

C o u n t r y R e p o r t

B r u n e i

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

March 2015

AHA CENTRE

Japan International Cooperation Agency

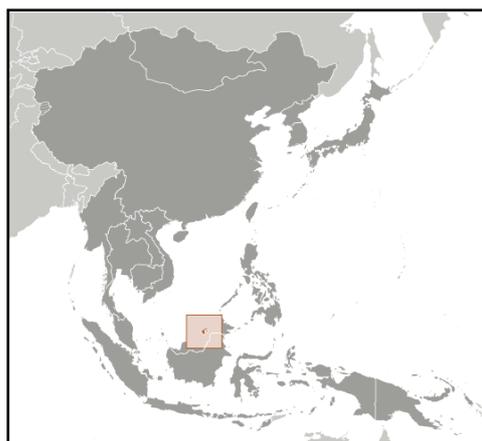
**OYO International Corporation
Mitsubishi Research Institute, Inc.
CTI Engineering International Co., Ltd.**

Overview of the Country

Basic Information of Brunei 1), 2), 3)



National Flag



Country Name	Long form : Brunei Darussalam Short form : Brunei
Capital	Bandar Seri Begawan
Area (km²)	Total: 5,770 Land: 5,270 Inland Water: 500
Population	417,784
Population density(people/ km² of land area)	79
Population growth (annual %)	1.3
Urban population (% of total)	77
Languages	Malay (official language), English, Chinese
Ethnic Groups	Malays (65.7%), Chinese (10.3%), Others (24.0%)
Religions	Islam (official religion) (67%), Buddhism (13%), Christianity (10%), Others (10%)
GDP (current US\$) (billion)	16
GNI per capita, PPP (current international \$)	68,090
GDP growth (annual %)	-1.8
Agriculture, value added (% of GDP)	1
Industry, value added (% of GDP)	68
Services, etc., value added (% of GDP)	31

Brief Description

Brunei is located on the north side of the island of Borneo (Kalimantan Island) and divided into east and west areas by Malaysia. Its capital Bandar Seri Begawan is located at the mouth of the Brunei River which runs through the western part of Brunei.

The country is rich in oil and natural gas, and is characterized by its high economic level and well-developed social welfare system supported by abundant income from oil/natural revenues.

Brunei joined ASEAN on January 8, 1984 after it became independent from the UK. Brunei is an economically strong country with the second highest GDP per capita among the ASEAN countries after Singapore.

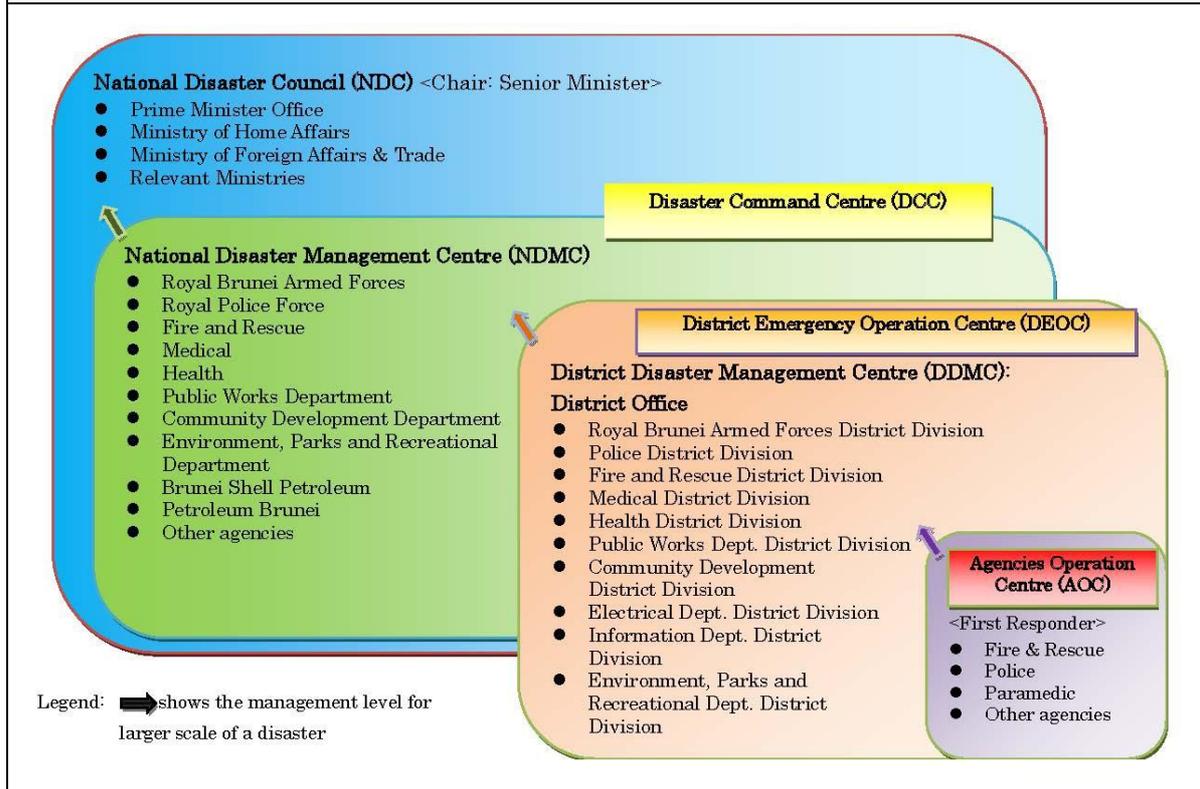
Brunei's government is a constitutional monarchy, and the current sultan is King Hassanal Bolkiah. In

order to prepare for the depletion of natural resources, the country is actively promoting foreign investments. It is expected that Brunei will promote the development of other industries that will support the country's economy after the era of fossil fuel production.

Natural Hazards

Frequent disaster in Brunei is flood and flash flood, which occurred 6 times since 1960, and killed 10 people. Although Brunei is not located on a major earthquake area, low level earthquakes and tremors were felt in the country in the past two decades. Brunei has experienced small earthquakes with the range of 4-5 magnitude in 1992 and 2005. Tsunami disaster is considered to occur due to strong earthquake occurred in South China Sea.

Disaster Management System 4)



References:

- 1) Central Intelligence Agency (CIA) website (2014): <https://www.cia.gov> (Accessed: October 15, 2014)
- 2) Ministry of Foreign Affairs website (2014): <http://www.mofa.go.jp> (Accessed: October 15, 2014)
- 3) The World Bank Data Bank website (2009, 2013): <http://data.worldbank.org> (Accessed: October 15, 2014)
- 4) Japan International Cooperation Agency (JICA) (2012): Data Collection Survey on ASEAN Regional Collaboration in Disaster Management

Contents

Overview of the Country

	Page
1. Introduction.....	1
2. Natural Disaster Risks	2
2.1 Predominant Hazards	2
2.2 Flood.....	4
2.3 Earthquake.....	8
2.4 Tsunami.....	12
2.5 Volcanoes	14
2.6 Cyclone and Meteorological Hazards.....	17
2.7 Landslides.....	22
3. Industrial Parks.....	23
3.1 Distribution of Industrial Parks in Brunei	23
3.2 Historical Evolution of Industrial Parks	25
3.3 Recent Trends and Japanese Investment.....	26
3.4 Risks of Natural Hazards	27
4. Transport Infrastructure and Lifeline Utilities.....	28
4.1 Overview of Transport Infrastructure	28
4.2 Overview of Lifeline Utilities	32
4.3 Natural Disasters and Infrastructure.....	35
5. Legislative Systems.....	36
5.1 Legislative Systems for Disaster Management	36
5.2 Regulations and Standards for Business Continuity Management	37
5.3 Legislative Systems for the Environment and Pollution Control	37
5.4 Legislative Systems for Development including Land Use, Rivers, and Building Code in Brunei.....	38
6. Implementation of BCP.....	39
6.1 Major Natural Disasters and Awareness Disaster Management	39
6.2 Current State of BCP Implementation	39
6.3 Efforts on Promoting BCP Implementation.....	39
6.4 Problems Facing for Implementation of BCP	40
Appendix 1: Method for Evaluating Predominant Hazards	41
Appendix 2: Data Sheets Outline of Existing Investigations and Studies.....	43
Appendix 3: List of Industrial Parks in Brunei	56
Appendix 4: General Investment Risk of Brunei	57

1. Introduction

This report is the first version of the Country Report for Brunei, which gives information on natural disaster risks of the country, industrial parks, major traffic infrastructure and lifeline utilities, and legislative systems relating to disaster management and business continuity.

The country report is prepared as a reference document for individuals and organizations who are wishing to integrate disaster risk information for their decisions: such as investment to Brunei, preparation of a business continuity plan (BCP) or disaster management plan of their organization, preparation of an Area Business Continuity Plan (Area BCP) of their area, and simply knowing natural disaster risks of their area.

Information contained in this report is macroscopic covering the entire country at the same level. When detailed risk information is necessary, hazard and risk assessments for an area of interest are required.

Since the country report was prepared with limited data and information as one of the components of the project¹ of ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre) and Japan International Cooperation Agency (JICA) with a limited data and information, a revision of the report by national experts is required for further refinement.

The following are reference documents prepared by the project of AHA Centre and JICA.

1. AHA Centre and JICA (2015): Planning Guide for Area Business Continuity, Area BCM Took Kits, Version 2.
2. AHA Centre and JICA (2015): The Country Reports; Brunei, Cambodia, Laos, Malaysia, Myanmar, the Philippines, Thailand, Singapore and Vietnam.
3. AHA Centre and JICA (2015): The Risk Profile Reports; Karawang and Bekasi of Indonesia, Cavite, Laguna and the Southern Part of Metropolitan Manila of the Philippines, and Haiphong of Vietnam..

