GIS layers

ID_DEPTH_BEKASI_KARAWANG	Vector (point)
ID_DEPTH_JAKARTA	Vector (point)
PH_31291_Contour	Vector (polyline)
PH_31291_Sounding	Vector (point)
PH_31293_Contour	Vector (polyline)
PH_31293_Sounding	Vector (point)
PH_31302_Contour	Vector (polyline)

B) Depth Raster

ID_Depth	Raster
PH_Depth	Raster
VN_Depth	Raster

741

3.3 Map Images

Major result maps of Hazard simulations are presented in the first half part of this section.
In the latter part data for simulation is presented for only GIS map.

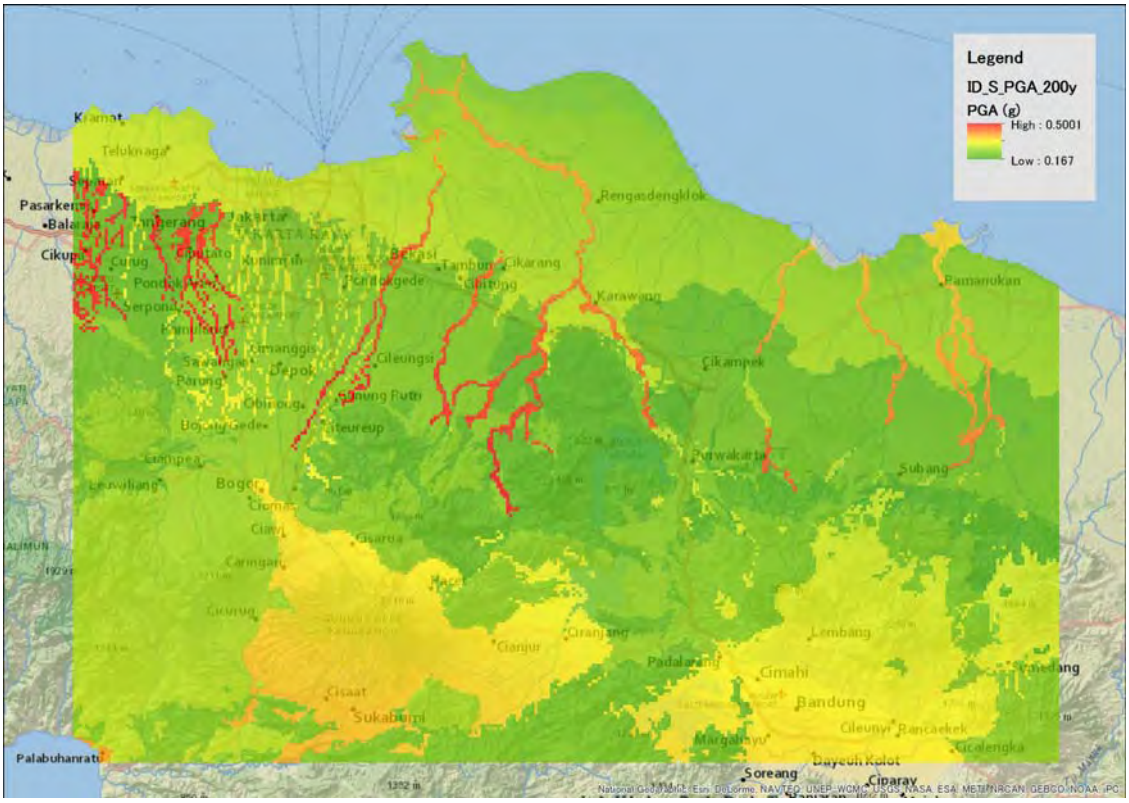

Figure 3.1 Ground Shaking Simulation for 200 years return period in and around Jakarta, Indonesia

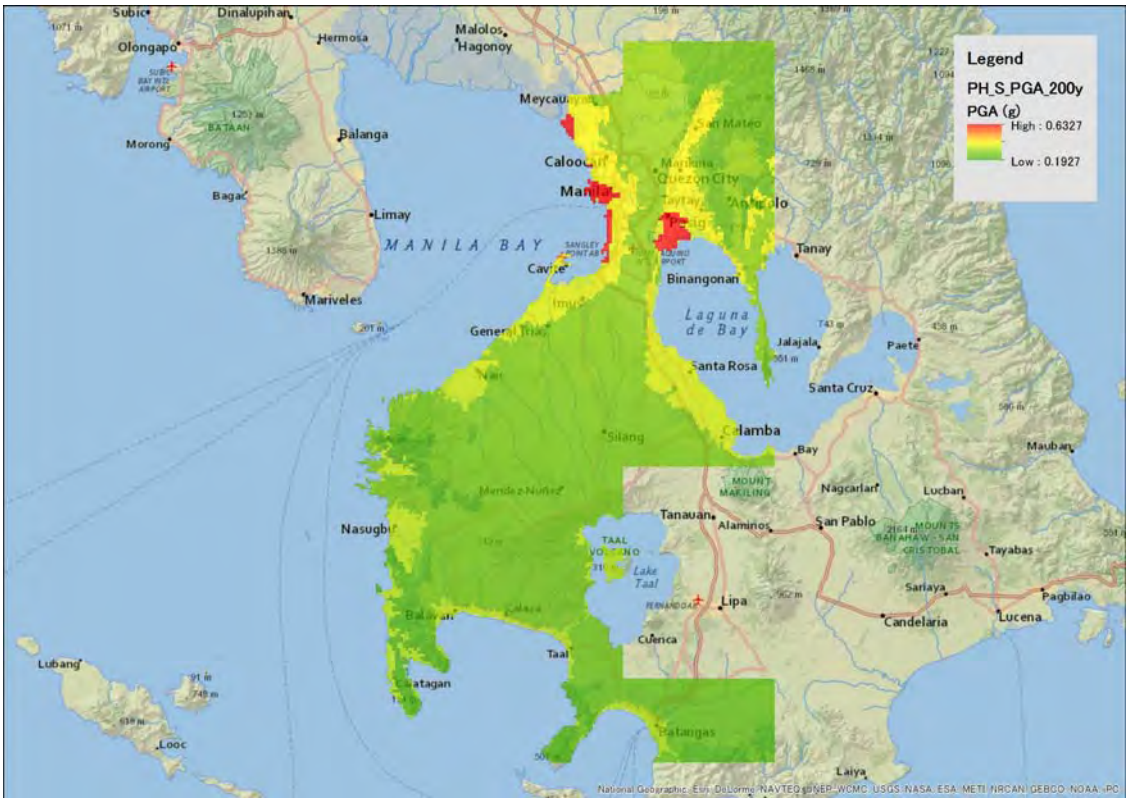

Figure 3.2 Ground Shaking Simulation for 200 years return period in and around Manila, the Philippines

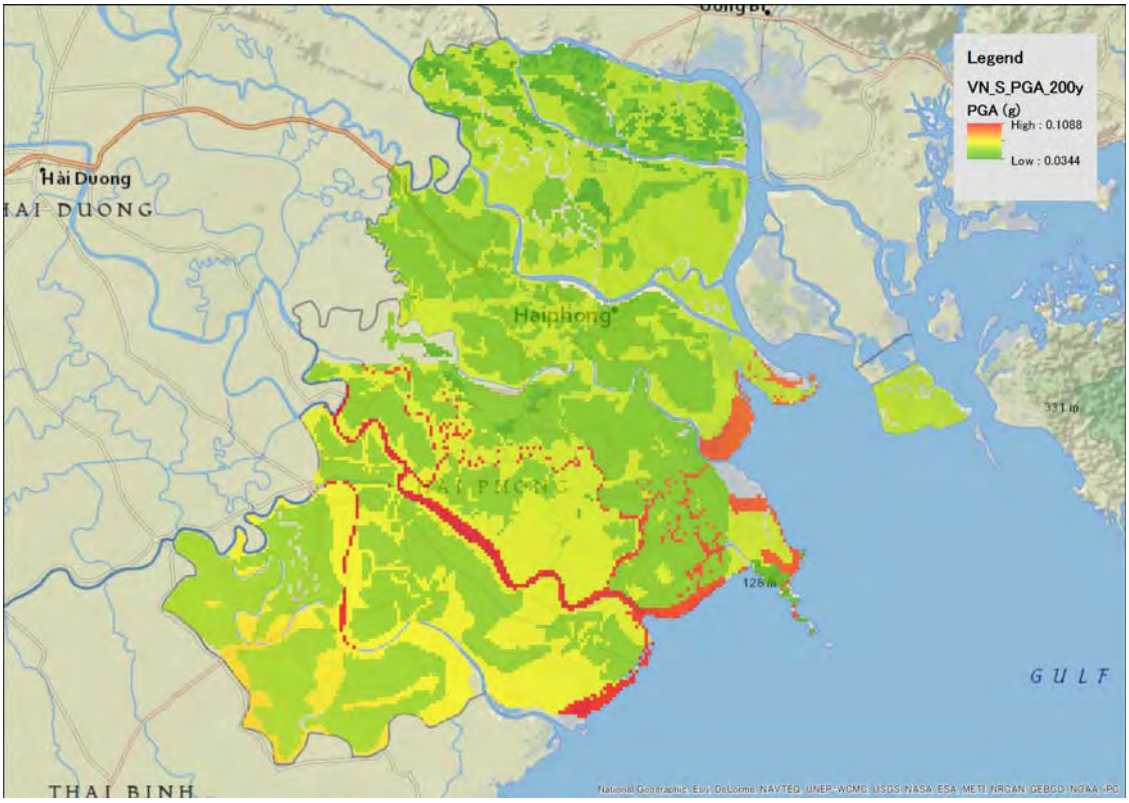

Figure 3.3 Ground Shaking Simulation for 200 years return period in and around Haiphong, Vietnam

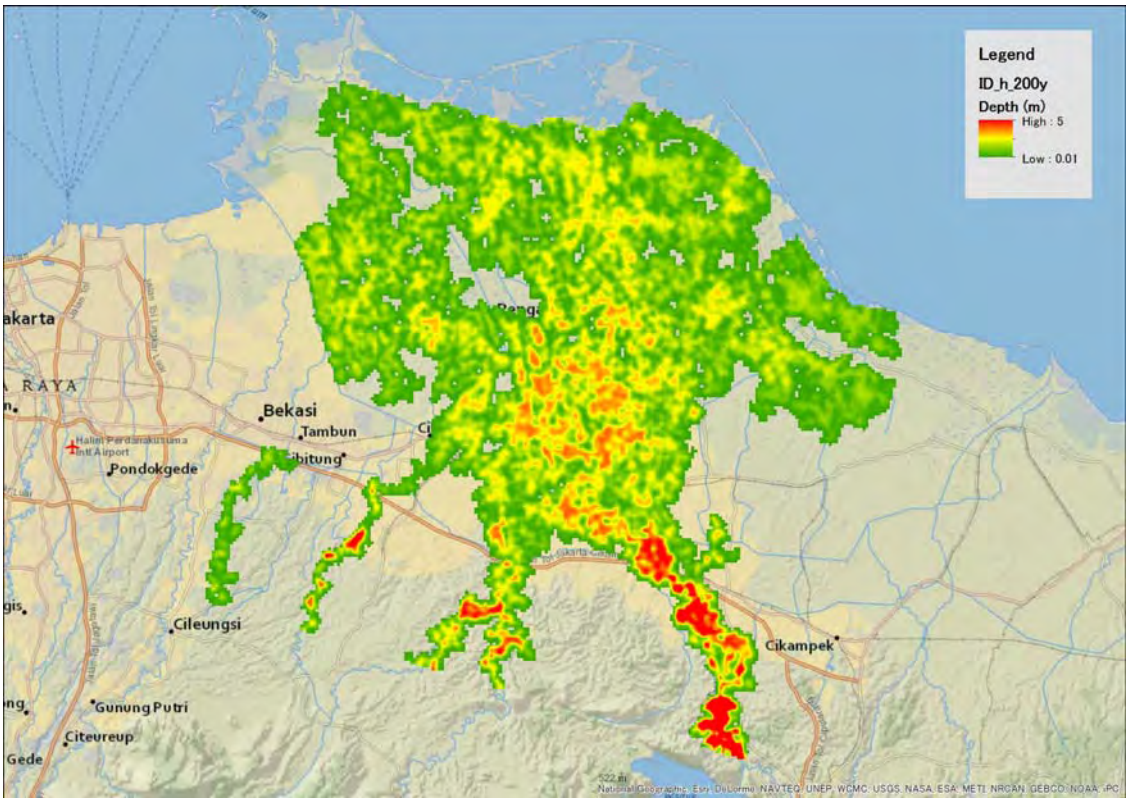

Figure 3.4 Maximum Depth of water caused by Flood for 200 years return period in and around Jakarta, Indonesia

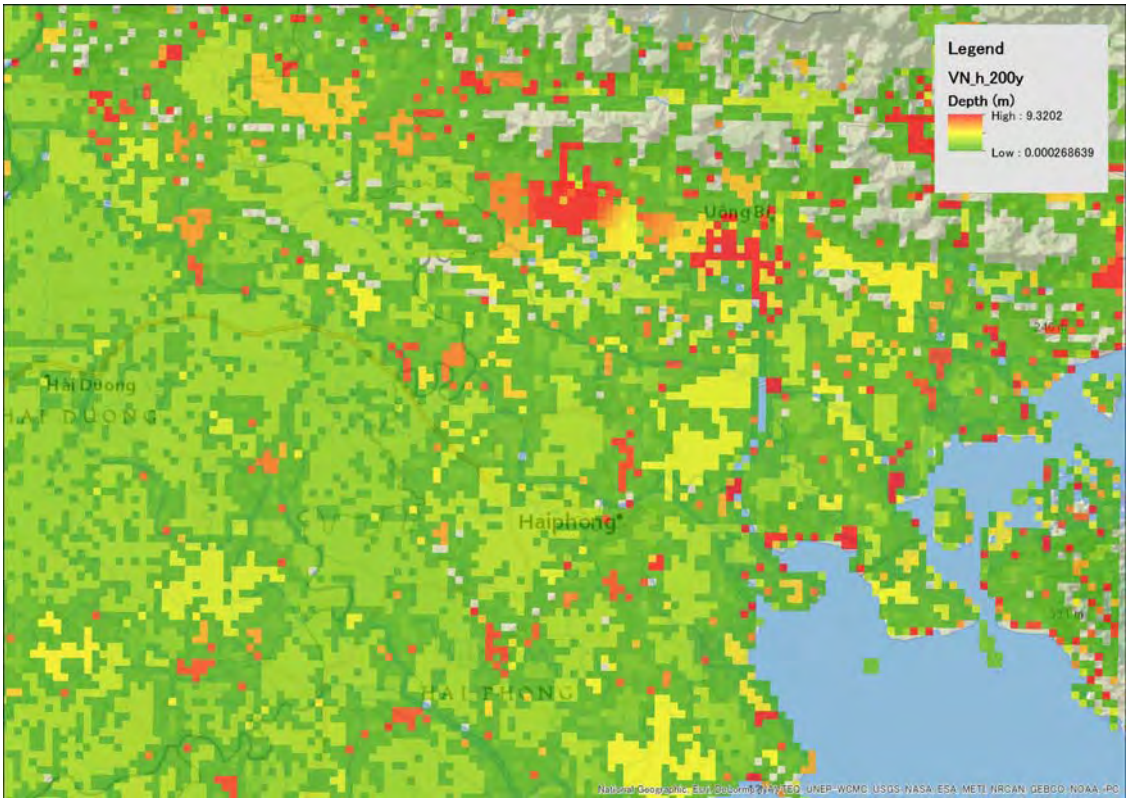

Figure 3.5 Maximum Depth of water caused by Flood for 200 years return period in and around Haiphong, Vietnam

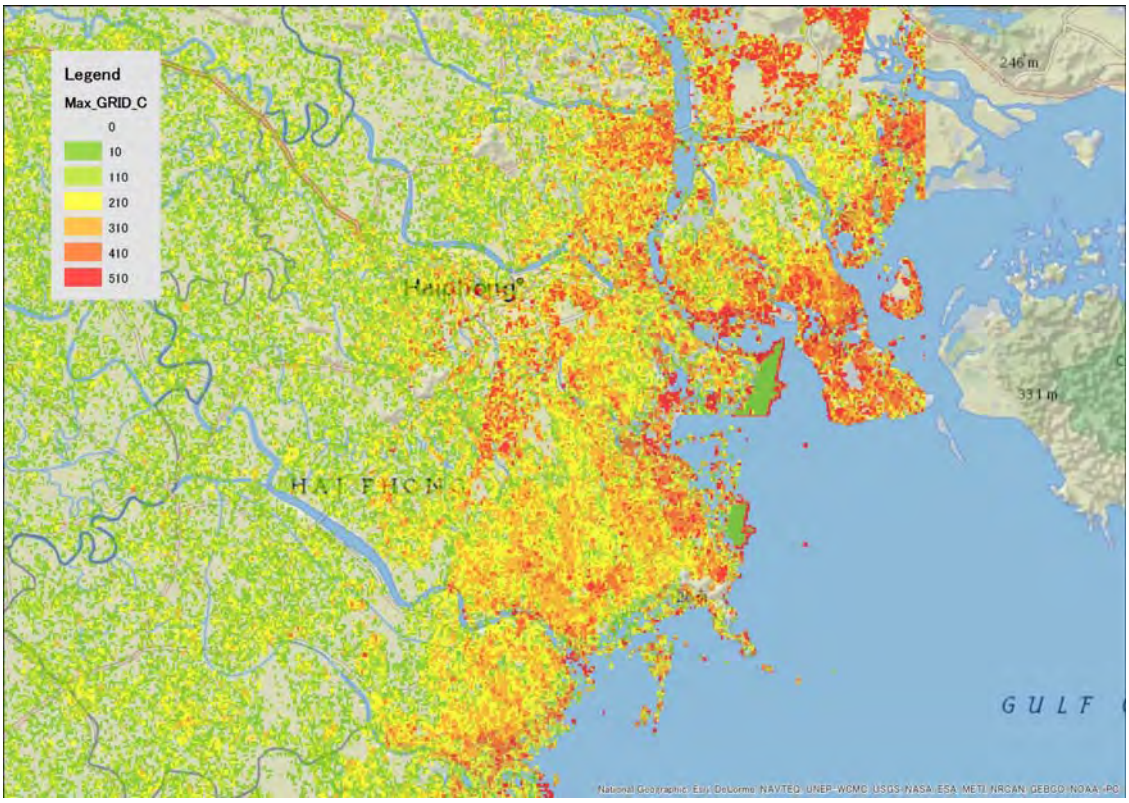

Figure 3.6 Maximum Tide Level of water caused by Storm Surge for 200 years return period in and around Haiphong, Vietnam

Figure 3.7 Distribution of Tsunami Simulation result for Mw 9.0 earthquake in and around Jakarta, Indonesia

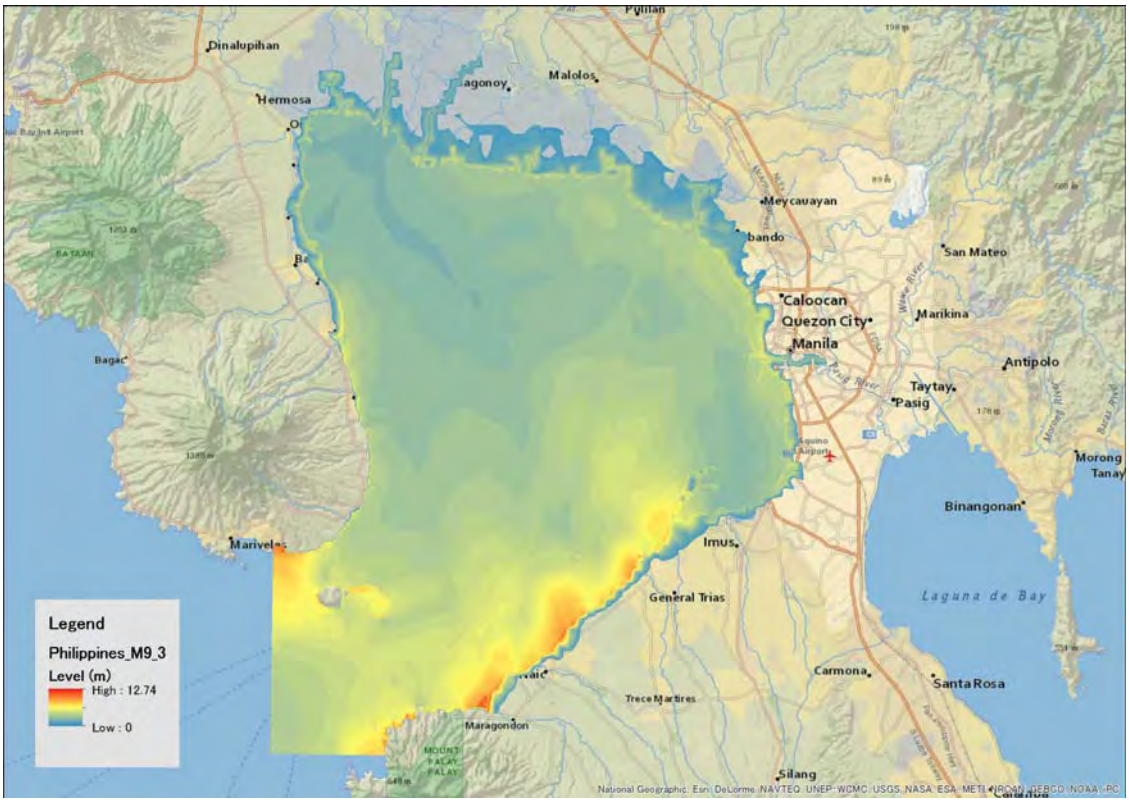

Figure 3.8 Distribution of Tsunami Simulation result for Mw 9.3 earthquake in Manila, the Philippines

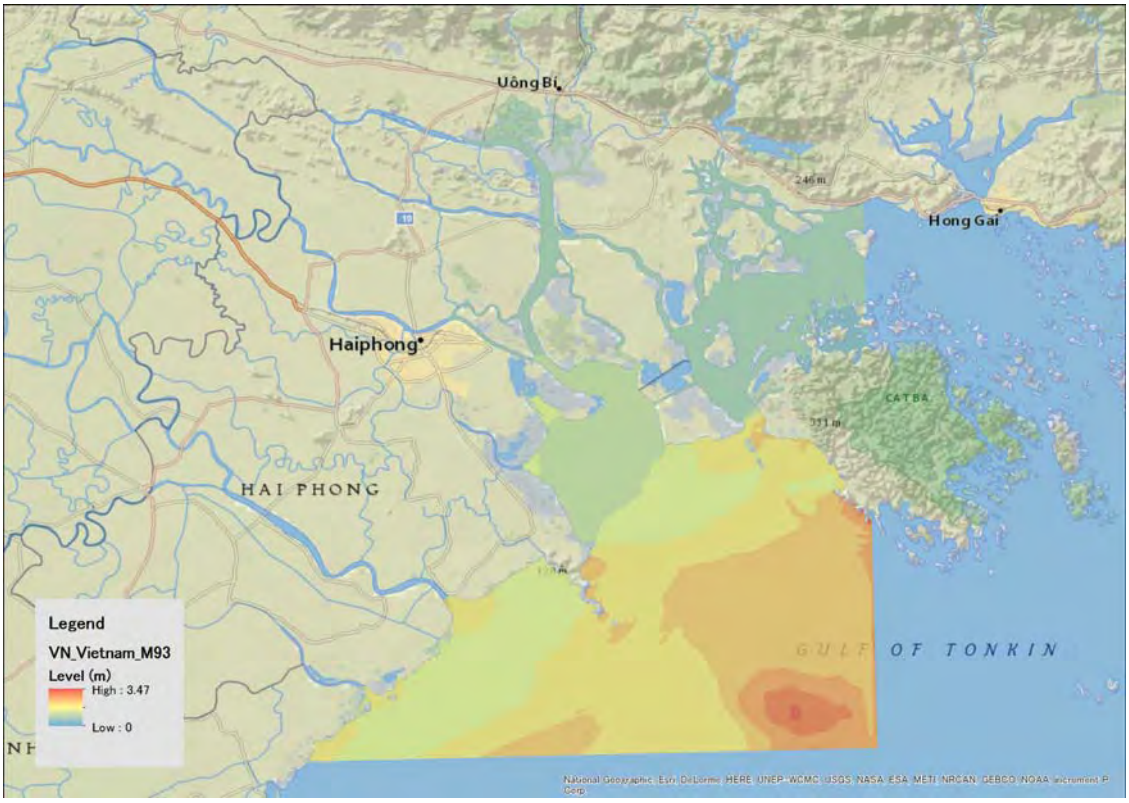

Figure 3.9 Distribution of Tsunami Simulation result for Mw 9.3 earthquake in and around Haiphong, Vietnam

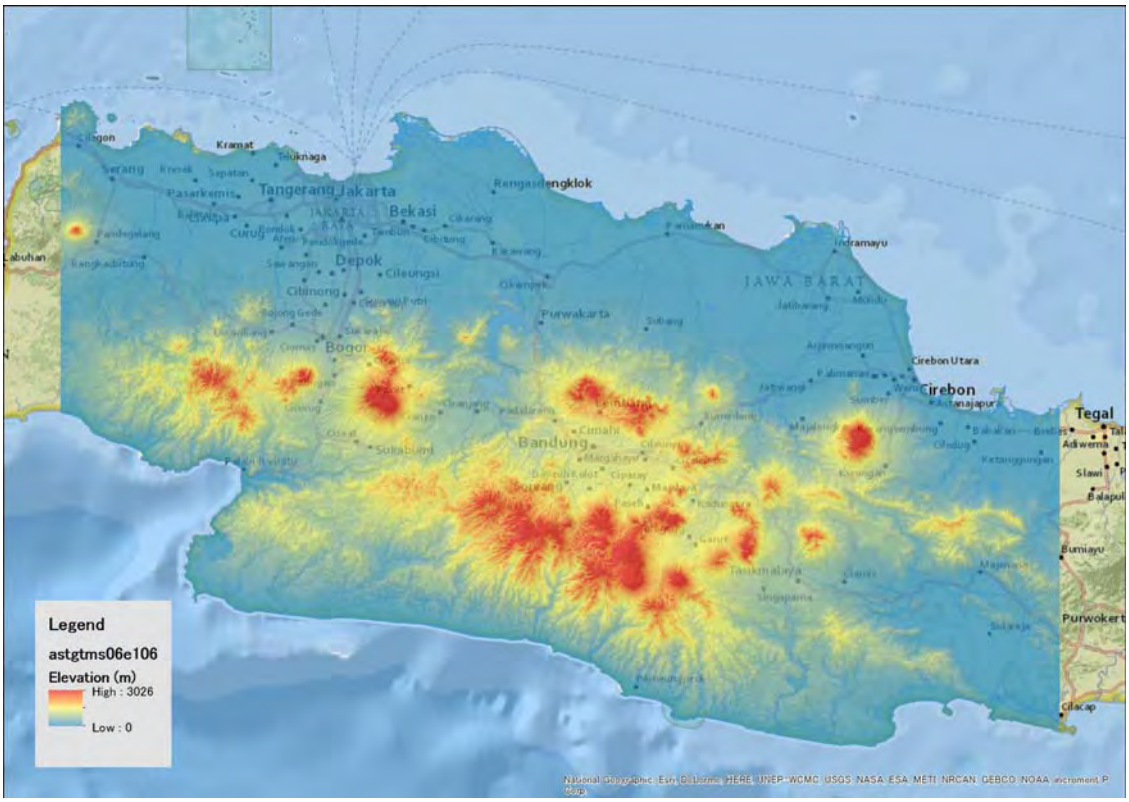

Figure 3.10 Distribution of Digital Elevation Model (DEM) by Aster GDEM in and around Jakarta, Indonesia

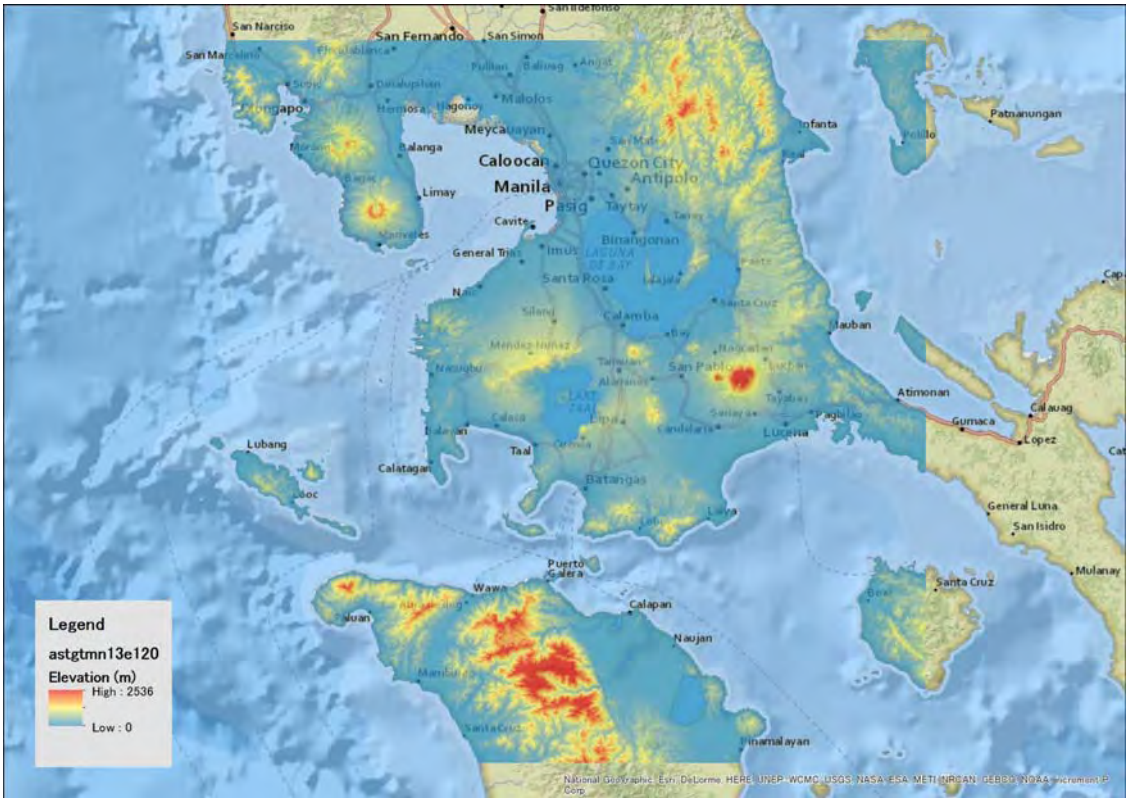

Figure 3.11 Distribution of Digital Elevation Model (DEM) by Aster GDEM in and around Manila, the Philippines

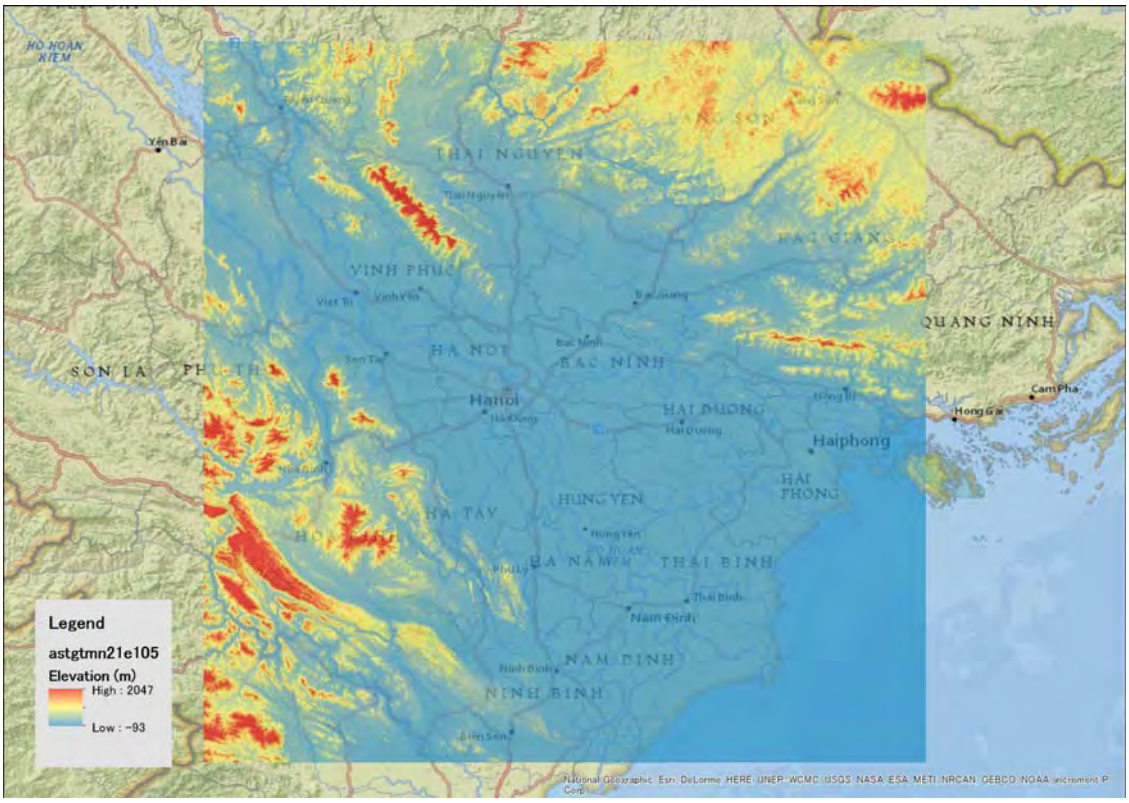

Figure 3.12 Distribution of Digital Elevation Model (DEM) by Aster GDEM in and around Haiphong, Vietnam

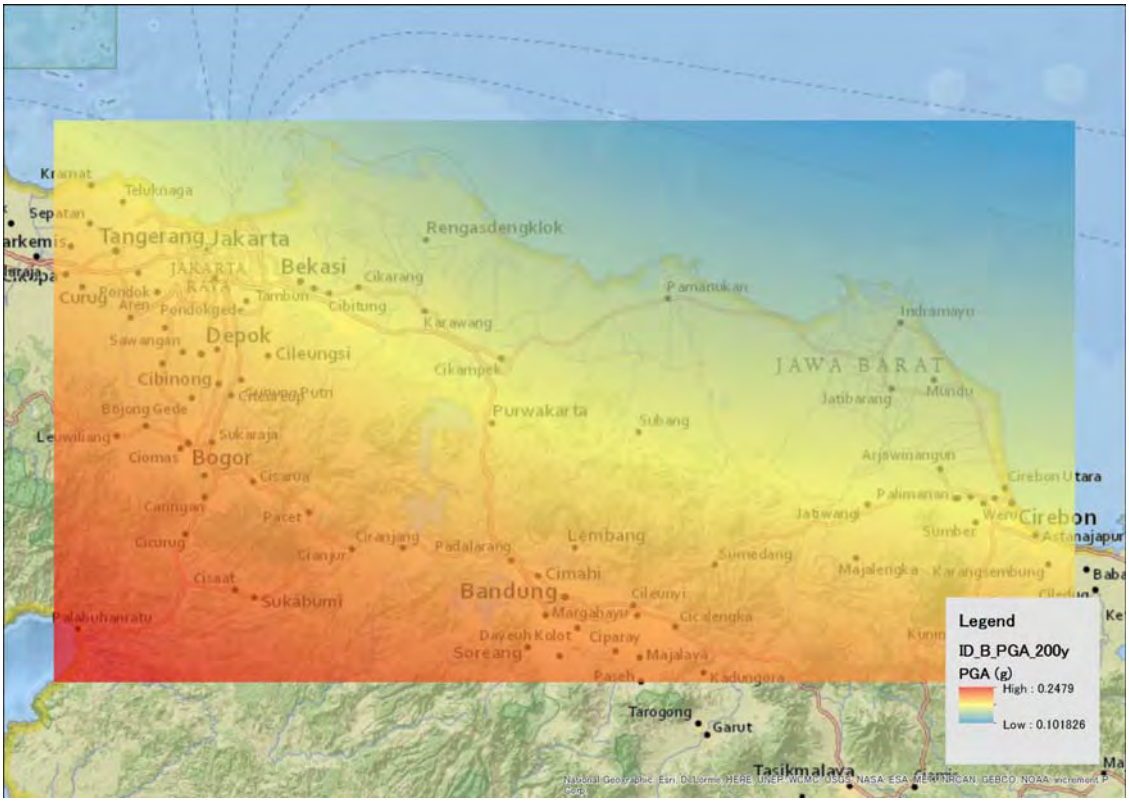

Figure 3.13 Distribution of Peak Ground Acceleration (PGA) on Baserock in and around Jakarta, Indonesia

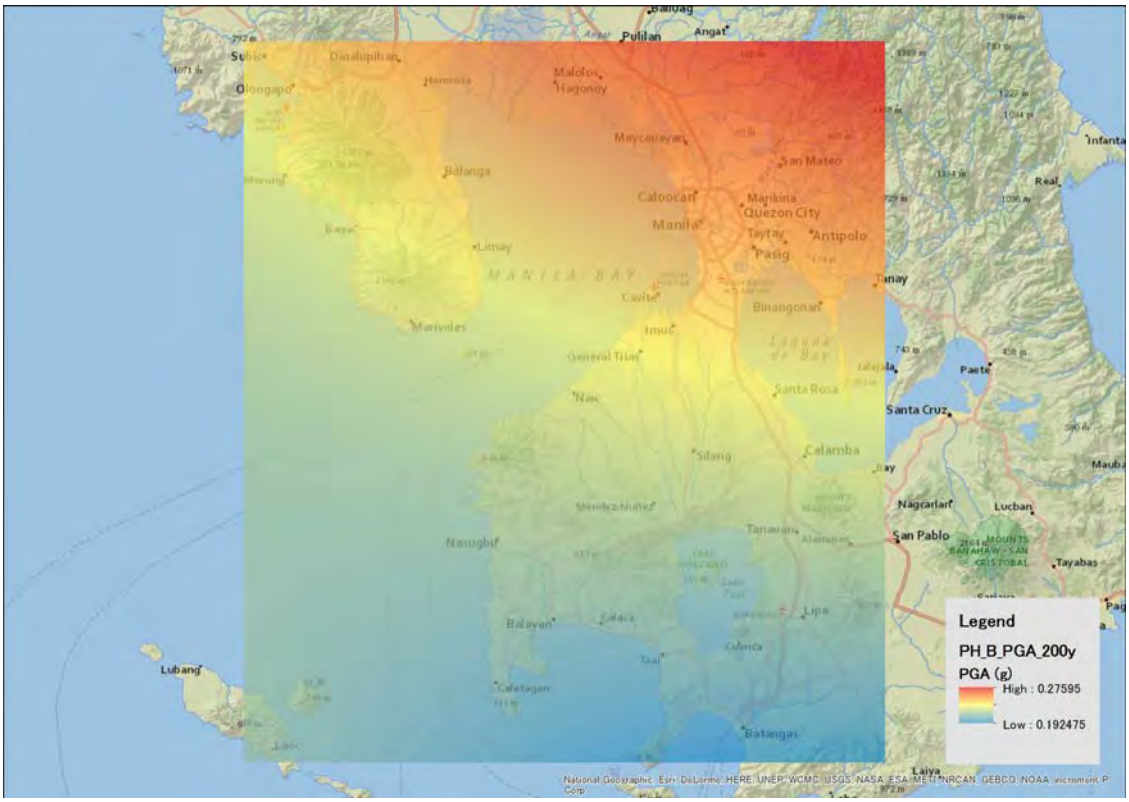

Figure 3.14 Distribution of Peak Ground Acceleration (PGA) on Baserock in and around Manila, the Philippines