¹ Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region, AHA Centre and JICA, 2013 to 2015.

2. Natural Disaster Risks

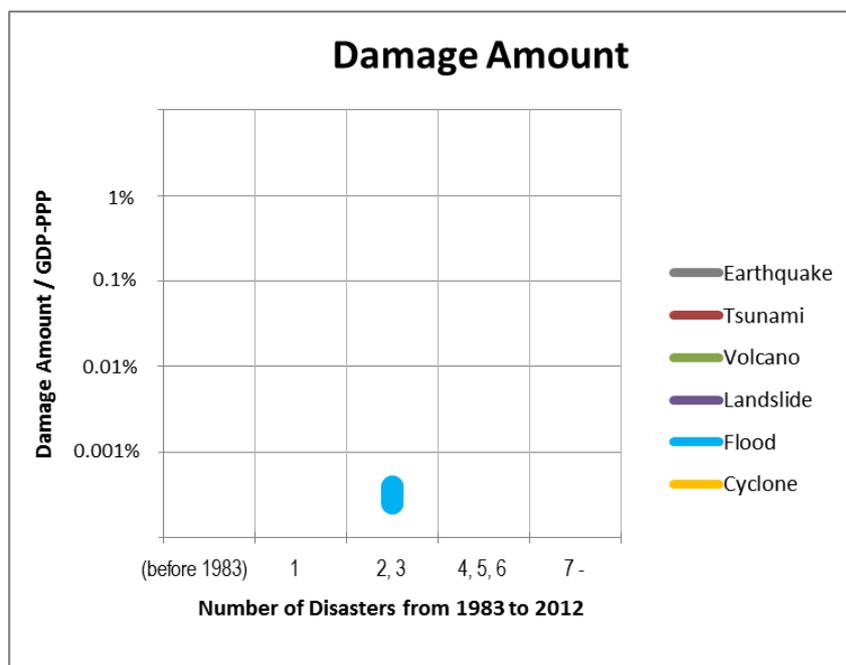
2.1 Predominant Hazards

Natural disaster risk of Brunei is low. Floods occur in the rainy season (October to May), but the country is seldom affected by typhoons because the country is not located in a typhoon path. Earthquake disasters are not common in Brunei. There is very low probability that a large earthquake along the coast of Brunei will generate a tsunami and cause a major disaster. Also, there is no record of significant disaster caused by volcano.

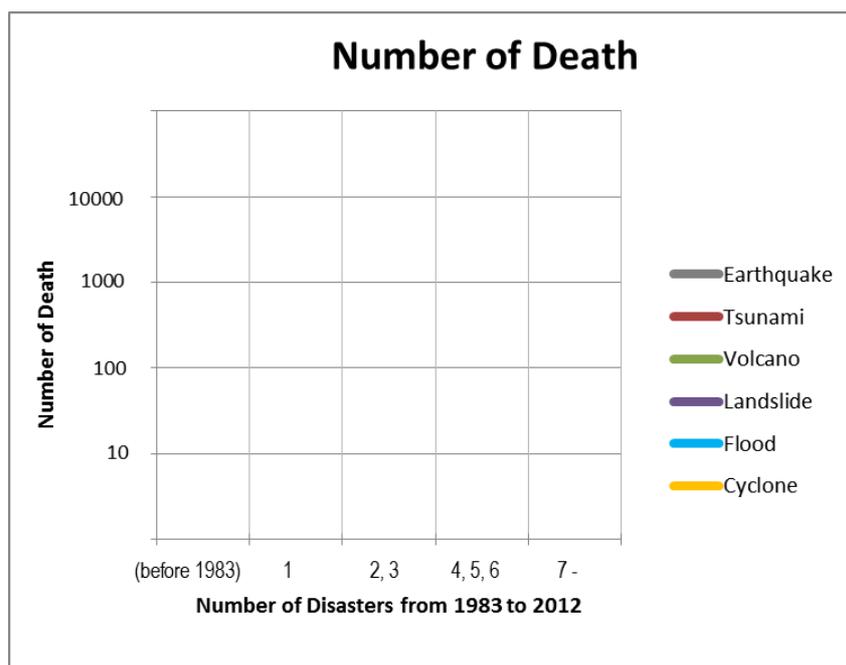
The records of natural disasters that have affected Brunei are classified based on the impact and frequency of occurrence in Figure 2.1. Both "damage amount" and "number of deaths" are used to express the impact, and "number of disasters occurred between 1983 and 2012" is used to represent the frequency of occurrence.

Figure 2.1 can be used to see the relative level of risk of natural hazards in Brunei according to their impacts and frequency of occurrence. Descriptions of each hazard are given in Section 2.2 to Section 2.7.

Please note that the figure was prepared by the available existing information, and not all information relating to the impacts of disasters was included. Further collection of information and discussion among experts of Brunei will be necessary to improve on the information represented in Figure 2.1.



Note: GDP-PPP, Gross domestic product based on purchasing-power-parity (PPP) valuation of country GDP, International Monetary Fund, World Economic Outlook Database, October 2012



Source of data and information:

EM-DAT, The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium: <http://www.emdat.be>.

Pacific Rim Coordination Center Disaster Data: <http://data.pacificrimnetwork.org/>.

Global Unique Disaster Identification Number:

<http://www.glidenunder.net/glide/public/search/search.jsp>.

National Geophysical Data Center (NGDC), National Oceanic and Atmospheric Administration (NOAA): <http://ngdc.noaa.gov/hazard/hazards.shtml>

Dartmouth Flood Observatory, University of Colorado: <http://floodobservatory.colorado.edu/>

Figure 2.1 Impact of Natural Hazards in Brunei

2.2 Flood

Risks

In Brunei floods occur in the rainy season (October to May), but the country is seldom affected by typhoons because the country is not located in a typhoon path.

In recent years, no large flood disasters have occurred. However, heavy rainfalls have caused local inundation in the urban area. Storm rainfalls on January 21, 2009 and January 15, 2010, caused inundation damage in the capital city of Bandar Seri Begawan. These damages were not recorded in the EM-DAT (The International Disaster Database).

Background

Although floods are generally caused by storm rainfalls in the rainy season (October to May), large-scale flood damage has not occurred. Most of the residential areas are located on coastal plains and easily inundated, and transportation facilities are affected by local inundation.

Sources of Hazard and Risk Information

Table 2.1 Sources of Hazard and Risk Information: Flood

The National Disaster Management Centre (NDMC)
Brunei Darussalam Meteorological Service (BDMS)
http://www.bruneiweather.com.bn/
University of Brunei Darussalam (UBD)
http://www.ubd.edu.bn/
Institute Technology Brunei (ITB)
http://www.itb.edu.bn/modules/web/index.php

Table 2.2 List of Reference Reports for Risk Analysis

Organization	Post	Title/ Web Address	Form
Asia Development Bank	Asian Water Development Outlook	Asian Water Development Outlook 2013; Asia-Pacific Water Forum	Report
		http://www.adb.org/publications/asian-water-development-outlook-2013	
World Bank	ASEAN Disaster Risk Management Initiative	Synthesis Report on Ten Asian Countries Disaster Risks Assessment: December 2012	Report
		http://www.unisdr.org/files/18872_asean.pdf	
The Nature Conservancy	ASEAN Disaster Risk Management Initiative	World Risk Report 2012: October 2012	Report
		http://www.ehs.unu.edu/article/read/worldriskreport-2012	
World Bank	Framework and Options for Implementation	Advancing Disaster Risk Financing and Insurance in ASEAN Countries: April 2012	Report
		https://openknowledge.worldbank.org/bitstream/handle/10986/12628/714530v20ESW0W0AN0appendices0June12.pdf?sequence=1	
International Development Research Centre	Economy and Environment Program for Southeast Asia (EPPSA)	Climate Change Vulnerability Mapping for Southeast Asia: January 2009	Report
		http://web.idrc.ca/uploads/user-S/12324196651Mapping_Report.pdf	
UNEP, GRID, UNISDR		Global Risk Data Platform	Web Map
		http://preview.grid.unep.ch/index.php?preview=map&lang=eng	

Studies on Hazard and/or Risk Assessment

Some useful studies on flood hazard, risk, and vulnerability are publicly available presenting assessment results, case studies of countermeasures, as well as different methodological approaches. There are a few types of methodologies to assess risks and vulnerability including, for example, risks involving exposure to flooding events and population density. Vulnerability can be defined as a function of exposure, adaptive or coping capacity, and land-use etc. There are slightly different combinations of these factors with different studies for use. Therefore, these concepts must be defined in advance to plan a methodology for an assessment, in terms of which definitions are to be used in a certain analysis

Locations of existing investigations and studies on flood are shown in Figure 2.2. Outline of those investigations and studies are attached in Appendix 2 and their summary is given in Table 2.3.