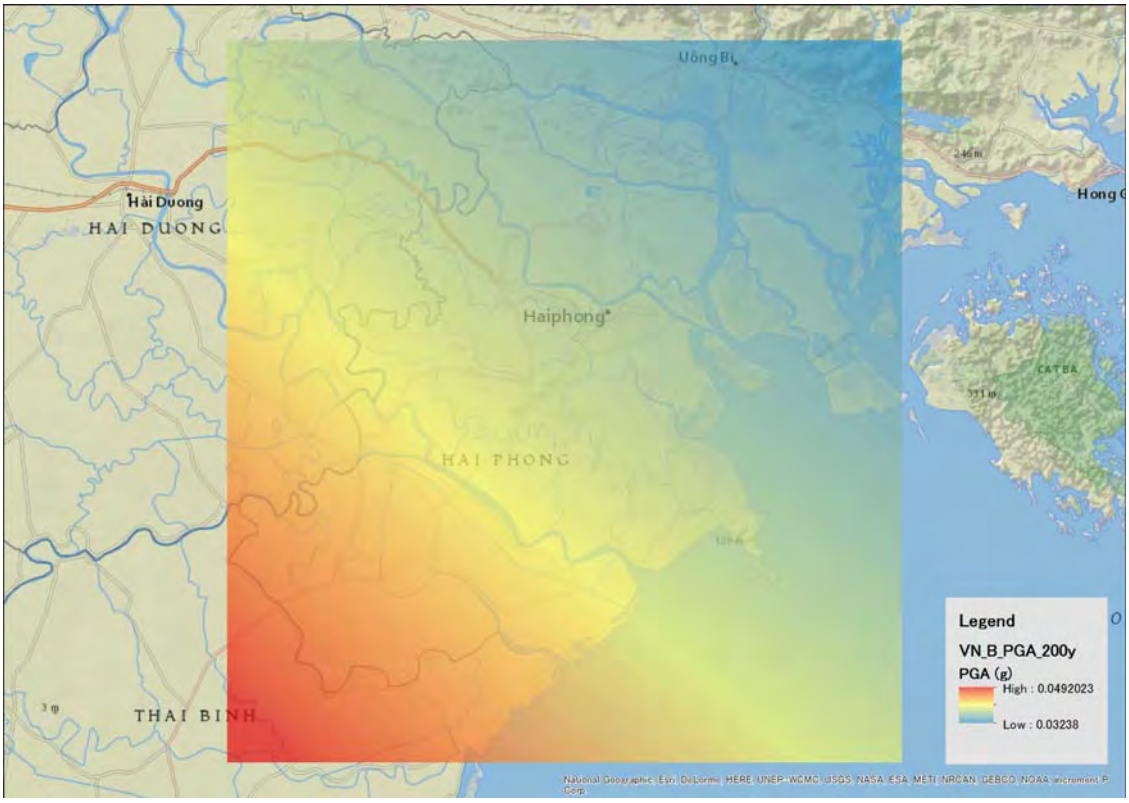

Figure 3.15 Distribution of Peak Ground Acceleration (PGA) on Baserock in and around Haiphong, Vietnam

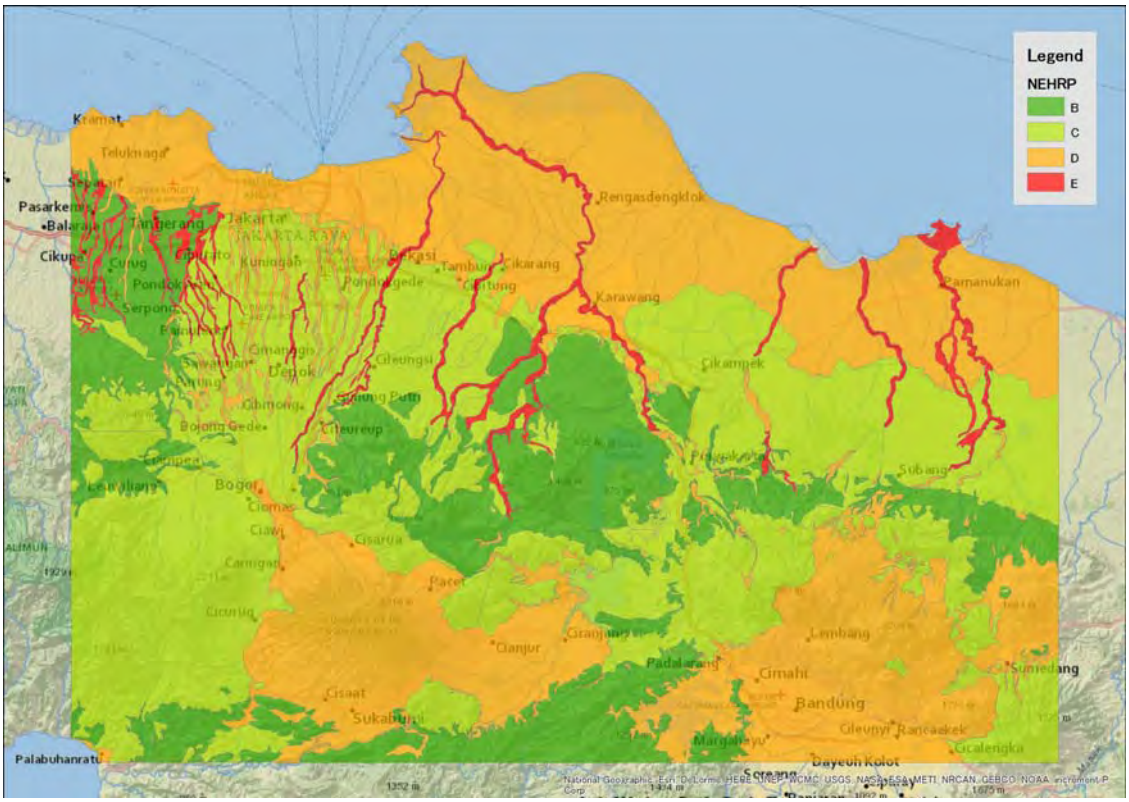

Figure 3.16 Geologic Map classified by NEHRP in and around Jakarta, Indonesia

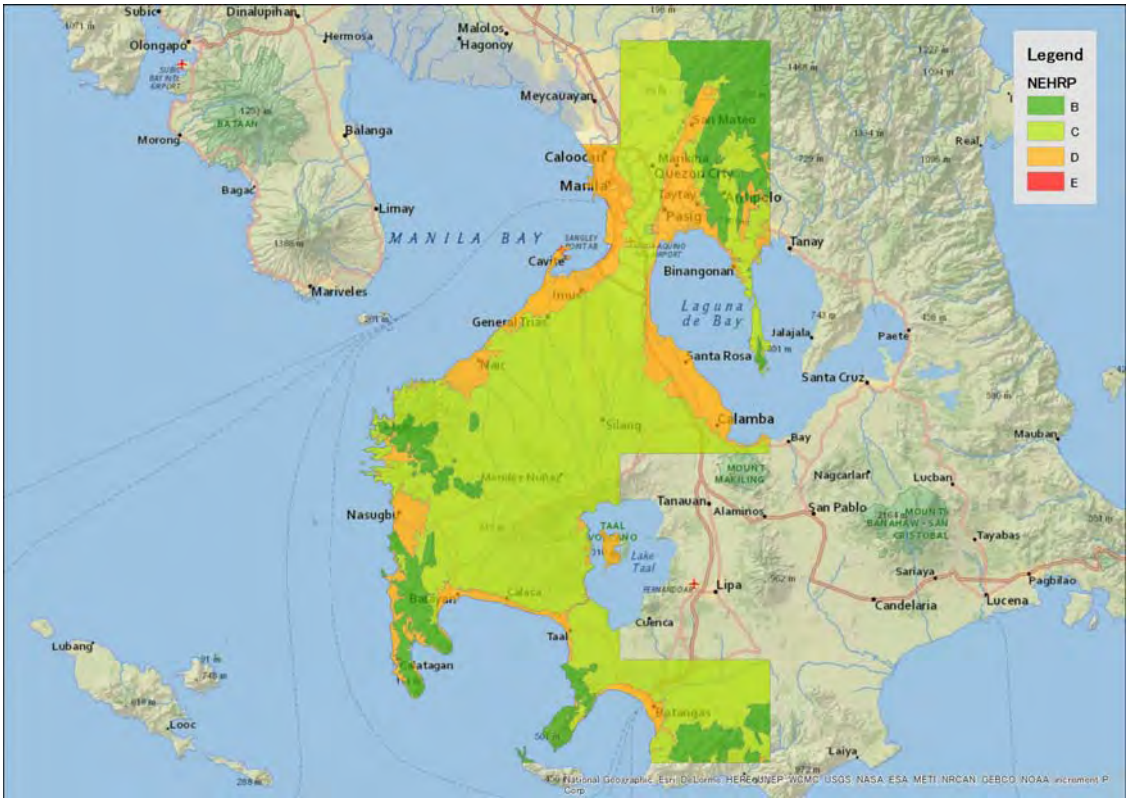

Figure 3.17 Geologic Map classified by NEHRP
in and around Manila, the Philippines

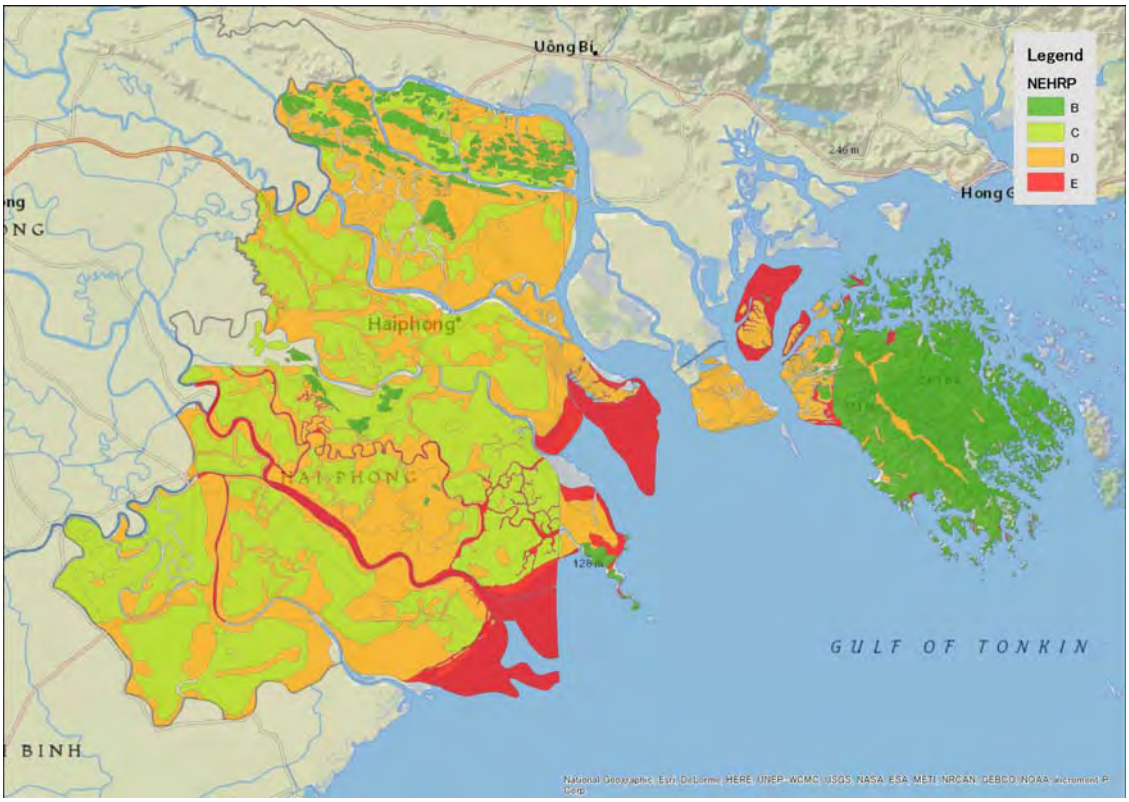

Figure 3.18 Geologic Map classified by NEHRP
in and around Haiphong, Vietnam

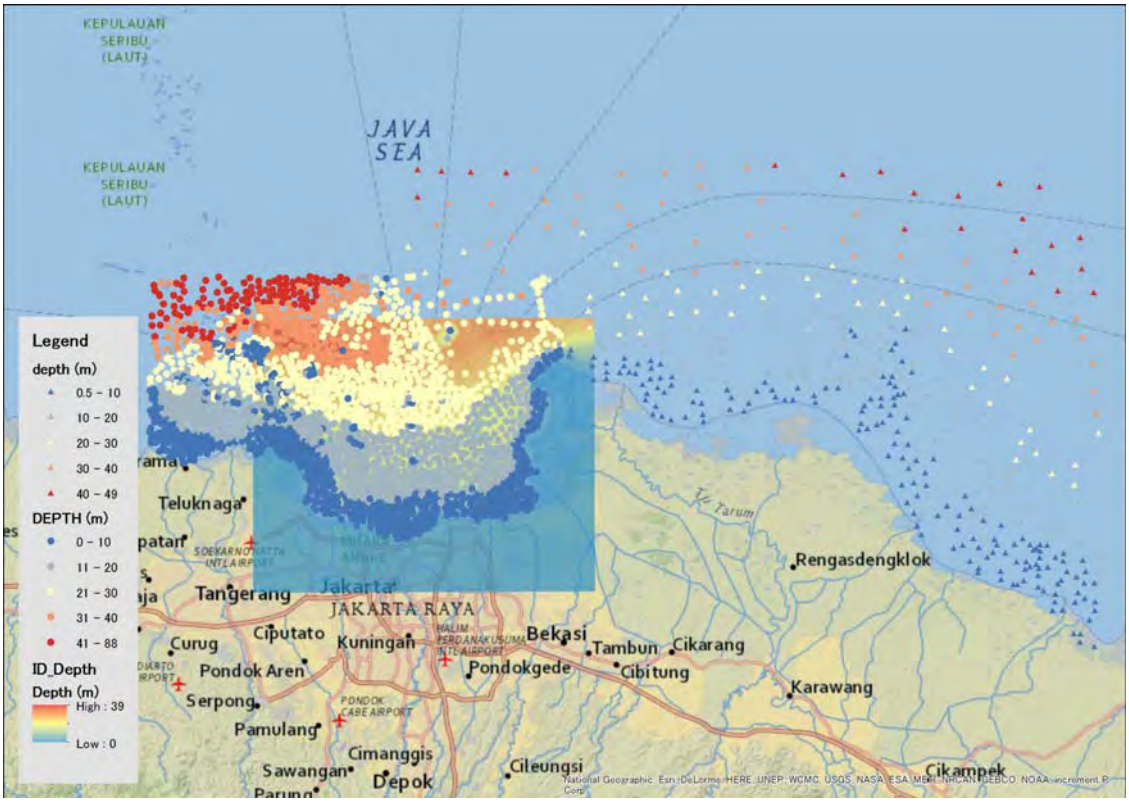

Figure 3.19 Distribution of Bathymetric Data for Tsunami Simulation in and around Jakarta, Indonesia

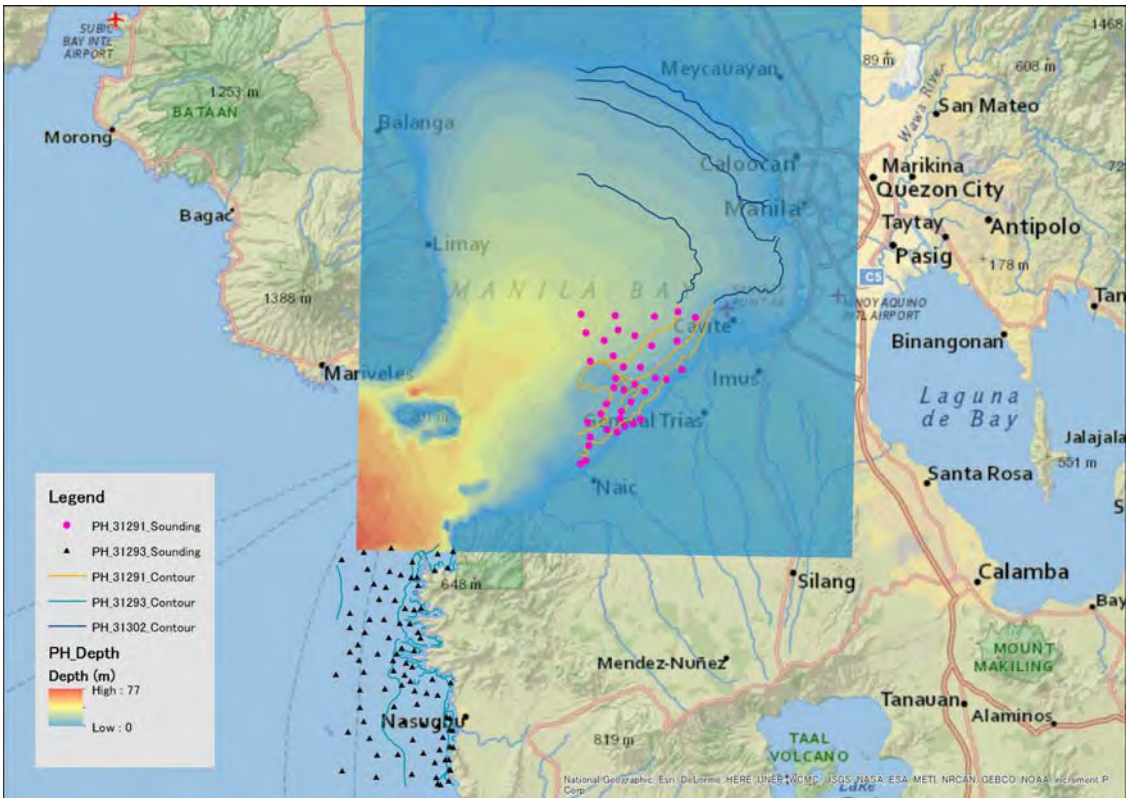

Figure 3.20 Distribution of Bathymetric Data for Tsunami Simulation in and around Manila, the Philippines

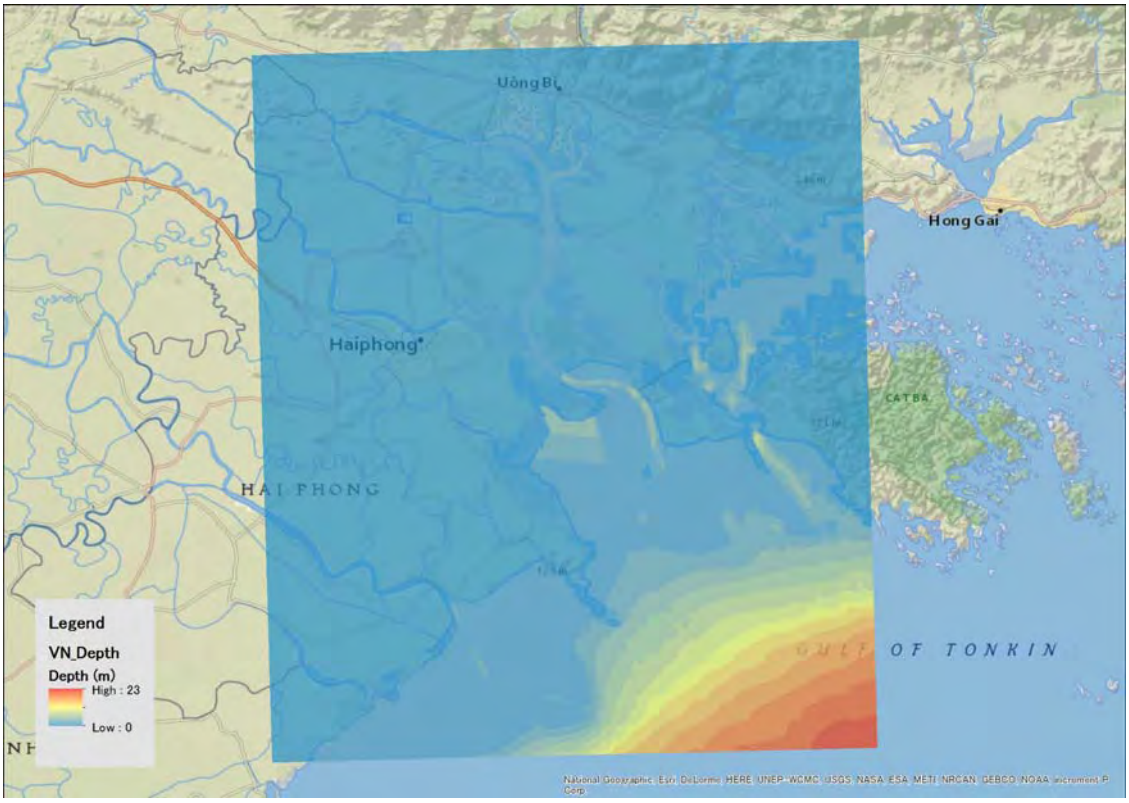

Figure 3.21 Distribution of Bathymetric Data for Tsunami Simulation in and around Haiphong, Vietnam

4 Existing GIS Hazard Maps

4.1 Type of Hazard Maps

4.1.1 PHIVOLCS

Folder: Existing Hazard Maps¥PHIVOLCS

Database Format

File Type: Personal Geodatabase (mdb)

Geodatabase Name and Layer Name with GIS Data Type

Laguna_Cavite_Hazards.mdb

Active_Fault	Vector (Polyline)
GroundShaking_Intensity_Cavite	Vector (Polygon)
GroundShaking_Intensity_Laguna	Vector (Polygon)
Lahar_Hazard_Laguna	Vector (Polygon)
Landslide_Susceptibility_Cavite	Vector (Polygon)
Landslide_Susceptibility _Laguna	Vector (Polygon)
Liquefaction_Hazard_Cavite	Vector (Polygon)
Liquefaction_Hazard _Laguna	Vector (Polygon)
Tsunami_Hazard_Cavite	Vector (Polygon)

Arc Map Document:

PHIVOLCS_ActiveFault.mxd
PHIVOLCS_GroundShaking_Cavite_Laguna.mxd
PHIVOLCS_Lahar_Laguna.mxd
PHIVOLCS_Landslide_Cavite_Laguna.mxd
PHIVOLCS_Liquefaction_Cavite_Laguna.mxd
PHIVOLCS_Tsunami_Cavite.mxd

4.1.2 BNPB

Folder: Existing Hazard Maps¥BNPB

Database Format

File Type: Layer file (lyr) ArcGIS Map Service by internet

File Name

Abrasi_Coast_Erosion.lyr
Ancaman_Bencana_All_Layers.lyr
Banjir_Flood.lyr
Epidemi_Epidemic.lyr
Gempabumi_Earthquake.lyr
Gunungapi_Volcano.lyr
Kebakaran_Hutan_Lahan_Fire_ForestLand.lyr

Kebakaran_Permukiman_Filre_Settlement.lyr
Kegagalan_Teknologi_Failure_Technology.lyr
Kekeringan_Drought.lyr
Konflik_Sosial_Social_Conflict.lyr
Longsor_Landslide.lyr
Putting_Beliung_Whirlwind.lyr
Tsunami_Tsunami.lyr

Arc Map Document:

BNPB_Hazard_Thematic.mxd

4.2 Data Explanation

4.2.1 PHIVOLCS

Major Attributes

Active_Fault

Field Name	**Data Type**	**Explanation**
FAULT_NAME	Text	Fault System Name (Valley Fault System)
SEG_NAME	Text	Fault Segment Name (West Valley Fault)
TRACE_TYPE	Text	Trace Type (Certain, Down thrown Area, Approximate, Concealed)
NOTES	Text	Notes of editing line data

Ground Shaking_Intensity_*** (Cavite, Laguna)

Field Name	**Data Type**	**Explanation**
Intensity	Integer	Value of MMI (Modified Mercalli Intensity)

Lahar_Hazard_Laguna

Field Name	**Data Type**	**Explanation**
Lahar	Text	Susceptibility of Lahar (High, Moderate, Low)

Landslide_Susceptibility_*** (Cavite, Laguna)

Field Name	**Data Type**	**Explanation**
Susceptibi	Text	Susceptibility of Landslide (High, Moderate, Low)

Liquefaction_Hazard_*** (Cavite, Laguna)

Field Name	**Data Type**	**Explanation**
Hazard	Text	Susceptibility of Liquefaction (High, Moderate, Low)

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Tsunami_Hazard_Cavite

Field Name	Data Type	Explanation
ID	Text	ID (0 or NULL)

All hazard polygons are the same hazard level.

4.2.2 BNPB

Raster Cell Value

Raster cell value shows Index Class for each hazard by three classes, Low, Medium and High.

Please find PDF document named “Pedoman Kjian Rsiko.pdf” in the following folder.

¥Existing Hazard Maps¥BNPB¥Doc

757

4.3 Map Images

A) PHIVOLCS

Figure 4.1 Distribution of Active Fault (ground failure hazard)

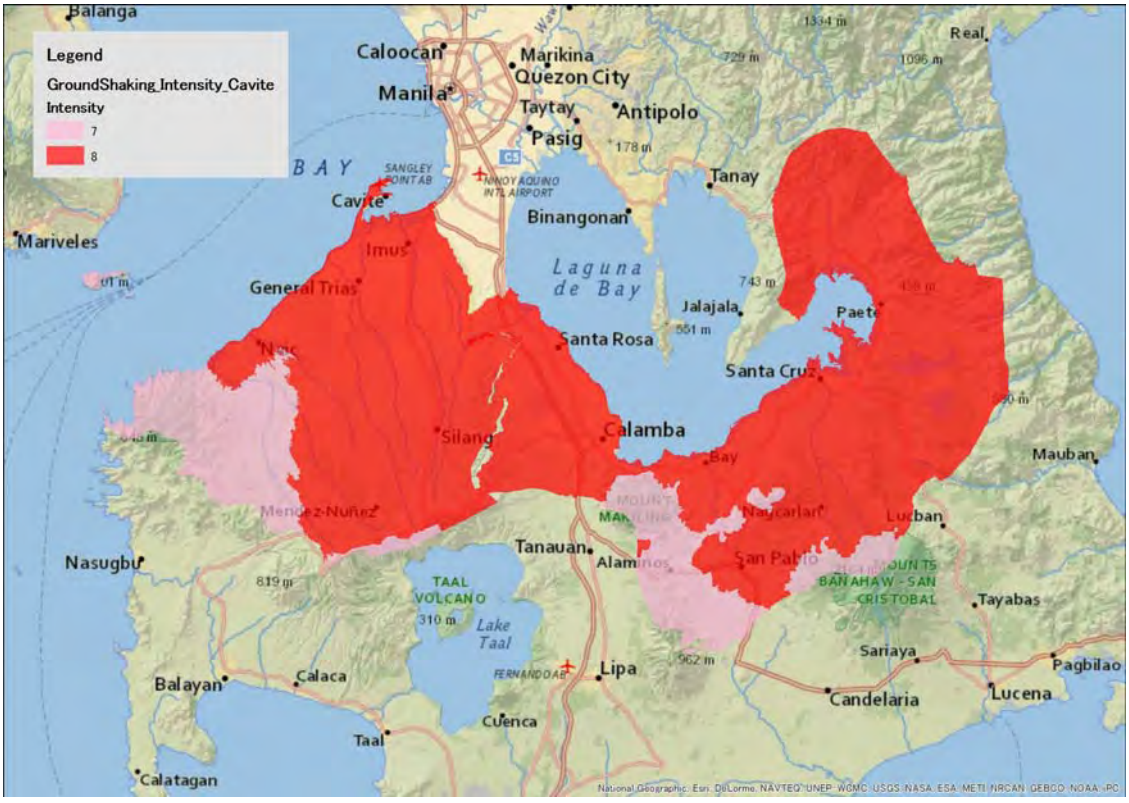


Figure 4.2 Distribution of Ground Shaking Intensity (MMI)