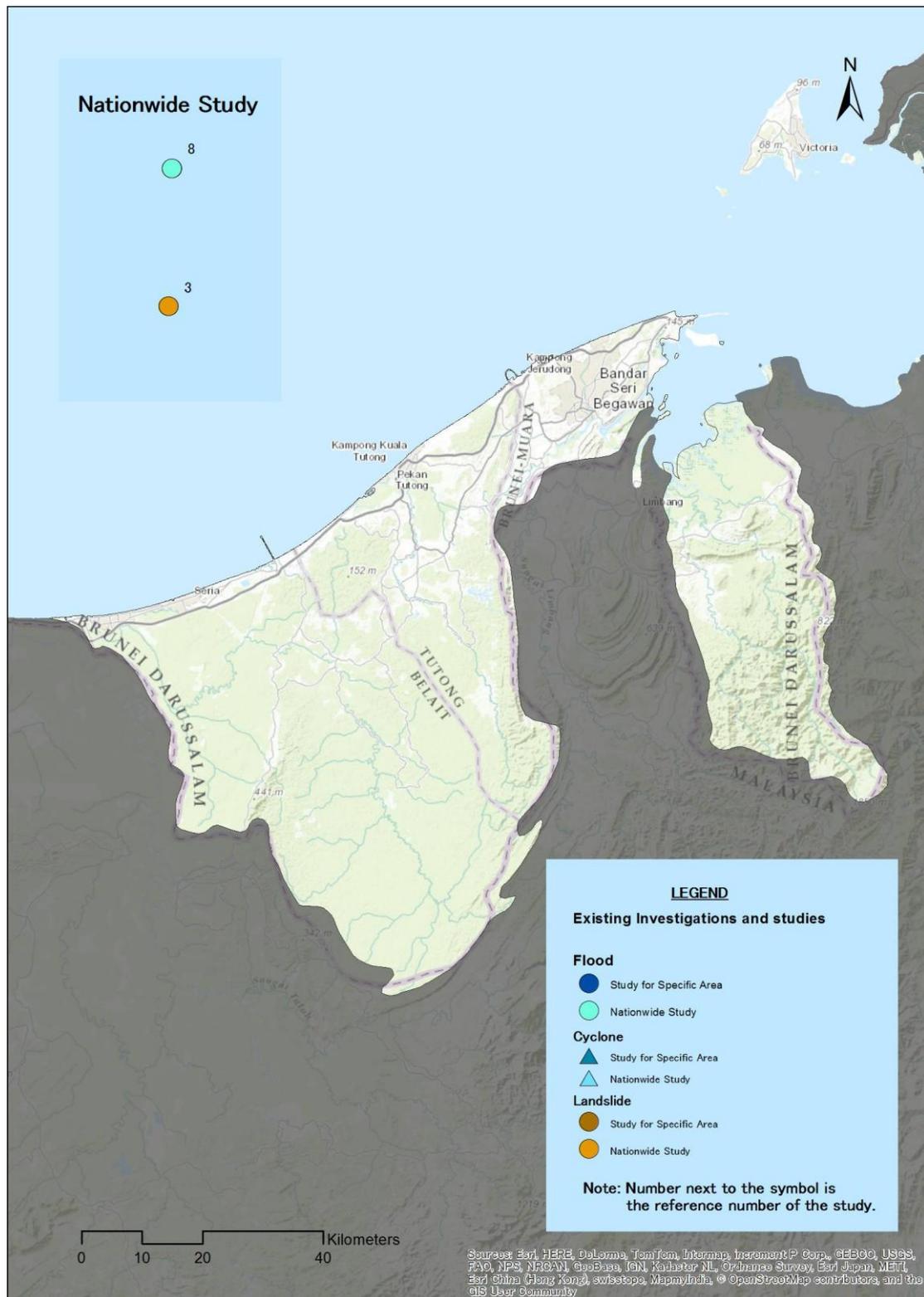


Figure 2.2 Locations of Existing Investigations and Studies: Flood, Cyclone and Landslide

Table 2.3 Summary of Existing Investigations and Studies: Flood

Country/Region	Summary of Existing Studies and Reports
ASEAN	There are a few reports that study natural disasters for ASEAN and the Pacific regions at large in recent years. Disaster risks are assessed by scenario, exposure, vulnerability, damage, and loss. An assessment framework is also sought to give an overview of risks, hazard and vulnerability.
Brunei	Information for the public is rather limited and a comprehensive report is not available.

References for Data and Further Reading

- 1) The Brunei Times (2009): "Kg Tanjong Maya hit by worst floods," February 7, 2009
- 2) The Daily Brunei Resources (2009): "The Brunei Flood," February 06, 2009
- 3) Hard Break Kid (2010): "2010 flash flood in Brunei," January 15, 2010.
- 4) Ministry of Foreign Affairs of Japan (2013): "Information on Brunei in Japanese," 06 2013.
- 5) Shigenobu Tanaka et al (2010). Progress Report on Flood Hazard Mapping in Asian Countries. PWRI.
- 6) Velasquez, Jerry et al (ed.) (2012). Reducing vulnerability and exposure to disasters: Asia-Pacific disaster report 2012, ESCAP/UNISDR AP
- 7) World Bank (2011). Advancing Disaster Risk Financing and Insurance in ASEAN Countries: Framework and Options for Implementation, Washington: Global Facility for Disaster Reduction and Recovery
- 8) World Bank, UNISDR (2010). Synthesis Report on Ten ASEAN Countries Disaster Risks Assessment.

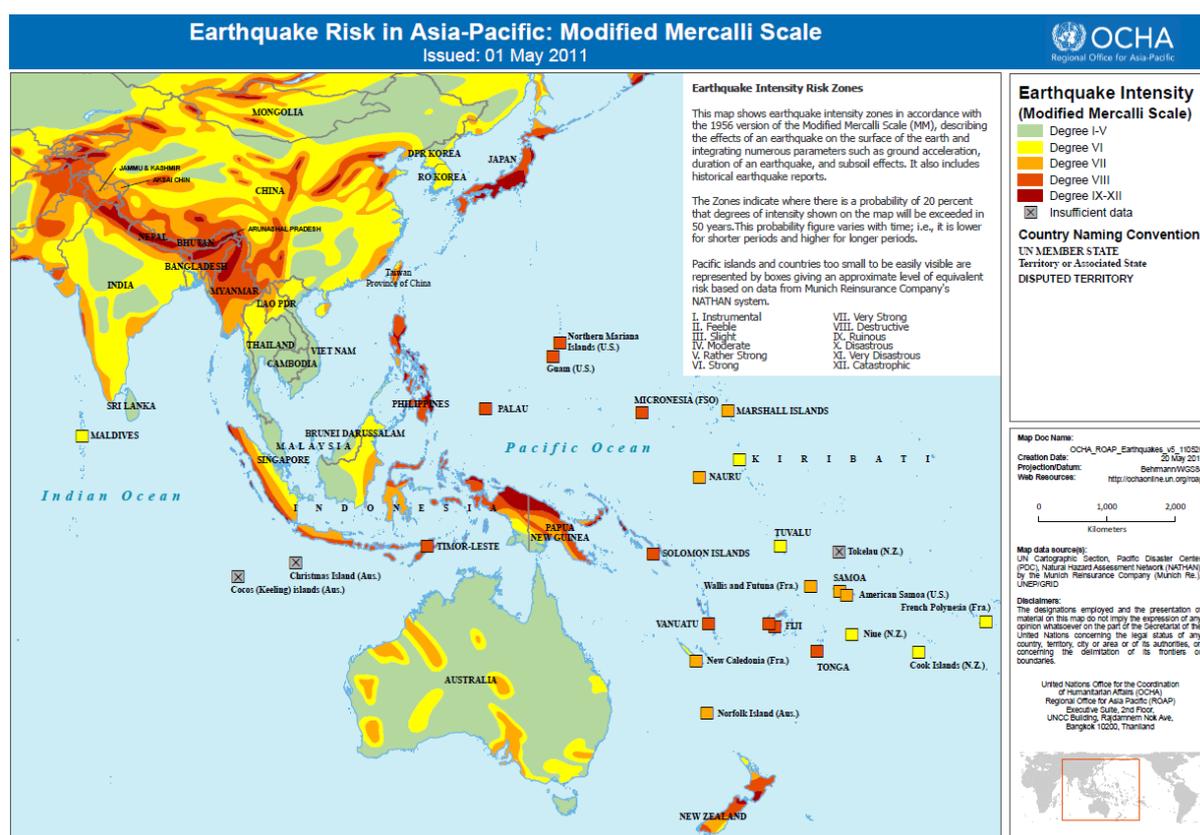
2.3 Earthquake

Risks

Earthquake disasters are not common in Brunei. There is no record of significant disaster caused by earthquakes.

Background

Figure 2.3 shows earthquake risk in the Asia-Pacific region. The zones indicate where there is a probability of 20% that degrees of intensity shown on the map will be exceeded in 50 years. This probability figure varies with time; i.e., it is lower for shorter periods and higher for longer periods. The Brunei region is categorized as VI on the Modified Mercalli Intensity Scale VI.



Source: OCHA

Figure 2.3 Earthquake Risk in Asia-Pacific

Responses by Brunei

There are no special measures focusing on earthquake disaster.

Reports on Hazard and/or Risk Assessment

Useful information and studies on earthquake hazard, risk, and vulnerability were collected from resources available in the public domain including websites. The information and studies include methodologies with analysis and assessment.

There is no standardized or authorized methodology for risk and vulnerability assessment. Therefore, the methodology should be selected or updated in accordance with the purpose when risk and vulnerability assessments are required.

Locations of existing investigations and studies on earthquake are shown in Figure 2.4. Outline of those investigations and studies are attached in Appendix 2 and their summary is given in Table 2.4.