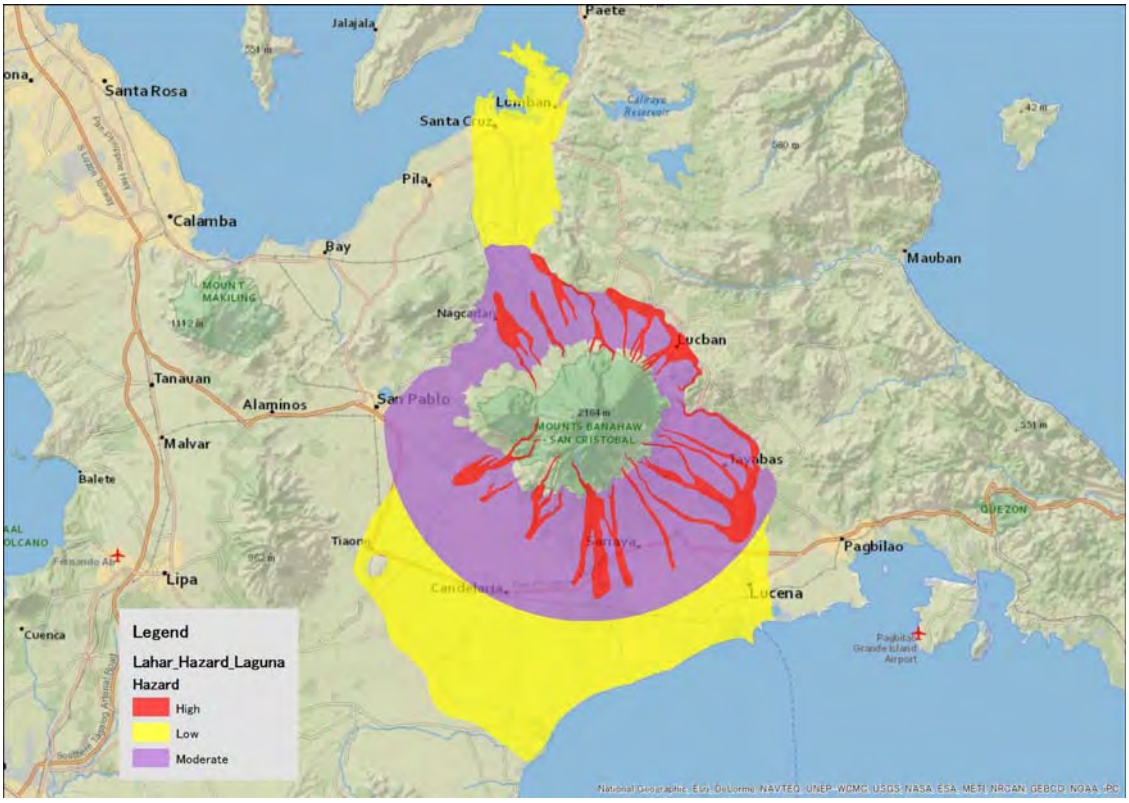


Figure 4.3 Distribution of Lahar Hazard

Figure 4.4 Distribution of Landslide Hazard

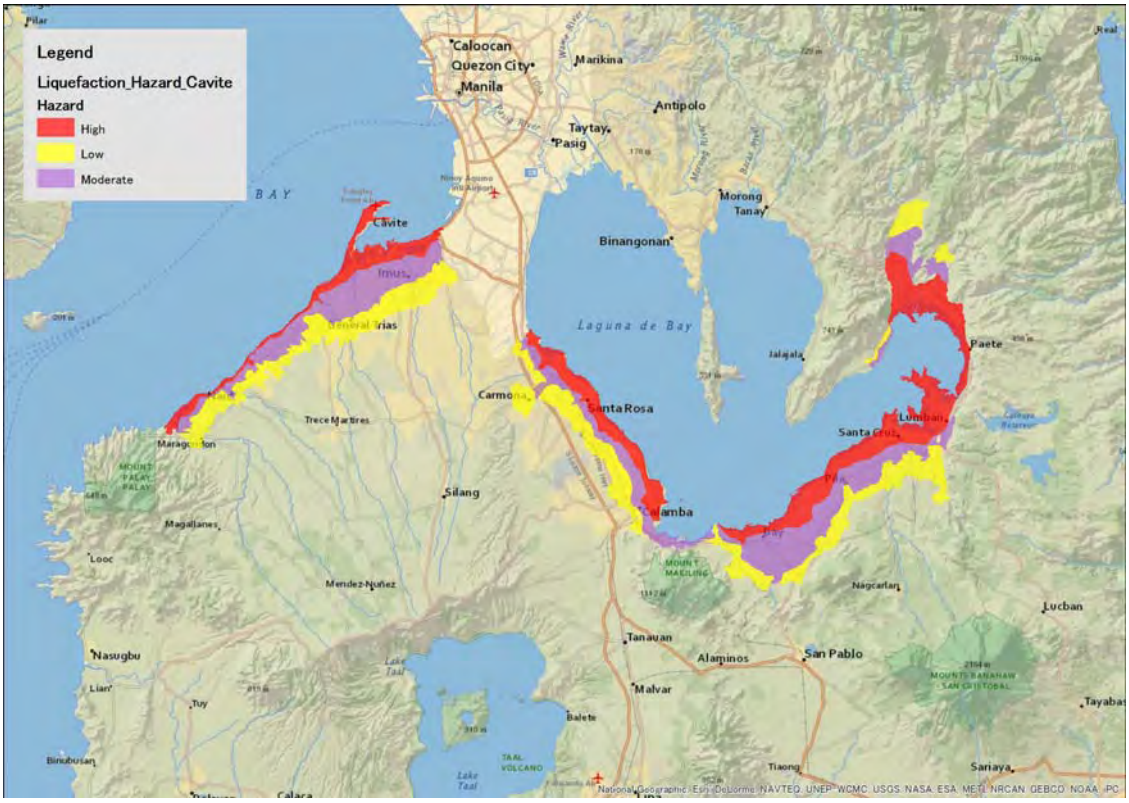


Figure 4.5 Distribution of Liquefaction Hazard

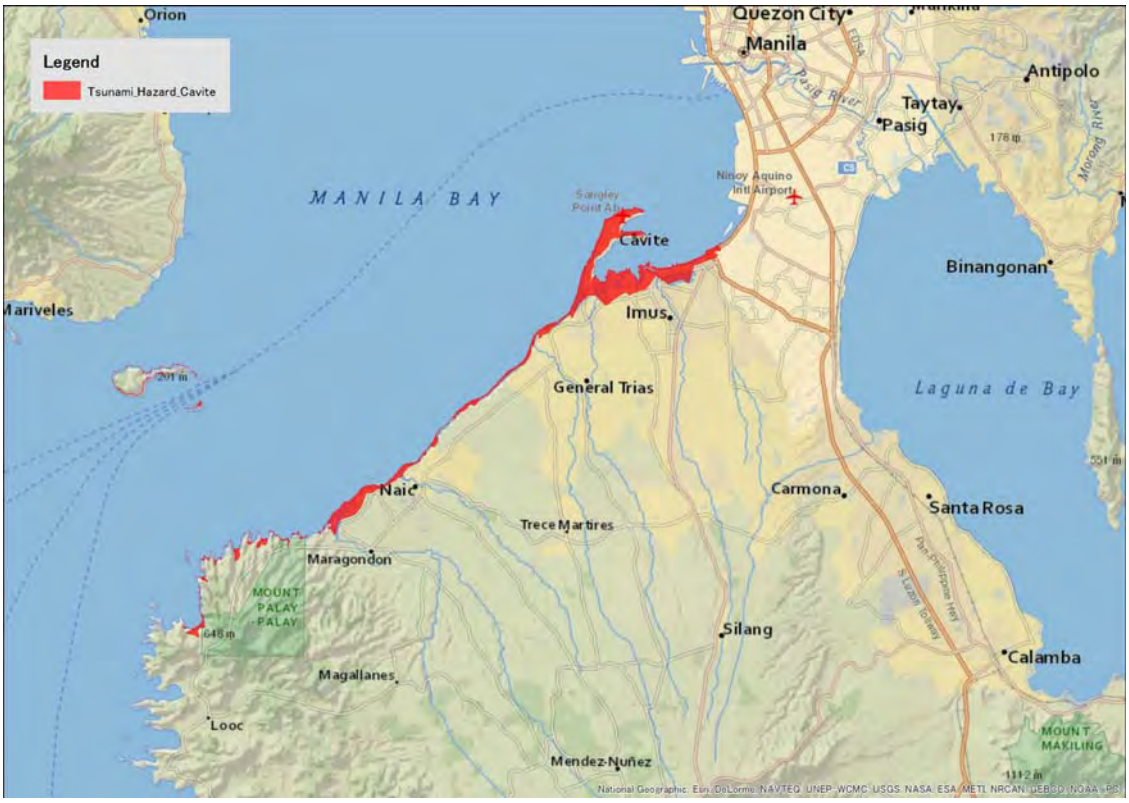


Figure 4.6 Distribution of Tsunami Hazard

B) BNPB

Figure 4.7 Distribution of Coast Erosion Hazard

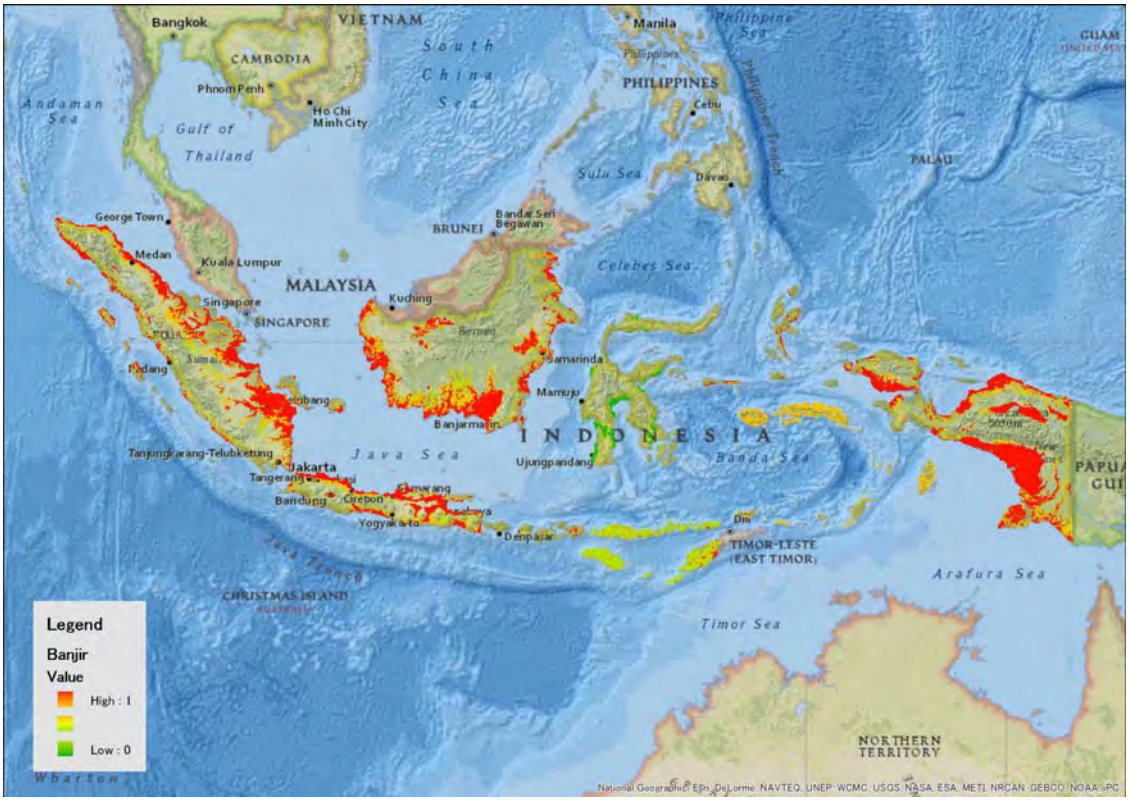


Figure 4.8 Distribution of Flood Hazard

761

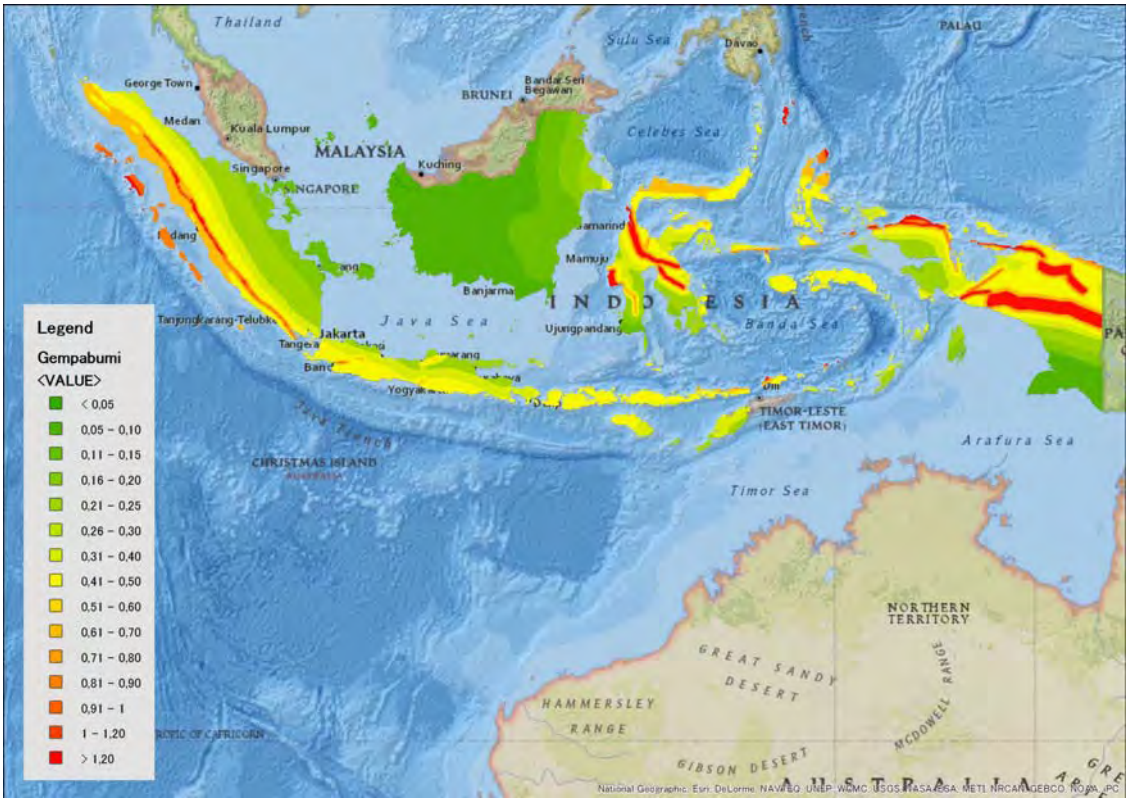


Figure 4.9 Distribution of Seismic Hazard

Figure 4.10 Distribution of Volcanic Hazard

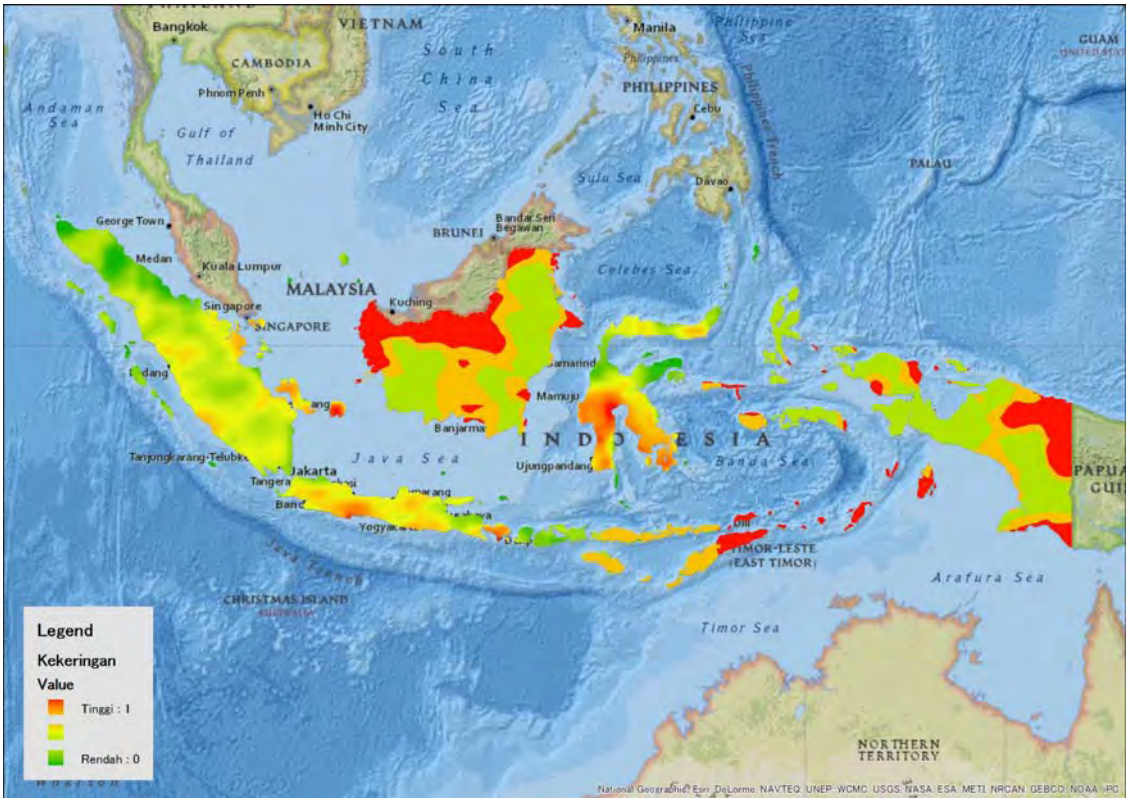


Figure 4.11 Distribution of Drought Hazard

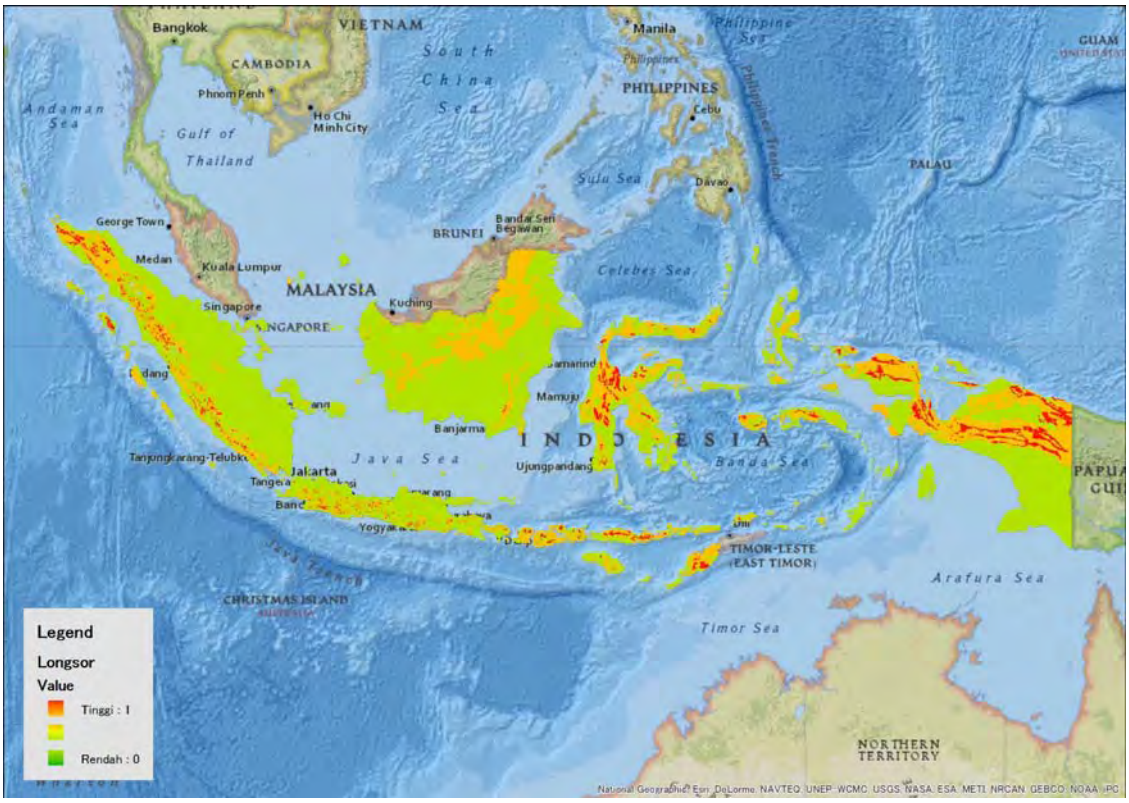


Figure 4.12 Distribution of Landslide Hazard

Figure 4.13 Distribution of Whirlwind Hazard

Figure 4.14 Distribution of Tsunami Hazard

A11 Project News

A8-0_Project News 0
A8-1_Project News 1
A8-2_Project News 2
A8-3_Project News 3
A8-4_Project News 4
A8-5_Project News 5
A8-6_Project News 6
A8-7_Project News 7

AHA CENTRE
ASEAN Coordinating Centre for Humanitarian Assistance on disaster management

A-BCP News No.0 2013. 07 30

JICA

Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region

AHA Centre
Japan International Cooperation Agency
OYO International Corporation
Mitsubishi Research Institute, Inc.
CTI Engineering International Co., Ltd.

Background to the Investigation

The Great East Japan Earthquake occurred on March 11, 2011 had a negative impact on the business activities of many enterprises, including business interruptions or a decline in the operational level due to a shortage in the supply of energy, water, etc. Besides, the Flood of the Chao Phraya River occurred in Thailand in the same year caused direct damages to the industrial agglomerated areas where industrial complexes were located, and inflicted heavy losses on the Thai economy. Those disasters made us aware that a disaster can pose a high risk of business slowdown and cause impacts on not only the national economy but also the regional and world economy.

The countries in the ASEAN region have been suffering constantly by natural disasters, such as typhoons/cyclones and floods, and they face an extremely high risk of being hit by earthquakes and tsunamis. In the case of a large scale natural disaster, basic infrastructure ceases to function, including cessation of electricity and water supply, disruption of distribution channels, and thus there is a limit to what individual enterprises can do. Under such circumstances, a local authority who administers the industrial agglomerated areas and/or the national authority have responsibility to properly grasp the risk in the area and to make efforts for risk management, including disaster-prevention measures.

The efforts for business continuation made by individual enterprises, which are viewed as managerial-level strategic issues, aim to protect the enterprises from losing their customers, market share or corporate reputation due to interruption of important business activities. In preparation for business interruption or disturbance, they should plan how to resume operations, rebuild their businesses and restore them to the predetermined level.

This investigation is a new attempt. It aims to help reduce economic impact and damages in industrial agglomerated areas caused by natural disasters, by examining individual efforts to be made by local authorities and private enterprises related to industrial agglomerated areas, and ideal cooperation and collaboration among them.

A plan for wide-area efforts to reduce economic impact and damages in industrial agglomerated areas caused by natural disasters is called an “Area BCP (Business Continuity Plan)”.

Outline of the investigation

Implementing agencies

The investigation will be conducted jointly by the AHA Centre (ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management) and JICA (Japan International Cooperation Agency). The AHA Centre is an international agency, which was established on November 17, 2011, in accordance with the AADMER (ASEAN Agreement on Disaster Management and Emergency Response). It communicates and coordinates with related organizations in order to respond to natural disasters occurred in the ASEAN region and carries out activities for the improvement of disaster-response capabilities of ASEAN member states.

Purpose of the investigation

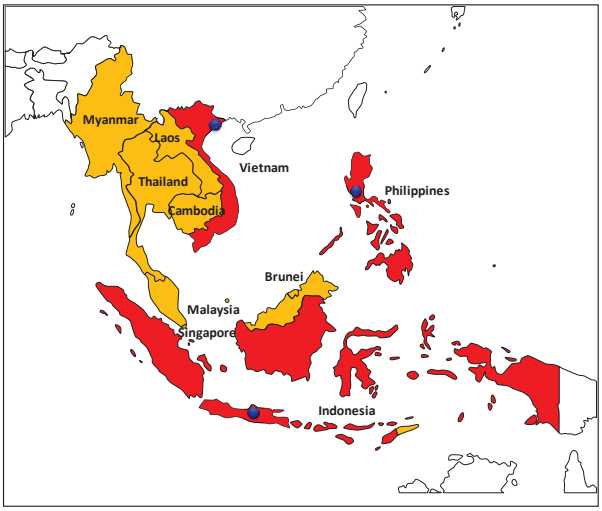
The investigation aims to assess natural disaster risk in industrial agglomerated areas in the ASEAN region and examine the regional impacts. It also aims to select a pilot area and formulate an Area BCP.

Investigation period

From February 2013 to August 2014

Countries investigated

The investigation will be conducted in 10 ASEAN member states. Further, a representative industrial agglomerated area chosen from each of three countries, Indonesia, the Philippines and Vietnam, will be designated as a pilot area, for which an Area BCP should be formulated.



Study Area: 10 ASEAN member states (The areas indicated in red are pilot countries.)

Natural disasters investigated

Natural disasters to be investigated will include floods, typhoons/hurricanes, storm surges, earthquakes, volcanic activity/eruption, and sediment disasters. They will not include any biological hazards, such as an outbreak of infectious disease and viral infection of animals and infections.

Investigation items

[Component 1]
Areas investigated: 10 ASEAN member states

(1) Mapping of industrial agglomerated areas in each ASEAN member state
(2) Vulnerability assessment on distribution infrastructure, such as airports, port/harbors and roads, and grasp of the actual conditions of supply chains
(3) Integrated analysis of hazards and vulnerability, and supposition of wide-area impact

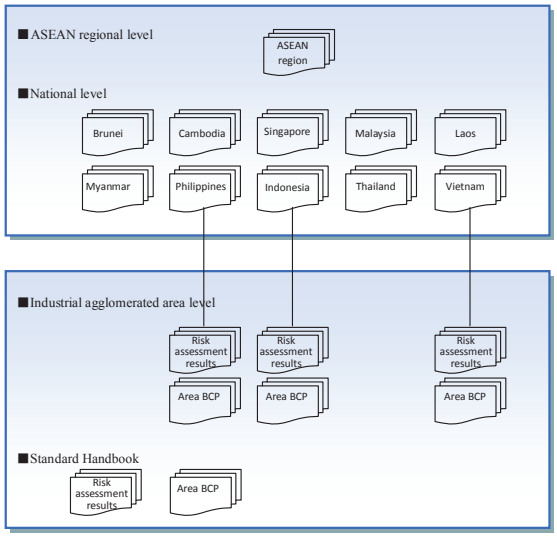
[Component 2]
Areas investigated: Pilot areas which are three industrial agglomerated areas, each of which is chosen from three countries, Indonesia, the Philippines and Vietnam

(1) Risk assessment in pilot areas (supposition of natural disasters that are likely to happen based on realistic projections; analysis on vulnerability of distribution infrastructure, as well as basic infrastructure, including electricity, energy and water; and risk assessment by integrated analysis)
(2) Formulation of an Area BCP based on risk assessment in each pilot area, and evaluation of the Area BCP
(3) Summarization of the results of risk assessment implemented in pilot areas and the procedures for formulation of Area BCPs, and preparation of a standard guidebook for formulation of an Area BCP in other areas

Outcome of the investigation

The outcome of the investigation will be summarized in the "National-level Report", "ASEAN Regional-level Report", "Report on Industrial Agglomerated Areas", and "Standard Handbook".

The "Risk Assessment Report including Industrial Agglomerated Areas and Related Social Infrastructure" on a national level will be made in each of 10 ASEAN member states, aiming at offering information and data on natural disaster risks, industrial agglomerated areas, related social infrastructure, and disaster prevention efforts in each country. Information and data on 10 member states will be compared in the "ASEAN Regional-level Assessment Report".



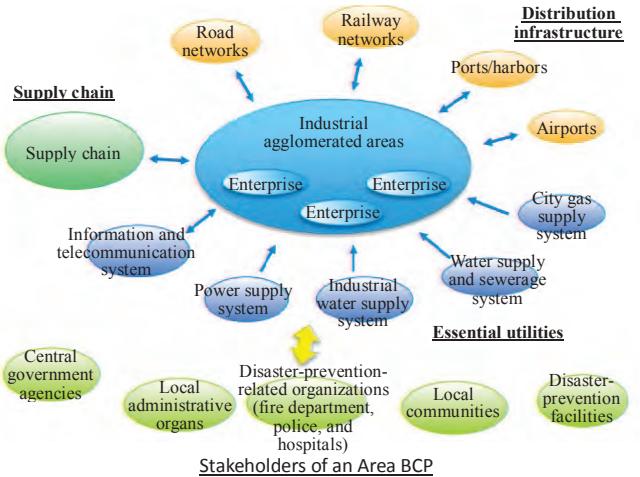
Outcome of the investigation

The "Natural Disaster Risk Assessment Report and Area BCP" prepared for industrial agglomerated areas should summarize the natural disaster risk in industrial agglomerated areas chosen as pilot areas, as well as more detailed information and data on industrial agglomerated areas, related social infrastructure and disaster prevention efforts. Based on the report, a plan for efforts to reduce economic impact and damages caused by a natural disaster in an industrial agglomerated area will be formulated.

The "Standard Handbook" is a guideline for the implementation of "natural disaster risk assessment" and "formulation of Area BCPs" in other industrial agglomerated areas in ASEAN member states based on the experiences and lessons gained in pilot areas.

Stakeholders of Area BCPs

In order to reduce the impact of a natural disaster on the industry and economy, efforts by various organizations and cooperation among them are needed. Those efforts and cooperation involve enterprises located in industrial agglomerated areas, business operators of distribution infrastructure (e.g. roads, railways, ports/harbors, airports) and essential utilities (electricity, water, fuels, information, telecommunication), and supply chains. Furthermore, it is important to receive support from local authorities, related national organizations, disaster-prevention agencies (e.g. fire departments, police and hospitals), and local communities.