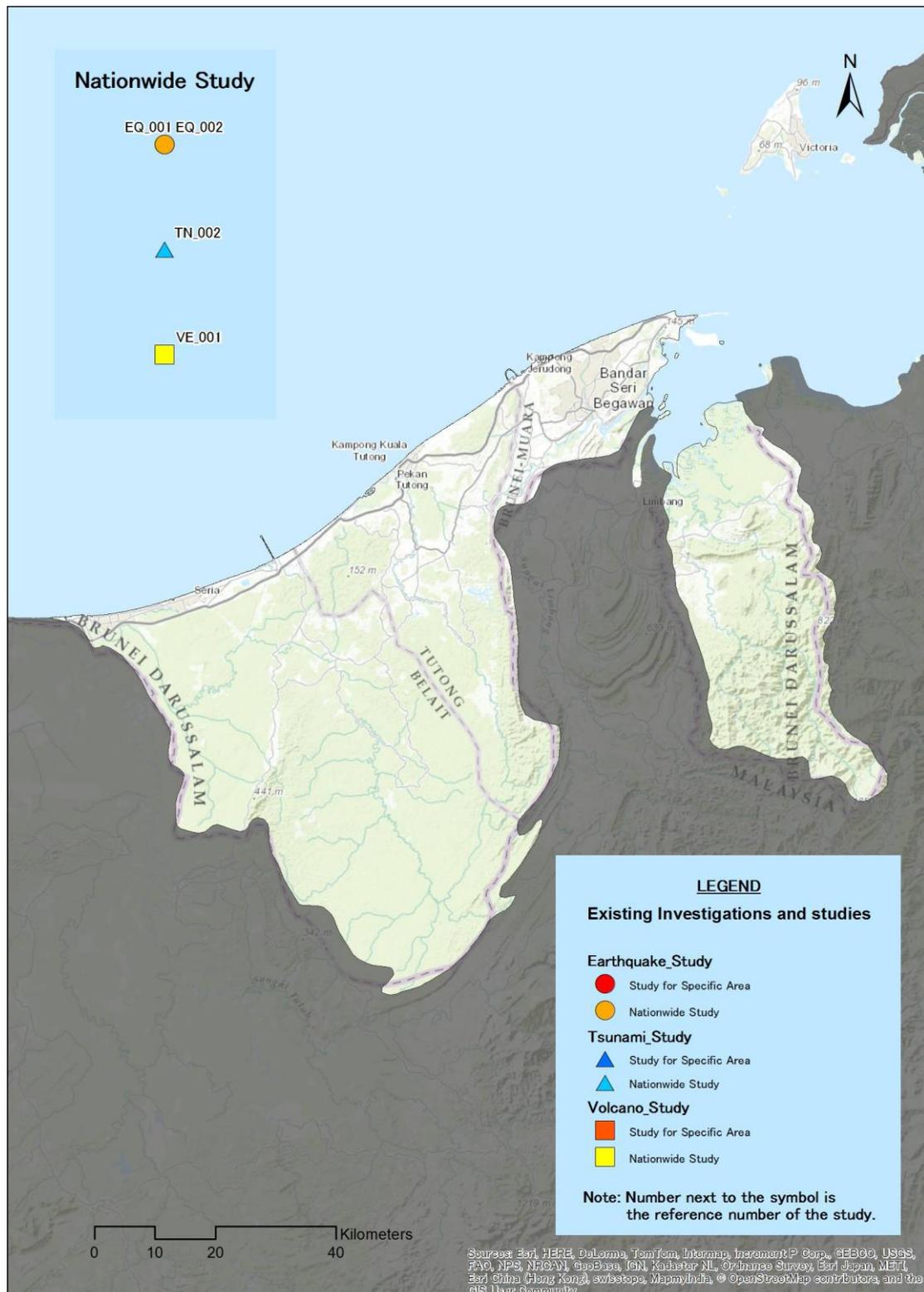


Figure 2.4 Locations of Existing Investigations and Studies: Earthquake, Tsunami and Volcano

Table 2.4 Summary of Existing Investigations and Studies: Earthquake

Country/Region	Summary of Existing Studies and Reports
ASEAN	There are natural hazard assessment reports for ASEAN region created by international organizations like World Bank etc. They summarize frequency, vulnerability, loss, and others subject for each disaster. Some reports describe the methodology and assessment points/items.
Brunei	There is no record of earthquake disaster in Brunei and no investigations or studies limited to this country and its regions were found.

References for Data and Further Reading

- 1) EM-DAT: The OFDA/CRED International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.
- 2) Japan International Cooperation Agency (JICA) (2012): “Data Collection Survey on ASEAN Regional Collaboration in Disaster Management”
- 3) United Nations Office for the Coordination of Humanitarian Affairs (OCHA), Regional Office for Asia Pacific (ROAP) (2011): “Earthquake Risk in Asia-Pacific: Modified Mercalli Scale,” Downloaded from, http://reliefweb.int/sites/reliefweb.int/files/resources/map_613.pdf
- 4) UNISDR (2009). Global assessment report on disaster risk reduction, Risk and poverty in a changing climate

2.4 Tsunami

Risks

It is well known that tsunamis are generated by sea floor earthquakes. However, an undersea volcanic eruption, an undersea landslide, or other disturbances above or below water can also generate a tsunami. There is very low probability that a large earthquake along the coast of Brunei will generate a tsunami and cause a major disaster. In fact, there is no record of significant disaster caused by a tsunami.

However, tsunami disasters may occur due to large earthquakes occurring outside the country. For example, it is possible that a large earthquake occurring in the Manila Trench may affect the coastal area of Brunei.

Responses by Brunei

The meteorological agency of Brunei is monitoring and receiving international tsunami information through its existing networks.

Currently, Brunei does not have its own tsunami monitoring system and is dependent on the information gathered by international institutions and/or other countries. However, the National Disaster Management Center (NDMC) plans to install a new tsunami warning system.

Sources of Hazard and Risk Information

Table 2.5 Sources of Hazard and Risk Information: Tsunami

Ministry of Home Affairs
http://www.home-affairs.gov.bn/
The Disaster Command Center (DCC)
National Disaster Management Center (NDMC)
Brunei Darussalam Meteorological Department, Ministry of Communications
http://bruneiweather.com.bn/?mode=0

Reports on Hazard and/or Risk Assessment

Useful information and studies on tsunami hazard, risk, and vulnerability were collected from resources available in the public domain including websites. The information and studies include methodologies with analysis and assessment.

There is no standardized or authorized methodology for risk and vulnerability assessment. Therefore, methodology should be selected or updated in accordance with the purpose when risk and vulnerability assessment are required.

Locations of existing investigations and studies on tsunami are shown in Figure 2.4. Outline of those investigations and studies are attached in Appendix 2 and their summary is given in Table 2.6.

Table 2.6 Summary of Existing Investigations and Studies: Tsunami

Country/Region	Summary of Existing Studies and Reports
ASEAN	Tsunami induced by the Sumatra earthquake on December 26, 2004 caused major damage to ASEAN countries. The disaster is summarized by organizations like ADB.
Brunei	There is no record of tsunami disaster in Brunei and no investigations or studies limited to this country and its regions were found.

References for Data and Further Reading

- 1) ADB (2005). From Disaster to Reconstruction: A Report on ADB's Response to the Asian Tsunami
- 2) EM-DAT: The OFDA/CRED International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.
- 3) Japan International Cooperation Agency (JICA) (2012): "Data Collection Survey on ASEAN Regional Collaboration in Disaster Management"

2.5 Volcanoes

Risks

There is a volcano called “Bombalai” at the north east end of Borneo Island, but there are no volcanoes in Brunei. Also, there is no record of significant disaster caused by volcano.

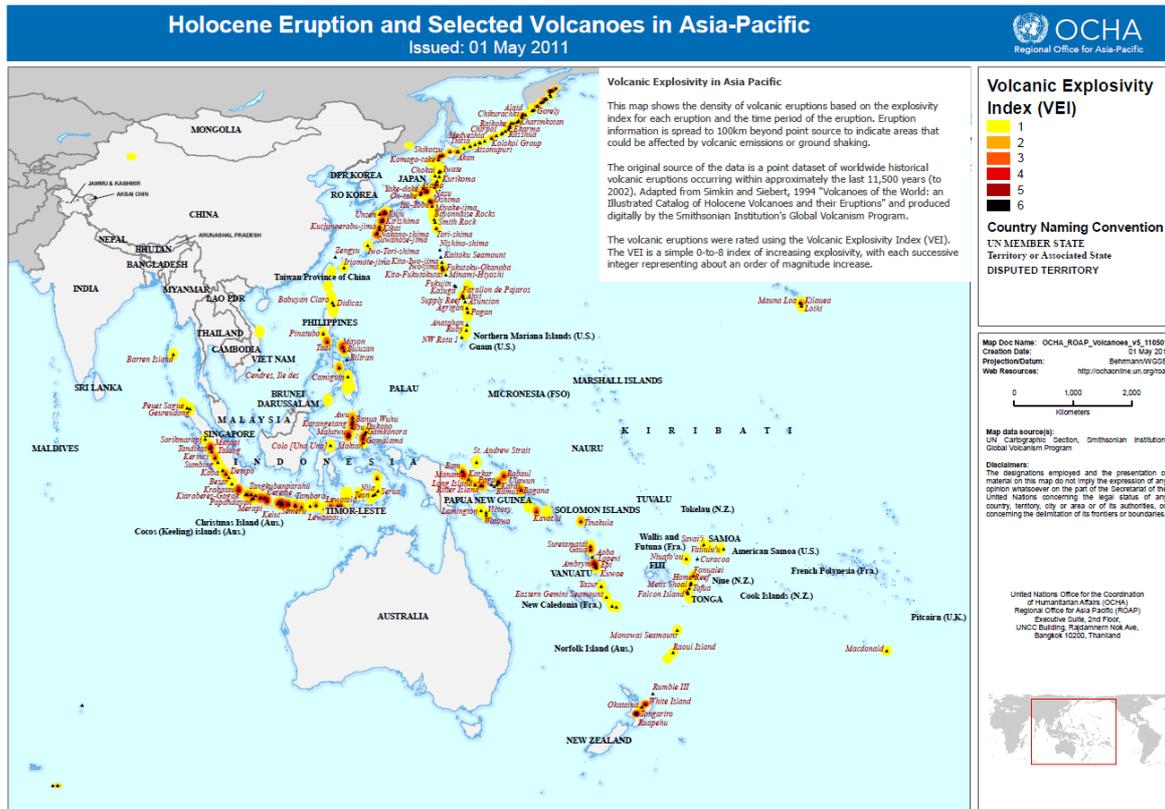
Background

Major hazards caused by volcanic eruption are lava flow, pyroclastic flow, “Lahar” (volcanic mud flow), and volcanic ash fall. Lava flow is a flow of melted rock along the slope. Pyroclastic flow is the flow of a mixture of hot dry masses of fragmented volcanic materials and volcanic gas along the slope. “Lahar” is originally an Indonesian term and is also called volcanic mud flow. It is the flow of a mixture of volcanic materials and water along the slope. These flows cause enormous damage to the side and foot of the volcano, but generally do not have an extended reach. However, volcanic ash fall often spreads widely via trade winds or the westerlies, causing damage over an extensive area. Therefore, there is a possibility that a volcanic eruption in neighboring countries might wreak a volcanic ash fall on Brunei.

Figure 2.5 shows the volcanoes in the Asia-Pacific region which erupted during the Holocene. The Holocene is a geological epoch from 10,000 years ago to the present. The map indicates that many volcanic eruptions have occurred in Indonesia, Philippines, and other neighboring countries.

Responses by Brunei

There are no special measures focusing on volcanic disaster.



Source: OCHA

Figure 2.5 Holocene Eruption and Selected Volcanoes in Asia-Pacific

Reports on Hazard and/or Risk Assessment

Useful information and studies on volcanic hazard, risk, and vulnerability were collected from resources available in the public domain including websites. The information and studies include methodologies for analysis and assessment.

There is no standardized or authorized methodology for risk and vulnerability assessment. Therefore, methodology should be selected or updated in accordance with the purpose when risk and vulnerability assessment are required.

Locations of existing investigations and studies on volcano are shown in Figure 2.4. Outline of those investigations and studies are attached in Appendix 2 and their summary is given in Table 2.7.

Table 2.7 Summary of Existing Investigations and Studies: Volcano

Country/Region	Summary of Existing Studies and Reports
ASEAN	UNOCHA summarized the scale of the explosion of volcanoes around the Asia-Pacific region using the Volcanic Explosivity Index (VEI).
Brunei	There is no record of volcanic disaster in Brunei and no investigations or studies limited to this country and its regions were found.

References for Data and Further Reading

- 1) EM-DAT: The OFDA/CRED International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.
- 2) Japan International Cooperation Agency (JICA) (2012): “Data Collection Survey on ASEAN Regional Collaboration in Disaster Management”
- 3) Lee Siebert, Tom Simkin, and Paul Kimberly (2011): “Volcanoes of the World - Third Edition,” Smithsonian Institute/University of California Press
- 4) United Nations Office for the Coordination of Humanitarian Affairs (OCHA), Regional Office for Asia Pacific (ROAP) (2011): “Holocene Eruption and Selected Volcanoes in Asia-Pacific,” Downloaded from:http://reliefweb.int/sites/reliefweb.int/files/resources/map_619.pdf

2.6 Cyclone and Meteorological Hazards

Risks

The climate of Brunei is generally hot and wet throughout the year as a result of its location on the northwest coast of Borneo within the equatorial tropics. It faces the South China Sea. It is hot and humid with a tropical climate on the plains, while the highlands have a subtropical climate. The country is located between the equator and latitude 10° to the north. It is not affected by typhoons or tropical cyclones. Table 2.8 lists the weather disasters which have occurred in Brunei in the past. The impact of weather disasters on the whole country is low. Most disasters are attributed to flash floods due to short-term rainfall.

Two women died in Brunei during the worst floods to hit the country in the past 40 years. Heavy rains started late on a Tuesday in May 2013 in the oil-rich capital of Bandar Seri Begawan, causing flash floods and landslides, interrupting power supply, and shutting down some telephone lines.

Table 2.8 Weather Disasters in Brunei

Year (Month)	Disaster	Daily Precipitation
1999	Flash flood during La Niña	-
2008	Temburong Flash flood	-
January 2009	Extensive flash flood in Muara, Tutong and Belait district	145.8mm
May 2013	Bandar Seri Begawan Flash flood	181.0mm

Background

The annual movement of the Inter-tropical Convergence Zone (ITCZ) and the associated trade wind fields produce two main seasons in Brunei separated by two transitional periods. However, the country is not affected by typhoons or tropical cyclones. Flooding (flash floods) caused by short-term heavy rains is the main weather disaster in Brunei. The Tutong and Belait districts have been identified as areas prone to flood damage.

Extreme weather events associated with El-Niño were reported to be more frequent and intense during the past 20 years. A projected sea level rise is likely to result in the

significant loss of coastal ecosystems and people will likely be at risk from coastal flooding.

Responses by Brunei

The Brunei Darussalam Meteorological Service is responsible for meteorological observation and weather forecast in this country. In terms of numerical weather prediction products, precipitation and ensemble forecasts have been carried out. One radar system is currently in operation.

Table 2.9 Brunei Meteorological Service Authorities

Institution	Department	Contact information
Brunei Darussalam Meteorological Service http://www.bruneiweather.com.bn/	Administration	Tel: +673 2381342 (ext: 110)
	Weather Forecast Office	Tel: +673 2381342 (ext: 114)
	Climatological Data	Tel: +673 2381342 (ext: 1888)

Sources of Hazard and Risk Information

Hazard risk assessment results related to tropical cyclones (meteorological disasters) are as follows.

Table 2.10 Sources of Information: Cyclone and Other Meteorological Hazards

Institution	Literature name
Economy and Environment Program for Southeast Asia (2010)	Climate Change Vulnerability Mapping for Southeast Asia http://css.escwa.org.lb/sdpd/1338/d2-5a.pdf
UNISDR (2010)	Synthesis Report on Ten ASEAN Countries Disaster Risks Assessment http://www.unisdr.org/files/18872_asean.pdf

Reports on Hazard and/or Risk Assessment

"Cyclone" is a term to describe many types of low pressure systems, of which tropical cyclones/typhoons are the main types creating disasters in the ASEAN region. Leading countries are monitoring and detecting tropical cyclones on a regional basis

under the framework of WMO. Table 2.11 indicates the responsible territory allocated to ASEAN members and its leading country.

Table 2.11 Members of WMO Tropical Cyclone Committee

	Warning Zones	Members (ASEAN)	Leading Country
Western North Pacific Ocean and South China Sea	0° - 60°(N) 0° - 100°(E)	Cambodia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, Vietnam	Japan
Bay of Bengal and the Arabian Sea	5°S - 45°(N) 30°E - 90°(E)	Myanmar, Thailand	India
South Pacific and South-East Indian Ocean	0°-50°(S) 90° - 170°(E)	Indonesia	Fiji

The dates and information utilized in this report have been acquired from various reports on the studies and research conducted on tropical cyclones and meteorological hazards published on the internet. Collected documents include evaluation results of hazards/risks, as well as their evaluation methods. With regard to tropical cyclones/typhoons, a meteorological organization of each country compiles a summary on the damage situation, including the number of casualties or loss of human lives, and the estimated amount of damage, etc.

Locations of existing investigations and studies on cyclone and other meteorological hazards are shown in Figure 2.2. Outline of those investigations and studies are attached in Appendix 2 and their summary is given in Table 2.12.

Table 2.12 Summary of Existing Investigations and Studies: Cyclone and Other Meteorological Hazards

Country/Region	Summary of Existing Studies and Reports
ASEAN	Study reports on natural disasters in the whole ASEAN region are available.
Brunei	There is no indication of tropical cyclones or meteorological hazards.

References for Data and Further Reading

- 1) Brunei Darussalam Meteorological Service
(Website):<http://www.bruneiweather.com.bn/>
- 2) Dagar L., et al and (2013): "A Numerical Weather Prediction-Based Infrastructure for Tropical Meteorology Research and Operations in Brunei," Symposium on the Next Level of Predictions in Tropical Meteorology.

- 3) ESCAP/WMO Typhoon Committee. (<http://www.typhooncommittee.org/>)
- 4) WMO National Meteorological or Hydrometeorological Services of Members (http://www.wmo.int/pages/members/members_en.html)
- 5) WMO (2010). First Meeting of the Task Team on "Meteorological, Hydrological and Climate Services for Improved Humanitarian Planning and Response", WMO Headquarters, Geneva, Switzerland (31 August - 2 September, 2010)

2.7 Landslides

Risks

The risk of landslide is very low.

One landslide was recorded in 2007 and one in 2008. A landslide is also assumed to have occurred in 2009. These landslides were caused by heavy rain. The landslide that occurred in 2009 blocked roads, but no fatalities were recorded.

Reports on Hazard and/or Risk Assessment

Locations of existing investigations and studies on landslide are shown in Figure 2.2. Outlines of those investigations and studies are shown in Appendix 2 and their summary is given in Table 2.13.