Stakeholders of an Area BCP

Workshops etc.

An Area BCP is a new approach, and any systematic method has not been established yet. Therefore, it is necessary to promote it within the ASEAN region by constructing ideas through meetings, seminars, workshops, etc. listed below, which will be held in the investigation period with the cooperation with intellectuals at home and abroad. Using public relations materials and videos, we intend to make people aware that it is important to advance efforts for Area BCPs in order to reduce natural disaster risks posed to the industry and economy.

Name of meetings etc.	Description
National support committee	It receives advice from experts and intellectuals in Japan regarding the concepts and efforts for Area BCPs, natural disaster risk assessment methods, etc.
Expert and intellectual panels in the ASEAN region and the relevant country	It receives advice from experts and intellectuals in the ASEAN region regarding the efforts for Area BCPs and natural disaster risk assessment, as well as regarding the method of reflecting the regional characteristics of the ASEAN region. The panel members are expected to play a role in promoting the efforts for Area BCPs and BCPs in the ASEAN region.
Working-level workshop	It is participated by working-level officials (managerial level) of organizations involved in disaster prevention, economy/industry, researches, etc. from 10 ASEAN member states. They are expected to play a role in communicating the significance and importance of the efforts for Area BCPs and BCPs and promoting efforts in their own countries.
Interim presentation	It is participated by the parties concerned with the efforts for Area BCPs in pilot areas. They are expected to communicate the efforts for Area BCPs and BCPs and their significance and importance using the outcome of the investigation.
Meeting to report results at the AHA Centre	It is participated by various organizations, including the parties concerned with Area BCPs. They are expected to report the results of the investigation and communicate the significance and importance of the efforts for Area BCPs and BCPs.
Seminar for the parties concerned with industrial agglomerated areas and private enterprises	It is participated by the parties concerned with industrial agglomerated areas and private enterprises in pilot areas. They are expected to communicate the efforts for Area BCPs and BCPs and their significance and importance using the outcome of the investigation.

Contact Address
E-mail to : asean.bcp@oyointer.com
(Contact : Ms. NONAKA)

AHA CENTRE
ASEAN Coordinating Centre for Humanitarian Assistance on disaster management

A-BCP News No. 1 2013. 02. 10

JICA

Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region

AHA Centre
Japan International Cooperation Agency
OYO International Corporation
Mitsubishi Research Institute, Inc.
CTI Engineering International Co., Ltd.

Why the Project is Necessary ?

In collaboration with the ASEAN Coordination Centre for Humanitarian Assistance on Disaster Management (AHA Centre), Japan International Cooperation Agency (JICA) has launched a study, "Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region", in February 2013. The Study aims to support local efforts in the ASEAN Region to minimize economic damages and/or losses of areas where industries are concentrated (Industrial Agglomerated Area), when large scale natural disasters strike. The ASEAN Committee on Disaster Management (ACDM) positively welcomed the Study.

The 2011 Great East Japan Earthquake caused the unprecedented disasters. Many private enterprises have suffered heavily and compelled to terminate operations or dropped operations level due to shortages of supply. The 2011 Flood of the Chao Phraya River in Thailand caused direct damages to industrial establishments and thus huge negative impact on economy. The disasters remind high risks of business termination, and also that the natural disasters can cause not only human causality but also impacts on national, regional and further more the world economy.

Photo1 Flood of the Chao Phraya

The countries in the ASEAN region have been suffering constantly by disasters caused by floods, typhoons/cyclones, earthquakes, tsunamis and others. In the case of a large scale natural disaster, individual enterprises have limitations when they struggle to continue their business, mainly due to malfunctioning of basic infrastructure for distribution, absence of basic supplies such as power, water and information, and disrupted supply chains. For those circumstances, a local authority who administers the area of the Industrial Agglomerated Areas and/or the national authority have responsibility to know the risks of the area and to plan, implement and take measures for minimizing the economic impacts.

The Study will collect, analyze and store information on natural disaster risks, industrial agglomerated areas, infrastructure for distribution, lifelines and supply chains in 10 ASEAN Member States, and prepare database which can be shared in the region.

Three Industrial Agglomerated Areas have been selected from Indonesia, the Philippines and Vietnam for pilot studies. Natural disaster risks will be evaluated and the plans for Regional BCP be prepared for the Industrial Agglomerated Areas. Handbooks describing guidelines for natural disaster risk assessment and Area BCP will be prepared with an aim to be utilized for other Industrial Agglomerated Areas in the region.

Photo2 Keihin Industrial Zone, Japan

The Study will continue for 18 months from February 2013 to August 2014. During the period, leaflets will be published 7 times to share widely the process and outputs of the Study and to disseminate and promote Area BCP.

What is Area BCP?

"Area BCP" is a newly developed concept. It is different from "BCP" adopted by a company or an administrative agency, or from "disaster prevention plan" designed by national or local governments. The main purpose of this research is to answer to the question "What is Area BCP? " and to raise awareness of and encourage efforts in designing "Area BCP" in the ASEAN region. This time we will explain the difference between "BCP" and "Area BCP".

B C P

Recently, the word BCP has become a commonly heard term. BCP is an acronym of Business Continuity Plan, which is a plan designed to protect the company from direct and indirect damages by preventing the company's "Core Business" that has a high priority, from being suspended in emergency circumstances such as earthquakes and

floods, or if they are suspended, by recovering the "Core Business" within "Recovery Time Objective". In order to implement such plan, it becomes important to consider measures as to how to "identify the core business" and "secure business resources". Also, in order to continually enhance the ability to respond to unexpected situation, it becomes necessary to adopt various measures and to provide guidance/trainings as part of Business Continuity Management (BCM).

Photo3 Companies affected by the Great East Japan Earthquake

Especially in the field of international business transaction, BCP is sometimes required as a condition of entering into a contract. In this way, adopting BCP is no longer intended just for damage control but rather it is becoming necessary for business strategy under normal conditions.

Area BCP

"Business Resources" which is vital for BCP, includes Internal Resources that can be managed by each company (e.g. buildings, manufacturing facilities, employees), and External Resources such as lifelines (e.g. electricity, water supply, sewage, communication, etc.) and transport facilities (e.g. roads, railroads, airports, ports). In some cases, measures such as emergency electric generators can be used as an alternate for external resources, but stoppage of society's infrastructure usually becomes the bottleneck of the company's BCP. Since measures that can be adopted by one company are limited due to financial and other reasons, it becomes important, especially in industrial agglomerated areas, to cooperate with other players within the region to secure alternative measures and to jointly request the authorities to improve the society's infrastructure or to amend the administrative procedures/system under emergency situations.

In addition, to the continuity of company's business, coordination with other related organizations within the region also becomes important when carrying out disaster prevention activities in case a disaster occurs in the places where several companies are concentrated in one area such as the case in an Industrial Agglomerated Area. Currently, there is no official definition of the term "Area BCP". However, to give an example, it can be considered as a method to prevent high priority functions in places such as Industrial Agglomerated Area, from being disrupted during emergencies such as earthquakes and floods, or it can be understood as a plan to protect the area by recovering its function within "Recovery Time Objective". Also, because BCP is a plan for management, examining Area BCP will also contribute to clarifying the measures and role of the companies, national/regional governments, and infrastructure providers in solving the issues revealed through the examination process. Therefore, it is expected that, by promoting the implementation of Area BCP while taking into consideration its benefits under normal conditions, each entity will be able to facilitate a more enabling business environment.

Future plan and Events

Timing	Contents
10 Feb.- 9 Mar.	Field Survey(1)(@Indonesia, Singapore, Malaysia, Thailand, Philippine and Vietnam)
Mid. of Feb. - May	Conducting Survey of Industrial Agglomerated Areas
End of Mar.	Submission of Interim Report of Survey of Industrial Agglomerated Areas
11Apr. - 12 Apr.	ERIA Workshop(@Sendai, Japan)
Mid. of Apr	Submission of Study Report 1 Publishing of A-BCP News No.2

This leaflet is named "**A-BCP News**" from the first letter of each of (Area Business Continuity Plan). We are looking forward to a continued relationship.

FOCUS AHA Centre - JICA Study Team

This Project covers wide areas of specialties related to "Natural Disaster Risk Assessment" and "Area BCP Formulation" for floods, typhoons / cyclones, earthquakes, tsunamis and other natural disasters. Two consulting firms and one think tank, namely OYO International Corporation, Mitsubishi Research Institute, Inc. and CTI Engineering International Co., Ltd., who have reputations of their deep knowledge and experiences in the above fields, formed a joint venture to propel for achieving the goal of the Project.

Experienced specialists from three firms are involved in the Project. They are divided into two groups; one is a group of "Natural Disaster Risk Assessment" consisting of specialists of "Risk Assessment", "Flood", "Earthquake / Tsunami / Volcano" and "Cyclone / Meteorological Hazard / Landslide", and other is a group of "Area BCP formulation" consisting of specialists of "Area BCP Formulation", "Analysis of Distribution System", "Economy and Industry Analysis", "Organization and Legislative System" , "Social and Economic Infrastructure" and "Industrial Agglomerated Area". Under the coordination of a specialist of "Disaster Management", two groups share information and integrate works to achieve the goal of the Project.

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A-BCP News No. 2 2014. 01 15

JICA

Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region

AHA Centre
Japan International Cooperation Agency
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Eight months have passed since the starting of our project. We are pleased to share "A-BCP News No. 2" with you which includes our activities carried out from February to June, 2013.

Study Trip 1

The study team visited six countries: Indonesia, the Philippines, Vietnam as pilot countries and Singapore, Malaysia, Thailand as resource countries from February 10 to March 9, 2013. The study team also visited industrial parks in pilot areas and Thailand. The team found some signs left by the Chao Phraya River floods in Rojana industrial park in Thailand (Photo1).

The study team visited disaster prevention/management agencies, local agencies and persons who were recommended as panel members in the pilot countries. They were explained the outline and policy of the study and requested for cooperation. In Indonesia, the study team checked the existing conditions of information system at the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) operations centre in Jakarta.

Photo1　Rojana Industrial Park

1st Supporting Committee Meeting

The first supporting committee meeting was held on April 30, 2013 in Tokyo, Japan. The objectives of the meeting were to receive advices from academicians and experts for better operation and output of the study. The committee meeting was chaired by Dr. Haruo Hayashi from the Disaster Prevention Research Institute of Kyoto University. Professors and experts from the areas of flood, hydro-meteorology, earthquake-tsunami and Business Continuity Plan (BCP) were present in the meeting. Representatives from Ministry of Foreign Affairs and Ministry of Economy, Trade and Industry of Japan attended as observers. Since area BCP is a very new concept, there were some challenges at the starting stage of the study. These challenges were: (1) definition of area BCP (2) efficient approach for disseminating the idea of area BCP to the ASEAN countries and (3) differences in regional disaster management/ prevention plans formulated in ASEAN.

The study team received some more comments on the method of disaster risk assessment. Some professors and experts pointed out that in the pilot areas, people's recognition on the risks is very important. Hence, the study team had to conduct (1) business impact analysis and (2) establishment of utilization mechanism of risk assessment result.

Study Trip 2

Study trip 2 was conducted from June 5 to June 29, 2013. One of the purposes of this trip was to request for cooperation for the BCP formulation workshop planned in November.

The lead implementing organizations for organizing workshops to be conducted in November in each pilot countries are the Ministry of National Development Planning and Regional Disaster Management Agency in Indonesia, National Disaster Risk Reduction and Management Council in the Philippines and Hai Phong People's Committee in Vietnam.

Table1　Lead Implementing Organizations

Country / Category	Central Government	Regional Government
Indonesia	National Disaster Management Agency Ministry of Industry	Regional Development Planning Agency and Regional Disaster Management Agency of West Java Karawang Regency Bekasi Regency Bekasi City
Philippines	National Disaster Risk Reduction and Management Council（Office of Civil Defense） Philippine Economic Zone Authority	Metro Manila Development Authority Cavite Province Laguna Province
Vietnam	Ministry of Agriculture and rural Development	Hai Phong People's Committee

Lead implementing organizations of working group are in red color

The study team also visited and requested infrastructure providers, lifeline providers and private sectors to participate in the workshops for formulating area BCP. At the same time, the study team collected data and information from infrastructure providers, lifeline providers and private sectors. It is very important that all relevant participants involved in the workshop to formulate a functional area BCP when disaster happened.

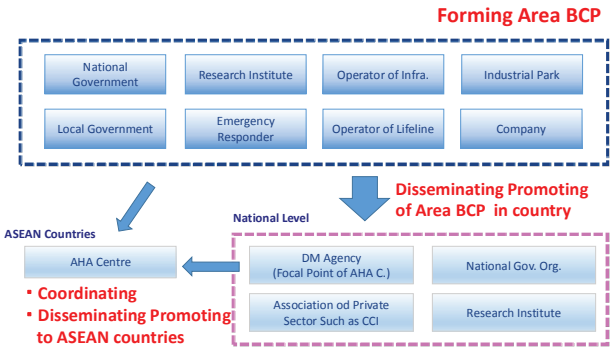


Figure 1 Composition of Working Group

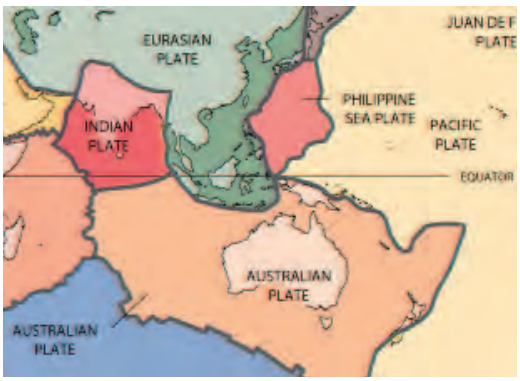
Natural Hazards in ASEAN Region 1 -Earthquake, Tsunami and Volcano-

It was believed traditionally in Japan that the earthquake occurs when a big catfish under the ground goes on a rampage. In an Indonesian folk legend, it was believed that a wild duck ramps about instead of a catfish, and in the Philippines folktales, it is a giant who behaves violently under the ground. So, what is the actual cause of the earthquake? The mainstream of the latest technology explains that the surface of the earth is covered with several plates of rocks, which are called as tectonic plates, and earthquakes occur by the collapse of the rocks when the plates move mutually, passes each other and entering under another. This theory is known as Plate Tectonics. The driving force of the plate movements is the mantle convection in the earth, that is, the globe itself is the driving force of the earthquakes.

Following Plate Tectonic theory, many earthquakes occur along the boundary of tectonic plates. Figure2 shows the distribution of tectonic plates around ASEAN region. The plate boundary runs from Myanmar, south of Indonesia to the Philippines in ASEAN Region. The solid circles in Figure3 denote the hypocenter of the earthquakes which have caused disaster in ASEAN countries; most of them locate along the boundary of the tectonic plates. Some earthquakes occur in the tectonic plates but they are not so usual. Myanmar, Indonesia and Philippines are the countries earthquake occurs easily due to their structures.

Tsunami is the phenomenon when a large volume of seawater is commonly generated due to the displacement of seabed by the earthquakes in marine and coastal regions; however, not all them are raised to sea surface, spread and surge to land. Most earthquakes in the sea produce Tsunami. Large magnitude with shallow depth with vertical slip tends to generate major Tsunami. The regions where one tectonic plates subducts another, have been proven to experience this condition. The 2004 Indian Ocean Tsunami was generated at the Southwest of Sumatra, Indonesia, where Indo-Australian Plate subducts the Eurasian Plate. One important characteristics of Tsunami is the width of the area of influence. The 2004 Tsunami affected not only Indonesia but also Thailand, Myanmar, and furthermore India and Sri Lanka. As the Philippines' ocean plate subducts Eurasian Plate, the Philippines was also affected by the tsunami.

The solid triangles in Figure 3 denote active volcanoes. The distributions of active volcanoes correspond to the hypocenter of destructive earthquakes. This is not the coincidence but due to the fact that the main cause of volcanic activity in ASEAN region is the movement of the tectonic plates. The volcano erupts the magma which was generated by the melted tectonic plates which sub-ducted deep into the ground; therefore, the probable hazardous area by the volcano in ASEAN region is limited to Indonesia and Philippines.



(amended to USGS Web site: http://pubs.usgs.gov/gip/earthq1/index.html)

Figure2 Tectonic Plates around ASEAN region

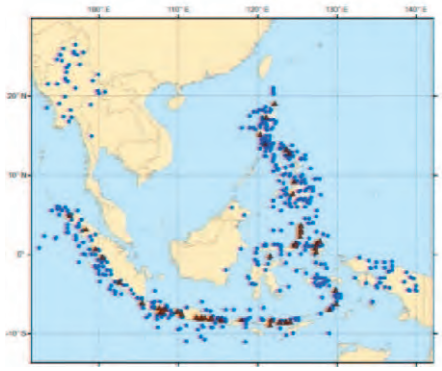


Figure3 Hypocenter of the destructive earthquakes and volcanoes

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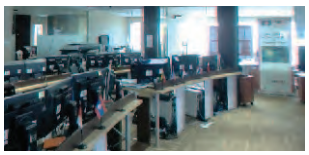
The AHA Centre

The AHA Centre (ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management) was established on 17 November 2011 for the purpose of facilitating co-operation and co-ordination among the affected parties, and with relevant international organizations including United Nations, while promoting regional collaboration. The AHA Centre works on the basis that the affected Party will act first to manage and respond to disasters. In the event that the affected Party requires further assistance to cope with such situation, in addition to direct request to any Assisting Entity, it may seek assistance from the AHA Centre to facilitate such



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A-BCP News No.3 2014. 02.01

JICA

Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region

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"A-BCP News No.3" contains the information on main activities conducted during July to September in 2013.

1st Expert Panel Meeting

1st Expert Panel Meeting was held on July 8, 2013 in Jakarta. The expert panel is a supporting committee by researchers and experts from ASEAN countries. The expert panel consists of 14 members from Indonesia, the Philippines and Vietnam as pilot countries, and Malaysia, Singapore and Thailand as resource countries.

Table1 Expert Panel Members

Countries	Expertise	Organization
Indonesia	Earthquake, Structural Engineering	Ministry of Research and Technology
	Local Development, Local Autonomy	Ministry of National Development Planning
The Philippines	Earthquake, Tsunami, Volcano	Philippine Institute of Volcanology and Seismology
	Flood, Typhoon	Hydrometeorology Division, Philippine Atmospheric, Geophysical & Astronomical Services Administration
	Policy	Metropolitan Manila Development Agency
Vietnam	Flood, Meteorological Hazards (Early Warning)	Deputy Director, National Centre for Hydro-Meteorological Forecasting
	Flood	Hanoi University of Science, Vietnam National University
	Private Sector	Viet Nam Chamber of Commerce and Industry
Singapore	Earthquake, Risk Management	Nanyang Technological University
	Emergency Services	Singapore Civil Defense Force
	BCM, Disaster Recovery Plan (Private Sector)	BCM Institute
Malaysia	Landslide, Local Urban Planning	Ministry of Natural Resources and Environment
	Risk Assessment, Risk Management of Corporates	University Utara Malaysia
Thailand	Flood, Integrated Water Resource Management	Kasetsart University

AHA Centre and the Ministry of Industry of Indonesia, Japanese Embassy, JICA Head Quarter and JICA Indonesia Office from Japan side also participated as observers. Total number of the participants was 32.

The study team explained outline, progress and future plan of the study, and panel members gave many meaningful opinions such as (1) clarification of the necessity of Area BCP in ASEAN region, (2) importance of involving stakeholders widely and clarification of definition of BCP/Area BCP and BCM/Area BCM. Study team will continue the activities using the advices of the panelists.