Table 2.13 Summary of Existing Studies and Reports by Country: Landslide

Country/Region	Summary of Existing Studies and Reports
ASEAN	There have been a few reports that study landslides for ASEAN and the Pacific region at large in recent years. Disaster risks are assessed by scenario, exposure, vulnerability, damage, and loss. An assessment framework is also sought to give an overview of risks, hazard, and vulnerability.
Brunei	Only three landslide events were identified in this country. The hazard map LS-08 indicates a low level of distribution near the border with Malaysia. Although 1/3 of prior disasters are landslides, assessments of risk and vulnerability are very low level.

References for Data and Further Reading

- 1) Economy and Environment Program for Southeast Asia (EEPSEA) (2009): "Climate Change Vulnerability Mapping for Southeast Asia," p. 19
- 2) World Bank, UNISDR (2010). Synthesis Report on Ten ASEAN Countries Disaster Risks Assessment

3. Industrial Parks

3.1 Distribution of Industrial Parks in Brunei

21 industrial parks were identified by the study, and as shown in Figure 3.1, most of them are distributed along the coastline of South China Sea.

A list of the industrial parks in Brunei is given in Appendix 3, and a brief description of the selected industrial parks is given in reference².

Industrial sites in Brunei appear to be generally well run, though most are relatively small and full or nearly fully-occupied. It is also worth noting that as all of Brunei's parks are government-run with limited resources, they do not offer the level of investor service or support that larger, private parks offer in countries such as Thailand or Vietnam, where competition drives high levels of support and service.

For BINA managed parks, infrastructure is provided and fairly current information about the parks (such as details on location, total site size, number of slots, slot availability, type of industry targeted and rent) is available online in English. For any further information, it is necessary to contact BINA directly, as no contact information is available for the individual parks. For BEDB parks, fairly current information in English is available online (such as details on location, type of industry targeted, and total site size). As the BEDB deals with larger projects than BINA, information on rent is not available. Staffs at BINA and the BEDB are helpful and responsive, though their responses can sometimes be slow. Both the BEDB and BINA are tasked with attracting foreign investment and enquiries by foreign investors are treated with priority.

² AHA Centre and JICA (2014), Risk Assessment Reports for ASEAN and its Countries, Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Areas in the ASEAN Region.

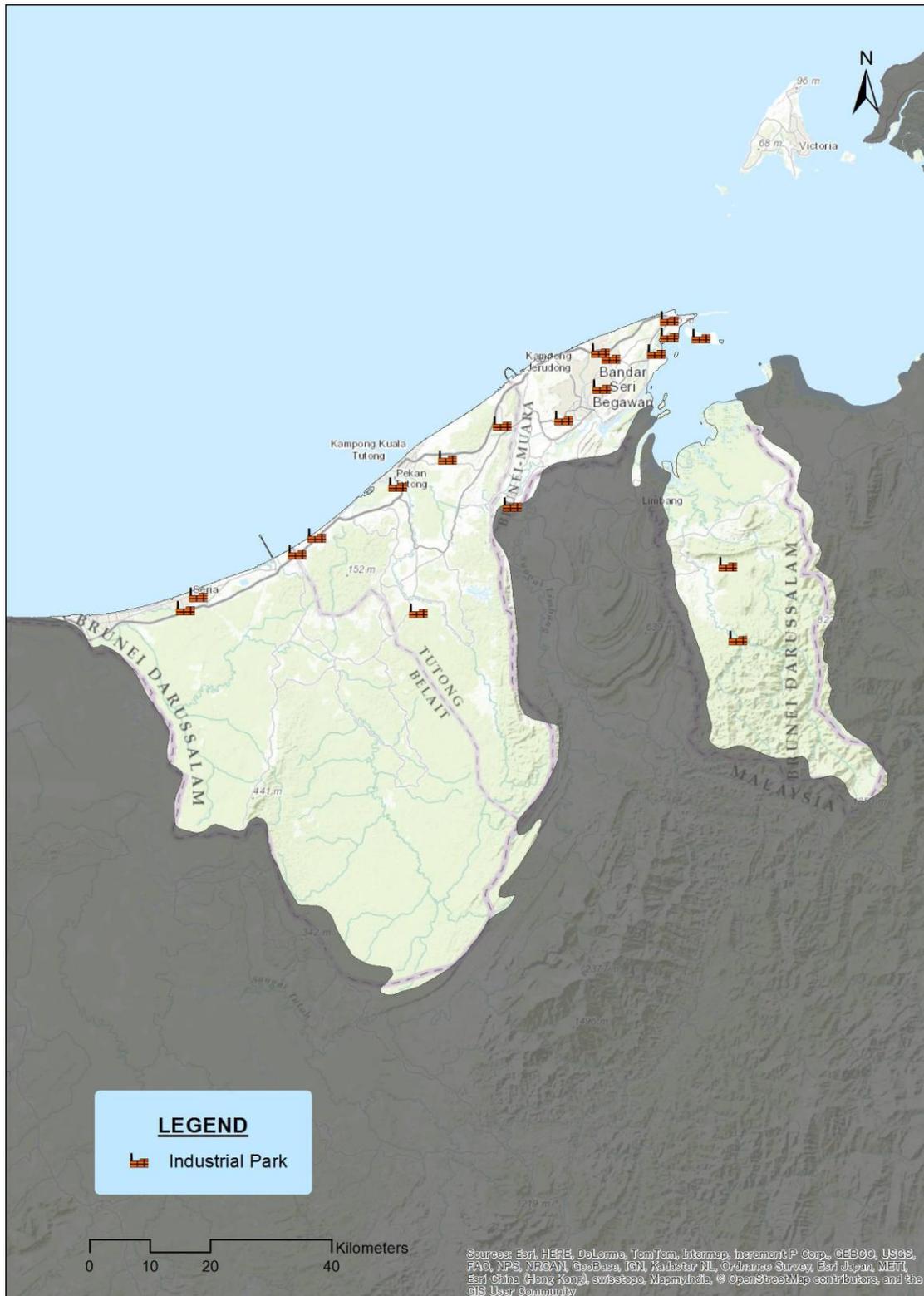


Figure 3.1 Distribution of Industrial Parks in Brunei

3.2 Historical Evolution of Industrial Parks

The development of industrial sites by government agencies for foreign and domestic investment is relatively recent in Brunei. The Brunei Economic Development Board (BEDB) was set up in November 2001 to promote Brunei as an investment destination. As a one-stop shop for potential investors, one of its key focus areas is to promote foreign direct investments in export-oriented manufacturing and services, as well as research collaboration. The BEDB focuses on a small number of large projects. While these include oil and gas-related ones, one of the BEDB objectives is also to promote economic diversification through private sector development outside of the oil and gas industries, including through the creation and management of industrial parks.

In January 2003, the BEDB launched its first two projects, the development of the Sungai Liang area into a hub for petrochemical industries – which included the creation of Sungai Liang Industrial Park (SPARK) - and the construction of a deep water port facility at the island Pulau Muara Besar. Since then, its management of industrial parks has steadily increased. Currently, the following industrial sites are managed by the BEDB: Seria (oil and gas), SPARK (petrochemicals), Telisai (mixed industries), Bukit Panggal (energy intensive industries), Anggerek Desa (technology park), Rimba (ICT & High Tech), Lambak Kanan East (light industries), Pulau Muara Besar (oil & gas related industries), Bandar Seri Begawan (financial center), Agrotech Park (halal and business center), Tasek Merimbun (ecotourism) and Ulu-Ulu Temburong (ecotourism). In Lambak Kanan East, a site for the food and beverage, pharmaceuticals and light manufacturing industries, the Canadian company Viva Pharmaceutical is a main investor, and there are plans for an expansion of the site. The main current development project under the BEDB is Pulau Muara Besar (PMB) for oil and gas related industries. Surbana Consortium was appointed as master planner for PMB development in 2008. The Chinese company Zhejiang Hengyi has been contracted to construct a refinery and aromatics complex, the USD 4 billion phase 1 of which is targeted to start in 2015.

A second government agency responsible for industrial sites is the Brunei Industrial Development Agency (BINA), a department under the Ministry of Industry and Primary Resources (MIPR). BINA was created in April 1996, through the merger of the Department of Co-operative Development, Ministry of Home Affairs, and the Industrial Unit, Ministry of Industry and Primary Resources. It is a government-facilitating

agency tasked with the promotion of industrial and co-operative development for export-oriented SMEs, through assisting industrial establishment, attracting FDI and stimulating trade. BINA provides a first point of contact for investors in the manufacturing and related support services sectors. It plays a fourfold role in industrial development: catering to the provision of industrial sites and complexes; allocating industrial projects; managing industrial sites; and providing support services for companies established in the BINA-managed industrial sites.

BINA's involvement with industrial parks increased notably in 2007, when nine industrial parks were allocated by the MIPR through BINA to accommodate SMEs: Beribi, Lambak Kanan Barat, Lambak Kanan Timur, Salar, Serasa, Serambangan, Sungai Bera, Pekan Belait and Batu Apoi. Scattered across Brunei Darussalam's four districts, these parks cover a total area of 422 ha. These BINA-managed sites are fully developed with complete infrastructure facilities, including road access, electricity, water, telecommunications and sewerage. Apart from prepared industrial land, BINA also provides units for monthly rent. In addition, BINA also manages three readily available industrial complexes: Beribi, Serambangan and Pekan Belait. Most of the nine industrial sites provided since 2007 are fully occupied. In response, BINA began the development of Kuala Lurah, a tenth industrial site. Kuala Lurah is to be developed in three phases. Its first phase, covering 33 ha, offers 27 lots for construction-related industries.

3.3 Recent Trends and Japanese Investment

Substantial Japanese investment was initially channeled into Brunei's oil and gas industry. In 1972 a liquefied natural gas (LNG) plant was completed in Lumut as a joint venture between the Brunei government, Shell Overseas Holdings Limited and Japanese Mitsubishi Corporation. Since then, Japanese investment has grown. There are eight Japanese companies currently operating in Brunei Darussalam. None of these are located in BINA-managed industrial parks. Four Japanese companies operate either in or directly adjacent to industrial sites under the BEDB. The other four operate outside of industrial parks.

In SPARK, the only resident Japanese project is the Brunei Methanol Company (BMC), which was established by the Japan-Brunei consortium Mitsubishi Gas Chemical Co

Inc., Itochu Corporation and Brunei Petroleum. The USD 600 million methanol plant started commercial operation in May 2010 with a capacity to produce 850,000 metric tons of methanol per annum. In August 2011, a second project was approved for the site; a USD 2.8 billion integrated petrochemical complex to be developed by Mitsui Consortium. Pharmex Japan Co. Ltd. signed a MoU with the BEDB in 2008 to set up a pharmaceutical packaging plant in Brunei, where medicines are to be packaged under the Brunei Halal brand. In 2010, a supplement agreement was signed, and plans to establish a USD 250 million plant in the Agro-Technology Park were announced. Marubeni Power Systems Corporation has won several big power projects in Brunei, some of which power industrial parks. In 2000, the company was awarded a contract for the 100mW Gadong simple cycle power station, completed in 2003. In 2005, Marubeni Corp. was awarded a JPY 10 billion contract for the Bukit Panggal Combined Cycle Power Station phase 1.

Outside of the industrial parks, Tobishima Corporation is based in Bandar Seri Begawan. It is one of the major construction firms in Brunei Darussalam. Tokyo Marine Life Insurance, also based in Bandar Seri Begawan, has operated in Brunei since 1957. In 2011, the company announced that it would strengthen its presence in Brunei.

3.4 Risks of Natural Hazards

For the first glance of risks of natural hazards to industrial parks and individual enterprises, it is useful to superimpose your location on the distribution maps of natural disasters. Those maps could not be prepared for Brunei, mainly due to the risks of natural hazards of the country is low, as described in Chapter 2, and lack of information of disasters.

A description of general investment risks of Brunei is attached in Appendix 4.

4. Transport Infrastructure and Lifeline Utilities

4.1 Overview of Transport Infrastructure

Road

Various road networks such as highways, connecting roads, elevated roads, and roundabout interchanges have been developed. The Brunei National Roads System is the major national road network. It has been constructed and maintained by the Public Works Department of Brunei (JKRB).

All national highways are two-lane roads, and road signs use white characters on a green background. The speed limit is 100 km/h.

There are six (6) highways.

- (1) Muara-Tutong Highway
- (2) Sultan Hassanai Bolkiah Highway
- (3) Tungku Highway
- (4) Kuala Belait Highway
- (5) Telisai- Lumit Highway
- (6) Brunei-Temburong Highway including Temburong Bridge

The road density in 2010 was 52.50 km/km², and the density level remained at the same level after a drop in 2007. The total length of road is 2,836 km, of which 423 km is highways.

Major road networks of Brunei are shown in Figure 4.1.

Railway

There is no railway in Brunei.



Figure 4.1 Major Road and Industrial Parks in Brunei

Port

In Brunei, there are three ports: Muara Port, Kuala Belait Port, and Bangar Port, which are under the jurisdiction of the Ports Department of the Ministry of Communication. The facilities of Muara Port are of the local highest level. Muara Port is located about 28 km from the capital city. The water at the port is deep and it is the major entrance for international trading.

More than 90% of import and export items except oil and gas go through Muara Port. According to 2008 statistical data, 948,033 tons of cargo and 90,372 container TEUs were handled. It has two main terminals: a convention terminal and a container terminal. Their combined area is 24 hectare. There are also some oil-related facilities belonging to Royal Dutch Shell.

Moreover, Brunei Shell Oil (Brunei Shell Petroleum) has established an institution to support operations offshore along the Muara Port.

Locations of major ports are shown in Figure 4.2

Airport

In Brunei, there are two main airports: Brunei International Airport in Bandar Seri Begawan City and Anduki Airfield in the Seria Anduki District. Brunei International Airport is managed by the Government of Brunei and the runway is 3,658 m×46 m. Brunei International Airport is used as the base for Royal Brunei Airlines, while Anduki Airfield is a commercial airport managed by Brunei Shell Petroleum.

The passenger terminal of Brunei International Airport has a maximum capability of handling 2 million passengers per year, and there were 1,827,465 passengers in 2010.

Locations of major airports of Brunei are shown in Figure 4.2.

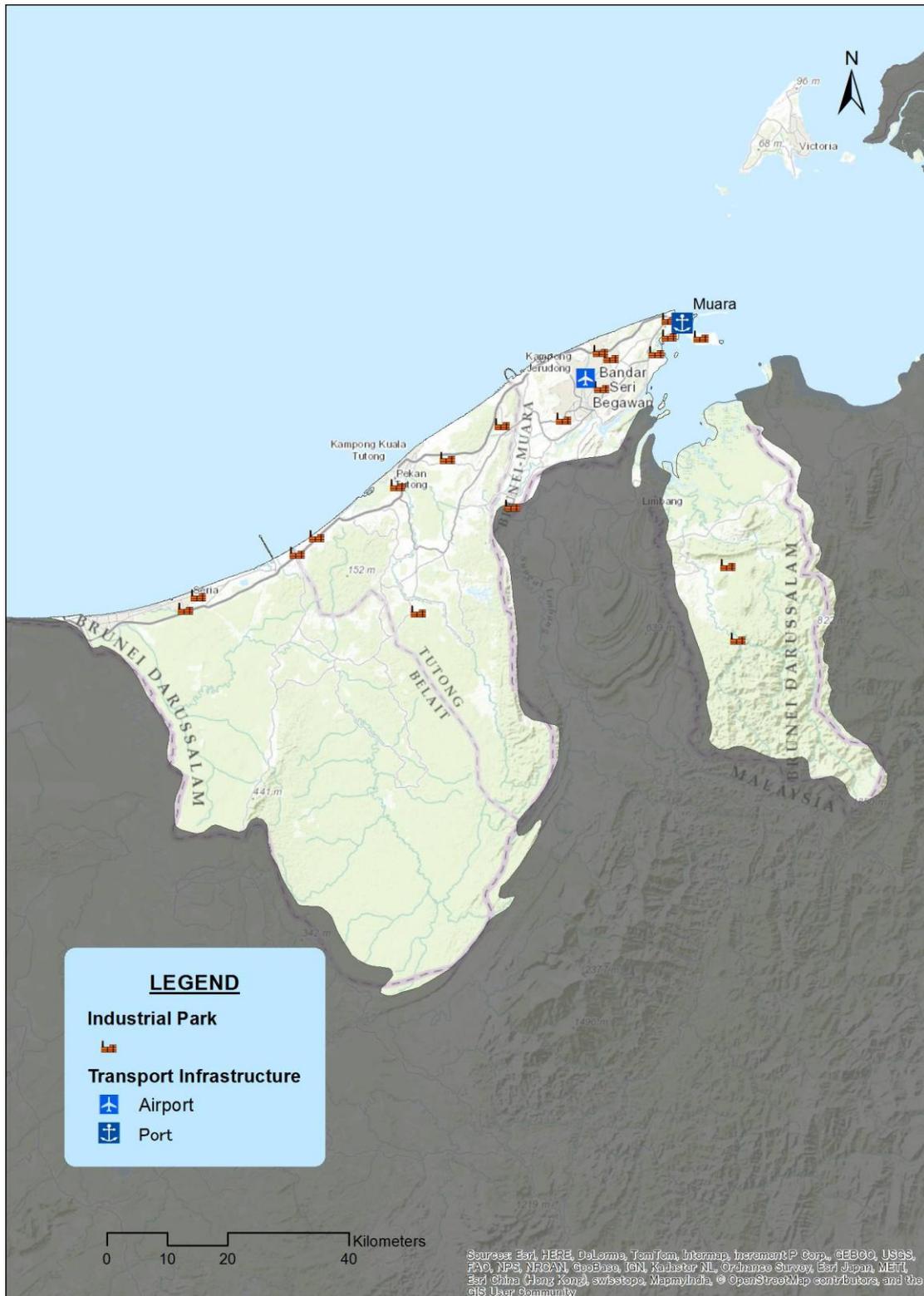


Figure 4.2 Major Ports, Airports and Industrial Parks in Brunei

4.2 Overview of Lifeline Utilities

Electricity

In Brunei, there are four (4) dams and ten (10) thermal power plants. The Ministry of Energy (MOE) is under the Prime Minister's Office, and the Department of Electrical Services (DES) is established within the MOE. There are seven (7) energy service companies, of which only five (5) are currently generating electricity.

Locations of major power stations and dams are shown in Figure 4.3.

Table 4.1 Energy Service Companies in 2011

Company	Total (MWh)	(%)	Number of Power Plant
Dept. of Electrical Serv.	2,292,070	75	4
Berakas Power Management Co.	420,603	14	3
Brunei Lng Sdn Bhd	253,610	8	1
Sultanate Of Brunei	38,971	1	1
Brunei Shell Petroleum Co. Ltd.	31,575	1	1
Brunei Economic Dev. Board	0	0	1
Mitsubishi Corp.	0	0	1

Sources: Enipedia, Brunei/Energy Companies

Water Supply

The Department of Public Works is responsible for overseeing planning, design, and management, and provides 99.9% of the potable water to the people of Brunei Darussalam.