Photo1 Expert Panel Members

Study Trip-3

Study trip-3 was done from June 31 to August 31, 2013. Main purposes of study trip3- were (1) Pre working group meeting for institutionalization of relevant organization for formulating Area BCP, (2) Data collection and status survey in the pilot countries. 13 team members joined this trip and visited pilot countries and Singapore, as a resource country

【Pre Working Group Meeting】
Pre Working Group Meeting was held on August 22 in Indonesia, on August 13 in the Philippines and on September 19 in Vietnam. Study team explained the purposes of the study, BCP and Area BCP to the relevant organizations such as local governments, infrastructure sector, lifeline sector and private companies for obtaining comprehension and cooperation.

【Data Collection and Status Survey】
Study team members continued data collection and status survey on 10 ASEAN member countries through internet and available documents in Japan. At study trip-3, study team members visited pilot countries for collecting necessary data and documents for writing country reports to be published in March, 2014, and formulation of Area BCP.

2nd Supporting Committee Meeting

2nd Supporting Committee Meeting was held on September 5 in Tokyo, Japan. Study team received many fruitful advices for the workshop for Area BCP formulation after active discussions. The Supporting Committee emphasized that as the Area BCP is the

new concept, stakeholders are requested to understand the differences between “BCP” and “Area BCP” and participate in the workshop actively.

What is the Hazard and Risk Assessment for Area BCP?

The first step of BCP or Area BCP formulation is to know what disaster is plausible to the enterprises or the industrial agglomerated area. The hazard and risk assessment is carried out for this purpose. Then, what is hazard, what is the difference between hazard and risk is considered. The words of hazard and risk are used in many fields and the meanings of those terms are inconsistent. The meanings of hazard and risk in the field of disaster management are explained as follows:

The word of ‘hazard’ in the field of disaster management usually means the phenomenon that may cause disasters such as loss of life, loss of property, or loss of social activities, and so forth. Other than natural phenomena, artificial phenomena such as explosion of a factory or terrorism are also included. The earthquake, tsunami, typhoon, storm surge, flood and volcanic eruption etc. are generally called as ‘natural hazards’.

In the field of disaster management, the word of ‘risk’ means the extent of potential disaster caused by hazard, which could occur over some specific future time period. The scale of damage in a disaster depends on the characteristics of the hazards and the feature of the objects.

Hazard characteristics to be considered are the intensity and the probability. In this case, the intensity and the probability of the hazard itself are not the subject but the intensity of the hazard that the facilities may experience and its probability are the points. In the case of an earthquake for example, the seismic intensity and the probability that a facility may experience are the necessary information instead of the magnitude of the earthquake. As for facilities with damage potential, the distribution and the vulnerability are the important factors. The risk of specific facility or area can be calculated in combination with the information above. This analysis is the hazard and risk assessment.

The hazard and risk assessment for BCP or Area BCP is an expanded form of concept explained earlier. The direct damage to the facilities or the area by the hazards is mainly considered for disaster management. However, the damage of the lifelines and the traffic infrastructure to which the enterprises or the area are dependent on is also considered for BCP or Area BCP, because even if the facilities are not directly damaged by the hazard, the activity of the enterprises may be affected by the interruption of lifelines and traffic infrastructures. In formulating BCP or Area BCP, the effect of business interruption to the enterprise is assessed by BIA (Business Impact Analysis). The hazard and risk assessment is the essential information for BIA.

Figure 1 Risk Assessment for Area BCP

FOCUS

Introduction of pilot site(1) Hai Phong, Vietnam

The Study Team worked together with Hai Phong Department of Dyke Management and Flood, Storm Control (HPDMFSC), where seven agglomerated industrial areas are located, is one of the pilot sites considered for the the study. HPDMFSC is the state management agency for dykes management and flood prevention in the city. HPDMFSC in the Hai Phong city’s Office of the Permanent Steering Committee is also responsible for flood, storm prevention search and rescue.

The Steering Committee Office performs the function as coordination center for disaster response activities of the city. HPDMFSC performs the tasks of secretary of the working group in Hai Phong by coordinating with stakeholders to implement the goals of the project, which include:

1. Formulating framework and implementation process of the Area Business Continuity Plan;
2. Formulating Area Business Continuity Plan for Industrial Agglomerated Area in Hai Phong; and
3. Exchanging experiences and lessons learned to establish handbook and guidance.

Leaders of Hai Phong city realize the impact of natural disasters on the business operation, and they direct the other departments of the city to collaborate with partners to implement the project.

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JICA

Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region

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"A-BCP News No.4" contains the information on main activities conducted during October 2013 to January 2014.

1st BCP Workshops in 3 pilot areas

In this project, three workshops are planned to be held at each of three pilot study areas, namely, Bekasi and Karawang in Indonesia, Cavite and Laguna in the Philippines and Hai Phong in Vietnam. The participants are from the national and local administrative bodies of pilot areas, industrial parks, business estates in the parks, transport operators and lifeline operators. The Area BCP will be developed considering the outcome of the discussions hold in three workshops on the topics as shown in Figure 1.

The 1st workshops were held in December 2013. The topics in the 1st workshop are (1) fundamental policy of Area BCP, (2) critical hazards to be considered in Area BCM/BCP and (3) critical problems on business continuity. The discussions of the participants in the workshop are emphasized. The home works were assigned to the participants and collected beforehand for an efficient discussion.

Around 40 to 60 persons including the observers attended each workshop in three pilot study areas. In the workshop, the study team presented the basic concept of Area BCM/BCP and the natural hazards and disaster scenario in the pilot study area. In the discussion session, the participants were divided into three to six discussion groups based on the affiliation and extracted the critical hazards and the problems on business continuity based on the proposed disaster scenario. After the discussion, each group presented the contents of the discussion and conclusions.

The summary of the discussions of three workshops are shown in Table 1. The critical hazards in three areas are different, namely, flood, earthquake or storm surge and flood, but the suspension of transportation infrastructures and lifeline facilities and affected employee are commonly pointed out as the critical problems.

In the 2nd workshops, the bottlenecks for area business continuity will be extracted from the critical problems that were discussed in 1st workshops and the measures to cope with them will be discussed.

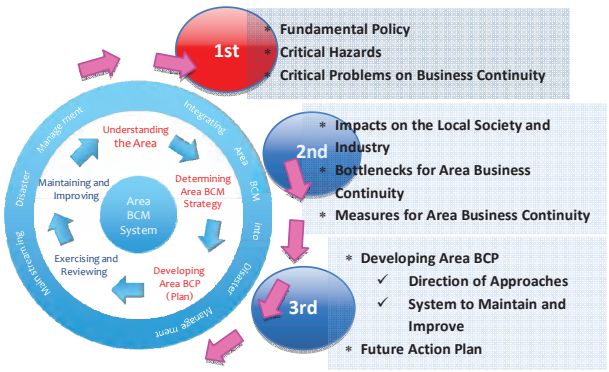

Figure 1 Plan and Topics of BCP Workshops

Table 1 Summary of Discussion in 1st BCP Workshops

Pilot Area	Critical Hazard	Critical Problems on Business Continuity
Bekasi, Karawang (Indonesia)	Flood	・Malfunction of road and lifeline ・Affected employees, labor disputes ・Disrupted community, rising crime
Cavite, Laguna (The Philippines)	Earthquake	・Damages of road and port ・Unavailability of power supply, water and communication ・Death or injury of employee
Hai Phong (Vietnam))	Storm Surge, Flood	・Suspension of transportation ・Disruption of lifeline ・Lack of reliable information

Photo 1 Discussion in Workshop (Manila)

1st Practitioner Seminar

The 1st practitioner seminar was held in December 2013 in Manila to obtain the recognition of Area BCP and anchor in ASEAN countries. The practitioners in ASEAN countries, who may become a leader in dissemination in each country after this project, were invited.

Twenty one persons from disaster management agency, planning agency and institutes attended the seminar. The basic concept and methodology of Area BCM/BCP and the methodology of natural disaster risk assessment were introduced in this seminar. The current situation of Area BCM/BCP and natural disaster risk assessment in the Philippines were also presented by the authorities of the Philippines. The damage by typhoon "YOLANDA", which hit the Philippines just before the seminar, was reported as the topic.

The target organizations, stakeholders and role of government body were addressed as the questions from the participants regarding the basic concepts. How to define the geographical area for Area BCP was discussed also.

Three practitioner seminars are planned in this project. The 2nd and 3rd are planned in February 2014 in Hanoi and June 2014 in Jakarta.

Progress Seminars in 3 Pilot Countries

The progress seminars were held in three pilot countries to disseminate the Area BCM/BCP. The basic concepts, methodology and the benefits of Area BCM/BCP were explained to the government, transportation operators, lifeline operators and private enterprises.

The seminar in Jakarta was held on 20 December 2013. The number of participants was 72. The main topics of discussion were communication among the stakeholders, contents of Area BCP and relationship with the master plan.

The seminar in Manila was held on 21 January 2014, where 70 persons attended. The definition of RTO (Recovery Time Objective) was discussed along with the way to communicate with stakeholders.

The seminar in Hanoi was held on 13 December 2013 and attended by 95 persons. The method to determine the probability of disaster and the definition of risk were discussed. The measures to adopt Area BCP to national policy and importance of coordination among the public organizations were indicated.

The seminars to disseminate Area BCP are planned in three pilot study areas and the capitals of three countries in August 2014 as "Final Seminar".

Natural Hazards in ASEAN Region 2 - Flood -

The ASEAN countries are located in the Southeast Asia monsoon area, where major natural disasters occur, and about 90% of disasters are water related, including floods, drought, storm surges and landslides. Among them, floods are by far the most frequent and devastating natural disasters. In the most of ASEAN countries floods are resulting from tropical storms and storm rainfalls during the monsoon. There are many areas coexisting with floods along the Mekong River and Chaophraya River, however, severe flood disasters have usually been resulting from typhoons, cyclones and monsoon rainfalls.

The tropical cyclones are classified according to the maximum winds in their centers by WMO. They are as follows: 1) Tropical depression: 17 meters per second, 2) Tropical storm: 18 to 32 meters per second, and 3) Tropical cyclone/typhoon: 33 meters per second or more.

Major cities of the ASEAN countries are mostly located at the river mouths or along them. The rivers are extensive natural inland water systems and have vital roles for the agricultural production and economic development in the areas. However, due to current rapid economic development and concentration of population and assets, flood disaster risks are increasing. The flood types like short or long periods are different from country to country as follows:

a)The Lao PDR, Cambodia, the southern part of Vietnam in the Mekong River basin (810,000 km²), the northern part of Vietnam in the Red River basin(169,000 km²) and Thailand in the Chaophraya River basin (160,000 km²) are affected by large and long flood disasters;

b)Philippines, the north and central parts of Vietnam and Myanmar are affected by frequent flood disasters caused by tropical cyclones and typhoons;

c)Java of Indonesia and Peninsular Malaysia affected by floods caused from the northeast monsoons; and

d)Brunei and Singapore are affected by storm waters by the northeast monsoon.

It is predicted that significant increase of extreme rainfalls in the monsoon Asia region due to the climate change and that is definitely going to worsen the flooding situation in the ASEAN countries. The ASEAN countries have conducted the flood prevention measures along major rivers; however, it would be necessary for them to adopt a new approach and integrated disaster risk management measures by main streaming of flood disaster management, flood warning and dissemination systems and development of flood disaster resilient areas in order to solve the vulnerability to the flood disaster risks.

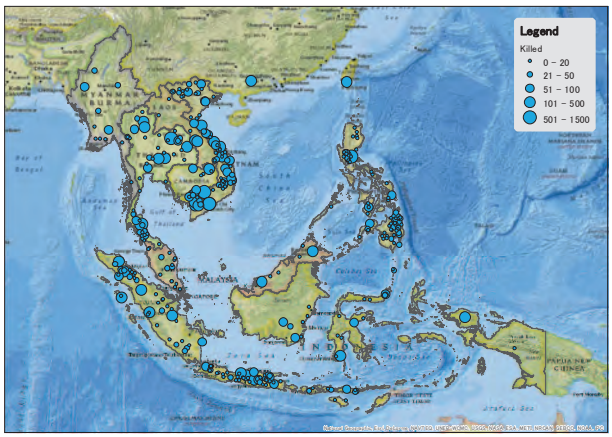

Figure 2 Number of people killed by Floods in ASEAN (1980 - 2012)

FOCUS

Introduction of relevant organizations

West Java Regional Planning Development Agenzcy, Indonesia

Located in Bandung, the West Java Capital, BAPPEDA West Java (BadanPerencanaan Pembangunan Daerah ProvinsiJawa Barat) was established for the purpose of assisting the Governor for formulating regional development planning (annual, mid-term and long term) through policy structuring and the efficient allocation of local government funds. Furthermore, BAPPEDA West Java is responsible for facilitating coordination, integration and synchronization among parties (national authority, city/regency authorities, communities, private sectors) in the process of the planning. These elements serve as the foundation for growth in important economic sectors such as infrastructure, human resources, agriculture and natural resources.

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A-BCP News No.5 2014. 07.01

JICA

Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region

AHA Centre
Japan International Cooperation Agency
OYO International Corporation
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CTI Engineering International Co., Ltd.

"A-BCP News No.5" contains the information on main activities conducted during January to March 2014.

3rd Supporting Committee Meeting

3rd supporting committee meeting was held on January 9, 2014 in Tokyo, Japan. The results of 1st BCP workshops those were held in December, 2013 were reported. The supporting committee members advised the improvement of the topics selected for the workshops to activate the discussion and emphasized the importance of more precise information provided by the participants in the 2nd workshops.

Another topic in this meeting was the concepts of BCM and BCP. It was reconfirmed that the activities to continue the operation of enterprises in case of a disaster is BCM (Business Continuity Management) and BCP (Business Continuity Plan) is the documented procedures of BCM. It was also pointed out that the BCP formulation is deemed to be the final goal in many cases because of the misunderstanding of the concepts of BCM and BCP.

It was concluded to publish a "Planning Guide for Area Business Continuity – Area BCM tool kit -"as the final product of this project to promote Area BCM/BCP.

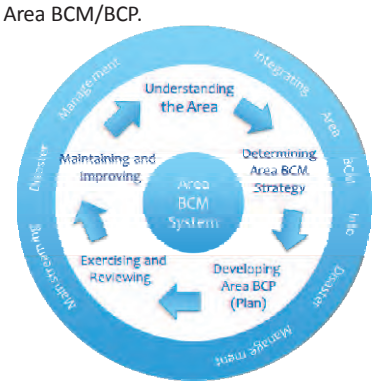

Figure 1 Concept of Area BCM

2nd Expert Panel Meeting

2nd expert panel meeting was held on January 23 and 24, 2014 in Manila. The advantages to formulate the Area BCP in conformity with ISO22301, which is the international standard for BCP, the importance to disclose the data used to create the disaster scenario and the importance of the participation of the local government in the process of Area BCP formulation were pointed out in the 1st day meeting. These indications will be reflected in formulating the Area BCP of the pilot area and "Planning Guidebook for Area BCP". The role of AHA Centre as the core of information for all ASEAN countries is also requested.

On the 2nd day of the workshop, the panelists made an on-site inspection tour to two industrial parks in the pilot study area, namely, Cavite Economic Zone and Laguna Technopark. The inspection team was briefed about the outline of the industrial parks and the disaster management system by the operating company. The BCP of the company in the park and the BCP for industrial park were discussed and the importance of Area BCP was reconfirmed.

Photo 1 Inspection Tour to Laguna Technopark

2nd Practitioner Seminar

The 2nd practitioner seminar was held in February 24, 2014 in Hanoi. The practitioners of ASEAN countries, who may become a leader to facilitate dissemination in each country after this project, were invited.

Thirty persons including fifteen Vietnamese from disaster management agency, planning agency and institutes attended the seminar. The basic concept and methodology of Area BCM/BCP, the methodology of natural disaster risk assessment and the outline of the pilot study in Vietnam were introduced. The current situation of Area BCM/BCP and natural disaster risk assessment in Vietnam were also presented by the authorities of Vietnam.

The relation between RTO (Recovery Time Objective) of a company and the RTO of the industrial agglomerated area and the applicability of Area BCP to the small and medium size enterprises were discussed. The participants expressed their expectations to the "Planning Guide for Area Business Continuity – Area BCM tool kit -" which will be published under this project and showed interests to use it in the activity of national and local governments.

The 3rd seminar is planned in June, 2014 in Jakarta.

2nd BCP Workshops in 3 pilot areas

2nd workshops were held on February 2, 2014 in Manila, on February 28 in Hai Phong and on March 6 in Karawang. The topics

in the 2nd workshop were (1) impacts on the local society and industry, (2) bottlenecks for area business continuity and (3) measures for area business continuity. In each country, including the observers, the number participants were between 50 to 70, more than the 1st workshop.

The summary of the discussion of all three workshops are shown in Table 1. The deterioration of public security, increase in bankruptcy and decrease of investment were pointed out in the discussions. Referring to the local conditions, refugees on the road, collapse of embankments, and suspension of the traffic and electric power were indicated as the bottlenecks. As the measures for Area BCP, alternative infrastructures as structural and raising awareness, public-private collaboration etc. as non-structural measures were discussed.

In the 3rd workshops, the draft of Area BCP based on the discussions hold in 1st and 2nd workshops will be proposed and the system to maintain and improve the Area BCM/BCP will be discussed.

Table 1 Summary of Discussion in 2nd Workshops

Pilot Area	Topics	Points of Discussion
Bekasi, Karawang (Indonesia)	Impacts on the Local Society and Industry	Absence from work, Discharge, Bankruptcy of SMEs
	Bottlenecks	Inundation of the road, Power failure, Refugees on the road
	Measures for Area BCP	Maintenance of the river, Hazard Maps, Alternative infrastructures and lifelines
Cavite, Laguna (The Philippines)	Impacts on the Local Society and Industry	Decline in public security
	Bottlenecks	Suspension of traffic, electric power, water supply and communication, Shortage of the staff
	Measures for Area BCP	Multiple circuit of power supply, Alternative means of transportation, Preparation of the society by raising awareness and planning, Insurance
Hai Phong (Vietnam))	Impacts on the Local Society and Industry	Traffic disorder, Decline in public security, Decrease of investment
	Bottlenecks	Collapse of embankment, Suspension of lifelines, Shortage of the staff
	Measures for Area BCP	Raising awareness, Policy, Support to local government, Public-private collaboration, Cooperation of enterprise and citizen

Natural Hazards in ASEAN Region 3 - Meteorological Disaster -

ASEAN countries are located in the monsoon region of Southeast Asia where floods, landslides, wildfires, and droughts occur frequently. Tropical cyclone (TC) or typhoon is one of the most hazardous natural phenomena which may cause significant loss of human lives and economy.

As TCs are not generated near the equator, Brunei, Indonesia and Singapore are not usually affected by TCs. The Philippines and Vietnam are located along the Typhoon belt in the western North Pacific and subjet to damages several times in every year. TCs sometimes affect Laos, Cambodia and Thailand after landing in Vietnam. TCs generated in the Western Pacific and the Southern China Sea cause damage to the northern area of Malaysia and the southern area of Thailand once in several years.

The counterclockwise swirling wind blows into the center of the TC in the Northern Hemisphere (clockwise in the Southern Hemisphere) following the earth's rotation (Figure 2). In mountainous areas, the rainfall will be more especially in the windward side because warm moist air of TC hits the mountain. In general, the occurance of TCs overlap with rainy season, the damage due to landslides and floods tend to increase by the fact that heavy rain caused by TC.

The most severe destructive feature of a tropical storm is the storm surge. The Enormous storm surges, which were generated by Cyclone Nargis in Myanmar in 2008 and Typhoon Haiyan (Yolanda) in the Philippines in 2013, caused unprecedented damages.

There are two main factors which generate the storm surges (Figure 3). One is suction effect of depression and the other is the wind drag effect. If the strong wind brought by a typhoon continuously blow from the direction of the mouth of the bay, or if a back of the bay is narrower than the mouth, the water dragged by the wind does not have any place to go but overflow the land. The wind drag effect is more evident in shallower bay.

The effect of storm surge depends on the intensity and the course of TC and the bathymetry of the coast. As the storm tide is the combination of the storm surge and the astronomical tide, the hazard becomes worse if the hit of TC overlaps with the highest astronomical tide. It is also important to remember that the water level may rise up due to the run-up along the river.

The monitoring of TCs including storm surge forecast are managed internationally. The attention to the warning of TCs issued by governmental agencies in each country and immediate evacuation are important.

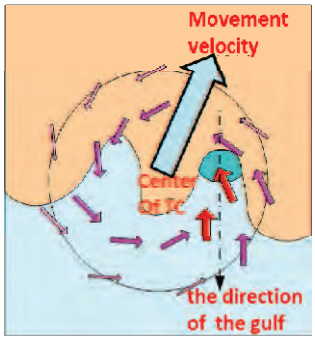

Figure 2 Direction of the wind by TC

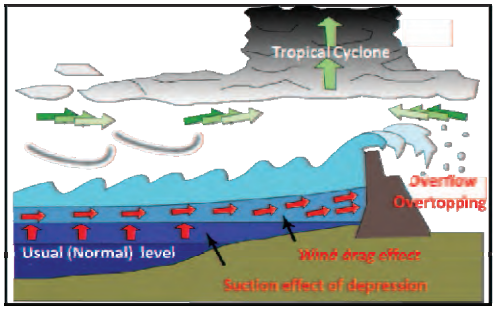

Figure 3 Mechanism of Storm Surge

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"A-BCP News No.6" contains the information on main activities conducted during April to June 2014.

3rd Area BCP Workshops in 3 pilot areas

3rd workshops were held on May 22, 2014 in Bekasi, on May 27 in Manila and on June 3 in Hai Phong. The draft Area BCP for pilot areas, prepared by the study team based on the discussion in 1st and 2nd workshops, were sent to the participants before the meeting and discussed following issues in the workshops; (1) contents to be improved in the plan, (2) owner of the plan and necessary resources to sustain, (3) activities of next steps.

Table 1 Summary of Discussion in 3rd Workshops

Pilot Area	Topics	Points of Discussion
Bekasi, Karawang (Indonesia)	Improvement of the Plan	Implementation schedule, Legal framework, Verification of risk assessment
	Owner of the Plan	BPBD, BAPPEDA
	Resources for Sustainability	Competent human resources, Annual program, Budget, Communication forum
	Next Steps	Review and update, Training, Integration with other government plans
Cavite, Laguna (The Philippines)	Improvement of the Plan	Coordination protocols, Coordination with other regions, Synchronization with other local government planning documents
	Owner of the Plan	PEZA, NDRRMC/OCD, DILG/LGUs, Coordinating council
	Resources for Sustainability	Competent human resources, Public-Private MoU, Communication Forum, Regular Exercise, Permanent staff
	Next Steps	Finalize the plan, Periodic review, Dissemination
Hai Phong (Vietnam))	Improvement of the Plan	Legal background, Clarification of stakeholders and its role, Definition of terms
	Owner of the Plan	HPPC
	Resources for Sustainability	Legal framework, Clear coordination, Technical support by NGOs, Sharing information
	Next Steps	Review and update, Dissemination and awareness raising, Preparation of other scenario

The summary of the discussion of all three workshops are shown in Table 1. To define the used terms, clarification of the stakeholders and their roles, verification of risk assessment by the local authority and coordination with other regions were pointed out to improve the plan.

In the discussion of owner of the plan, many candidates such as national disaster management authority, regional body for planning and development, economic zone authority were mentioned in the cases of Indonesia and the Philippines. In Vietnam, they agreed that Hai Phong People's Committee is the ideal organization.

The competent human resources, permanent staff, continuous training, annual program and budget, legal framework and technical support by NGOs or institutes were mentioned for the necessary resources to sustain.

In the discussion on activities of next steps, review and update of draft Area BCP, dissemination, integration with other governmental plans and planning for another disaster risk were brought up.

The draft Area BCP will be amended referring to the indicated points in the workshop and send to the related organizations in July. The organizations will review the contents of the plan and study tram will finalize the Area BCP based on the comments.

3rd Practitioner Semina

The 3rd practitioner seminar was held in June 16, 2014 in Jakarta. The practitioners of ASEAN countries, who may become a leader to facilitate dissemination in each country after this project, were invited.

Fifteen persons from disaster management agency, planning agency and institutes attended the seminar. The outline of the project, basic concept of Area BCM/BCP, ways to understand the area including risk assessment and draft Area BCP for Indonesia were introduced.

In the discussion session, how to promote Area BCM in ASEAN countries, how to secure required information and services for Area BCM and how to improve Area BCM were discussed.

3rd Panel Meeting

3rd expert panel meeting was held on July 19 and 20, 2014 in Hanoi.

On the 1st day of the meeting, the panelists made an on-site inspection tour to Hai Phong and visited two industrial parks in the pilot study area, namely, Nomura Hai Phong and Dinh Vu. They also visited Hai Phong Port, which is a very important infrastructure located at the mouth of Red Liver, by boat.

On the 2nd day of the meeting, workshops and the draft Area BCPs in pilot area were reported and discussions on common and different points of them were made. The advantage of the legal framework, importance of the precise guide book and the accessibility to them and standardization and propagation through the clarification of the role of stakeholders were pointed out. These issues will be reflected planning guidebook for Area BCP.

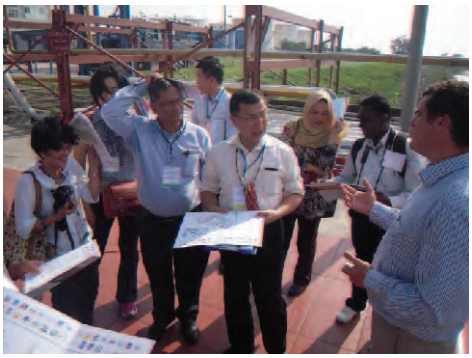
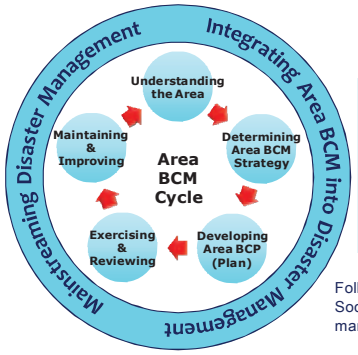


Photo 1 Inspection Tour to Dinh Vu Industrial Park

Proposed Area BCM/BCP

Area Business Continuity Management (Area BCM) is targeting that for the sustainable development of the subject area, the continuity of industry functions should be achieved in emergencies such as natural disasters that affect the entire area.



A management process that helps to manage the risk of continuity of businesses of an area in an emergency such as natural disasters that affect the entire area.

Follow the process of ISO22301 = Societal security - Business continuity management systems - Requirements

Figure 1 Image of Area BCM Cycle

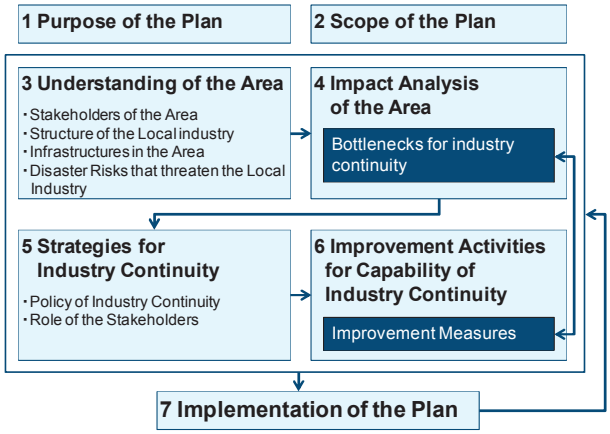
Area business continuity would be realized when local government and Infrastructure operators, industrial parks, companies in the area will promote their own BCM or disaster reduction measures with a common understanding of the weakness of the area in times of disaster and bottlenecks to continue the business of the area. Structure of the Local industries, infrastructures in the Area, impact analysis of the area, the roles of stakeholders, the strategy and contents of activity for area business continuity, and the continual operation of this plan are described in Area Business Continuity Plan (Area BCP) to share them among stakeholders.

The organizational structure is important to promote an Area BCM. The stakeholders are categorized as shown in Table 2, the roles are clarified and organization is formed.

The proposed Area BCP is consisted of seven chapters as shown in Figure 2.

Table 2 Category and roles of stakeholders

Category	Roles
Leader	Leader shall promote Area BCM. Leader shall manage to formulate and maintain Area BCP and shall be responsible for the researches, disaster risk assessment, workshops/seminars and other activities.
Members	Members shall be involved in Area BCP formulation through attending the workshops and providing the necessary information for Area BCM. Members shall be involved in the activities of Area BCM with understanding Area BCP, and shall promote disaster management measures and BCP of their own organizations.
Supporters	Supporters shall support Area BCM implemented by the leader and members. The advices in formulating institutional framework for Area BCM and technical assistance such as disaster risk assessment are the examples of supporting activities.



Chapter 1 Purpose of the Plan and Chapter 2 Scope of the Plan
The purpose of the plan and the scope of the plan are described.
Chapter 3 Understanding of the Area
The organization shown in Table 2 is defined. In addition, structure of the local industry, infrastructure in the area, and disaster risks that threaten the local industry are described. For example, earthquake and liquefaction in the Philippines, storm surge and flood in Vietnam, and flood in Indonesia were selected as assumed disasters because their risks are relatively high in each pilot area. And the damages to transportation infrastructures and lifeline utilities were estimated.
Chapter 4 Impact Analysis of the Area
Impact analysis and the bottlenecks for industry continuity by the assumed disasters are described. It is expected that stakeholders understand the limitations of individual BCM/BCP and the necessity of Area BCM/BCP. Bottlenecks for industry continuity are also described.
Chapter 5 Strategies for Industry Continuity
Policy of industry continuity and roles of the stakeholders during the usual / disaster times are described.
Chapter 6 Improvement Activities for Capability of Industry Continuity
Improvement activities for industry continuity are described to address the problems clarified in Chapter 4. Measures are listed for each stakeholder with the information of category and stage. Through Area BCM, the progress will be updated and new measures will be added.
Chapter 7 Implementation of the Plan
Area BCM System and concrete activities to implement Area BCP and to promote Area BCM continuously are described.

Figure 2 Contents of Area BCP (Outline)

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From the start of this project on Feb. 2013, the study and dissemination of Area BCM/BCP have continued through four workshops in each three pilot areas, four practitioner seminars, four expert panel meetings and eight progress/final seminars. Based on these activities during the project, "Guide Book for Area BCM", "Risk Profile Reports" and "Country Reports" are prepared to be applied to the Area BCM/BCP movements in the industrial agglomerated areas. "A-BCP News No.7 (Final)" introduces these materials.

The electronic edition of these materials is available from website of AHA Centre below.

http://www.ahacentre.org/

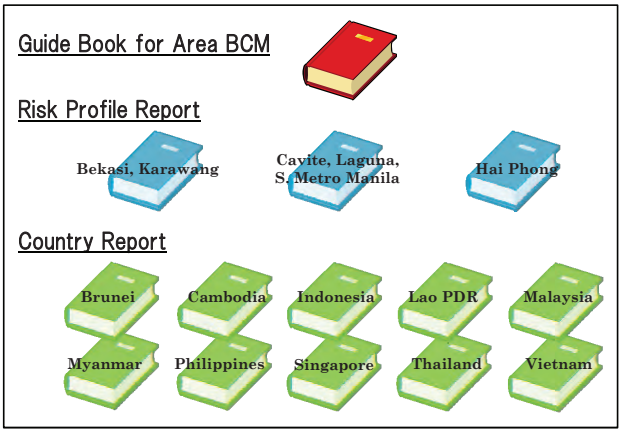

Figure 1 Prepared Documents

Guide Book for Area BCM

"Guide Book for Area BCM" aims to serve as a first step to Area BCM or a reference book in the process of implementing Area BCM. The configuration of guide book is shown in Table 1.

In the first part of main volume, the basic concept is explained to understand Area BCM. Next, the procedures of implementing Area BCM are described in a step-by-step manner following five steps of Area BCM system. The enriched glossary of terms is attached because the technical terms in the guide book may not be familiar to all readers. The examples of formulated Area BCP in the pilot study and the methodology of hazard assessment are included in supplement volume. The "Risk Profile Reports" and "Country Reports" are the reference materials of guide book. These three materials are called as "Area BCM Tool Kits".

Figure 2 shows which tool to be used in the phase of Area BCM system.

The target area of this project is ASEAN region but the approach of this guide book can be applied to any region in the world. Also, it can be applied from a single industrial park to industrial agglomerated area covering several local administrations.

The object hazard of this project is natural hazard such as flood and earthquake; however the basic concept and procedure can be applied to other types of hazards.

Table 1 Configuration of the Guide Book for Area BCM

Main Volume	**I Understanding Area BCM** Chap. 1 Introduction Chap. 2 Area Business Continuity Management **II Procedures for Area BCM** Chap. 3 [Phase 1] Understanding the Area Chap. 4 [Phase 2] Determining Area BCM Strategy Chap. 5 [Phase 3] Developing Area BCP Chap. 6 [Phase 4] Implementing and Reviewing Chap. 7 [Phase 5] Improving Area BCM **Appendices** 1 Glossary of Terms 2 Procedures for Developing Area BCP in the Pilot Area 3 References
Supplement Volume	1 Area BCPs Prepared for the Pilot Area ✓ Indonesia, Philippines and Vietnam 2 Methodologies of Hazard Assessment/ Used for the Pilot Study 3 Lessons Learned from the Extreme Natural Disasters 4 Samples of Lesson Learned Report ✓ Flood in Indonesia and Typhoon in Vietnam

Area BCM promotion video is uploaded to YouTube.

https://www.youtube.com/watch?v=ubjh8JIUWwk

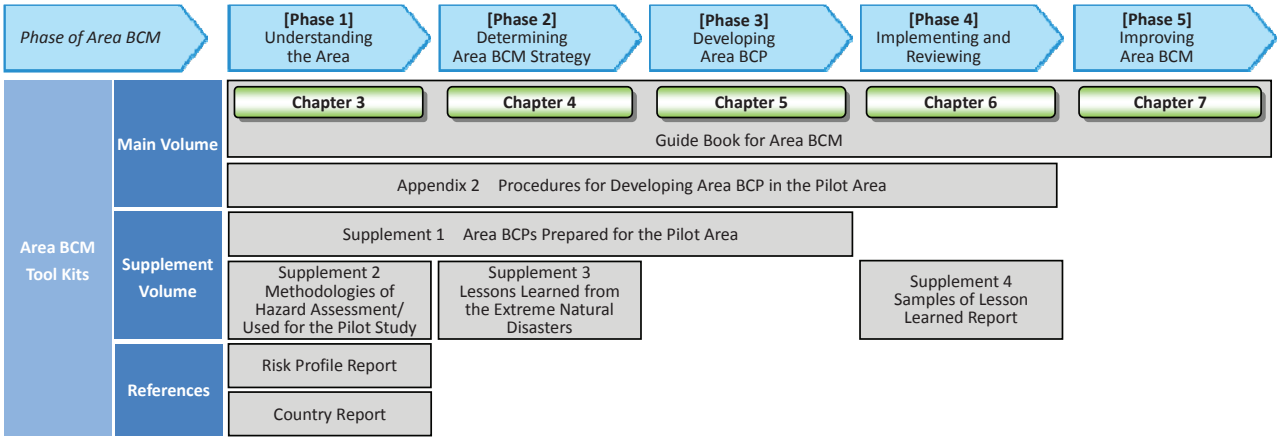

Figure 2 Usage of Tool Kits in the Phase of Area BCM

Risk Profile Report

In this project, risk assessment and Area BCP formulation were carried out in three pilot areas which were selected from the industrial agglomerated areas in ASEAN. The practical system and formation of Area BCM were studied through the pilot study.

The results of hazard and risk assessment and the condition of 3 pilot areas based on the collected data are compiled and 3 volumes of "Risk Profile Reports" are made.

The information about the natural hazards in the area is needed for decision making if enterprises or organizations consider the investment to the area, prepare BCP or disaster management plan and also try to implement Area BCM of the area. The risk profile reports which were prepared in this project are the trials to create portal site of the risks in the pilot areas.

Table 2 Contents of Risk Profile Report

Chap. 1	Disaster Risks of the Pilot Area
Chap. 2	Natural Hazards in the Pilot Area
Chap. 3	Outline of Natural Hazard Assessment
Chap. 4	Profile of the Pilot Area
Appendix	Details of Natural Hazard Assessment

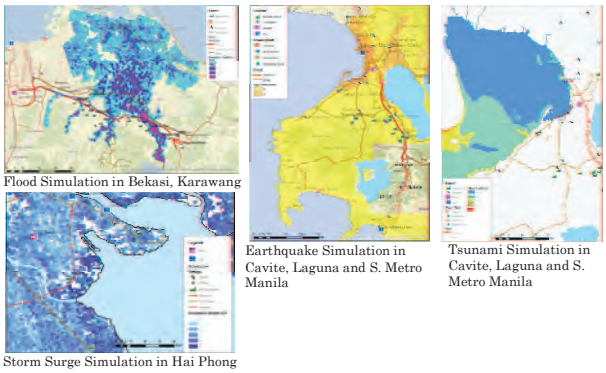

Figure 3 Examples of Hazard Assessment

Country Report

In this study, the information which is useful for Area BCM construction and Area BCP formulation in 10 ASEAN countries was collected and compiled. Also, the national level hazard and risk assessment was carried out based on the collected information.

The results of survey are compiled and 10 volumes of "Country Reports" are made. The country reports which were prepared in this project are the trials to create national level portal site of the natural disaster information.

Table 3 Contents of Country Report

Chap. 1	Introduction
Chap. 2	Natural Disaster Risks
Chap. 3	Industrial Parks
Chap. 4	Transportation Infrastructure and Lifeline Utilities
Chap. 5	Legislative Systems Regarding Disaster Risk Management and BCP
Chap. 6	Implementation of BCP
Appendix 1: Method for Evaluating Predominant Hazards	
Appendix 2: Data Sheets	Outline of Existing Investigations and Studies
Appendix 3: List of Industrial Parks	
Appendix 4: General Investment Risks	

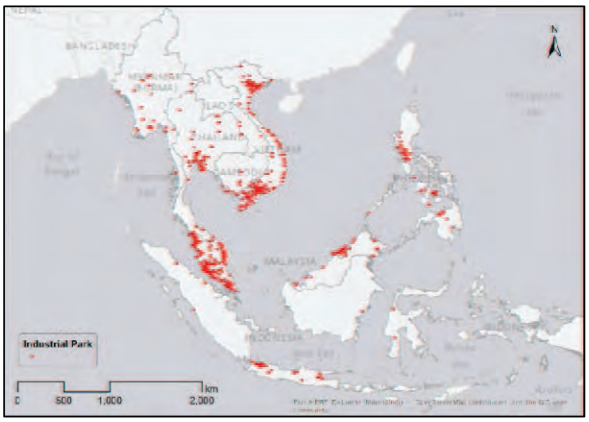

Figure 4 Example of Collected Information - Industrial Parks -

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