Table 4.2 Water Supply Facilities in Brunei

Facility	Quantity
Dams	5 (one (1) is under construction)
Water treatment plant	8
Water inspection facility	8
Barrage	2
Reservoir	56
Distribution pipelines ≤ D=400 mm	2,600 km
Transmission pipelines ≥ D=400 mm	320 km
Sub-office	5
Booster Pumping Stations	13
Tanker Trucks	13

Source: Jabatan Kerja Brunei Darussalam, Water Services

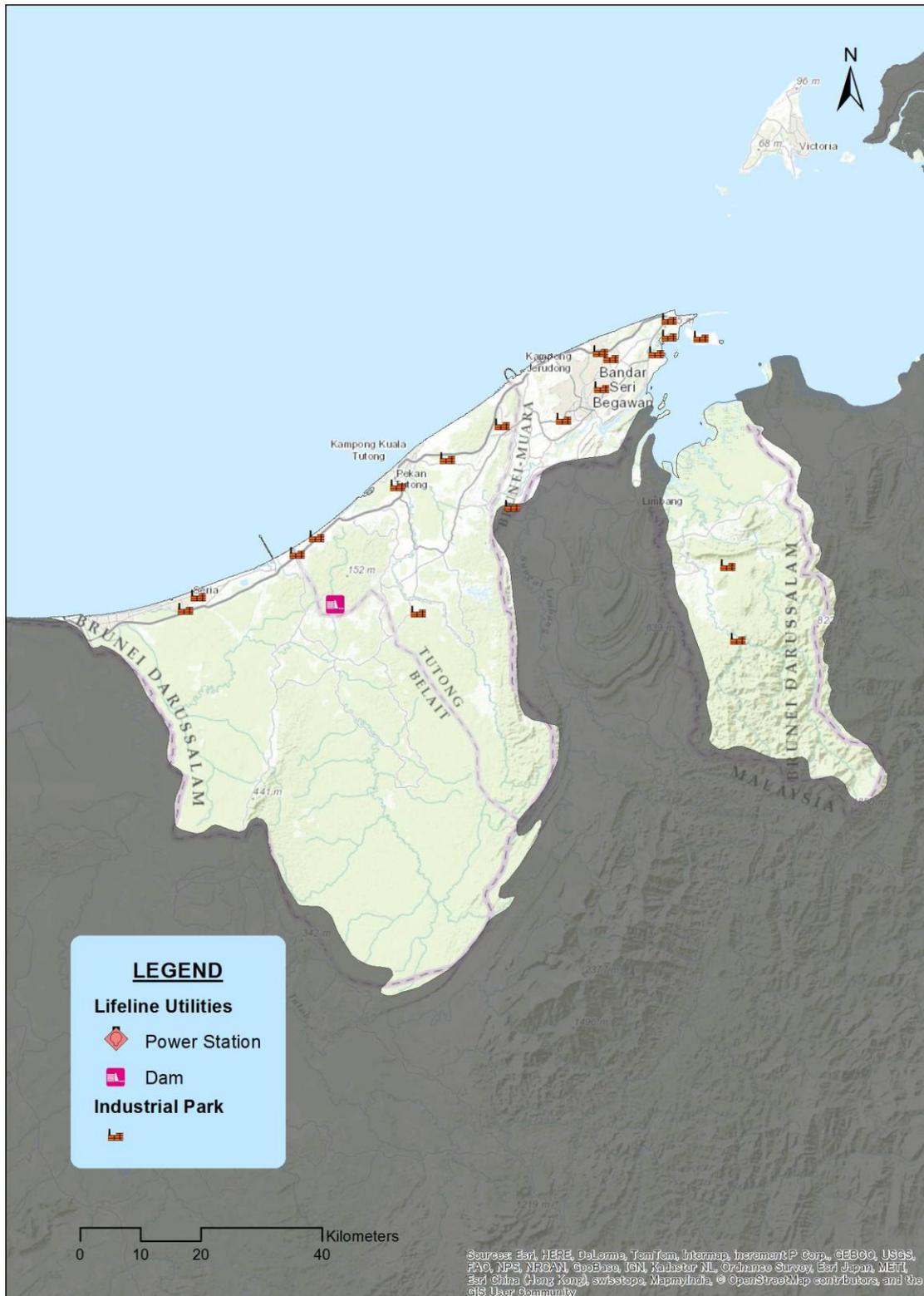


Figure 4.3 Power Stations, Dams and Industrial Parks in Brunei

Sewerage

The Department of Public Works is responsible for ensuring the sewerage system is clean and safe.

Table 4.3 Sewage Facilities

District	Sewage Treatment Plants	Major Sewerage Pumping Stations	Subsidiary Sewerage Pumping Stations	Sewer Pipes (km)
Brunei Muara	9	29	122	550.07
Tutang	4	1	16	48.1
Belait	3	15	6	140.5
Temburong	1	-	4	0.7
Total	17	45	148	739.37

Source: Jabatan Kerja Brunei Darussalam, Water Services

Communications

Internet and Broadband

The government is responding to the spread of broadband, and announced a broadband plan and a radio broadband access plan in 2008. However, the internet diffusion rate in 2011 was still low at 5.5%. There are approximately 22,000 subscribers. Currently the government is working on the spread of optical fiber networks.

Mobile Phone

In the mobile communications market of Brunei, DST Communications, TelNru (entered the market in 2008), and b-mobile (joint venture company with QAF Comserveno) provide services.

The diffusion rate is over 109.2% and exceeded one mobile per person in 2011.

Fixed-line Phone

The Department of Electricity and Communication, which offers fixed-line communication, was privatized in April 2006 to create TelBru. This company has monopolized the market. Landline subscribers have been influenced by mobile phones and are decreasing yearly, with the diffusion rate is dropping to 19.7% in 2011.

Terrestrial Broadcasting

The national broadcasting company Radio Television Brunei (RTB) offers television broadcasting. There is only one commercial broadcasting company, and satellite broadcasting company Kristal-Astro offers both television and a radio broadcasts.

Waste

In 2000, the volume of general waste was approximately 153,700 tons, and the volume of industrial waste was 25,640.87 thousand tons. This calculates to 1.4 kg of waste per person/day is 1.4 kg or 189,000 tons in a year; this amount is increasing every year.

The amount of general waste by area is shown as follows.

- (1) Brunei Muara: 129,000 tons/year
- (2) Tutong: 21,700 tons/year
- (3) Belait: 31,000 tons/year
- (4) Temburong: 6,300 tons/year

According to a survey conducted in 2005, the components of the waste are: food (36%), paper (18%), plastic (16%), garden waste (6%), and disposable diapers (6%). At present, there are six (6) landfill sites.

Brunei Economic Development Board (BEDB) has constructed and manages the disposal facility in Muara, which has the capability to treat 300 tons per day using osmotic water treatment.

4.3 Natural Disasters and Infrastructure

Since transport infrastructure and lifeline utilities have crucial role for business continuity of enterprises, it is important to know their risks to natural disasters. For the first glance of the risks, it is useful to superimpose locations of transport infrastructure and lifeline utilities on the distribution maps of natural disasters in the country.

For Brunei, such distribution maps could not be prepared, mainly due to low risk of natural hazards and lack of information of disasters. When the detailed assessment of the risks of natural disasters to transport infrastructure and lifeline utilities is required, hazard and risk assessment are necessary for an area of interest.

5. Legislative Systems

5.1 Legislative Systems for Disaster Management

Disaster Management Laws

Table 5.1 Laws and Regulations of Disaster Management in Brunei

	Laws / Regulations	Supervisory Authority	Matter
<i>Government Order</i>	Disaster Management Order, 2006	National Disaster Management Centre	Disaster Management

In Brunei, there is no specific law about disaster management. Instead, the Disaster Management Order (2006) defines the legal basis for disaster management. Responsibilities and authority of the National Disaster Management Centre (NDMC) are defined in this order.

Disaster Management Strategies and Plans

Table 5.2 Strategies and Plan for Disaster Management in Brunei

	Laws / Regulations	Supervisory Authority	Matter
<i>Plan</i>	Strategic National Action Plan for Disaster Risk Reduction 2012-2025	National Disaster Management Centre	General Disaster
<i>Plan</i>	RBPF (Royal Brunei Police Force) Standard Operating Procedures	Royal Brunei Police Force	General Disaster

In Brunei, development of a National Disaster Management Plan is defined in the Disaster Management Order. The National Disaster Management Plan is based on RBPF Standard Operating Procedures and the Strategic National Action Plan for Disaster Risk Reduction 2012-2025. NDMC held talks with RBPF in January 2012 to discuss implementation of the RBPF Standard Operating Procedures in case of emergency.

5.2 Regulations and Standards for Business Continuity Management

No regulations, standards or guidelines for business continuity management in time of disaster have been identified in Brunei.

5.3 Legislative Systems for the Environment and Pollution Control

Environmental Laws and Regulations

Table 5.3 Laws and Regulations regarding the Environment in Brunei

	Law / Regulations	Supervisory Authority	Matter
<i>Government Order</i>	Proposed Environmental Protection and Conservation Order, 2010	Ministry of Development	Environment Management

The Proposed Environmental Protection and Conservation Order were promulgated in 2010 as a central laws/regulation concerning environmental conservation in Brunei. This order stipulates the protection and management of the environment, and the integration of environmental concerns into private and public decision-making.

Pollution Control Laws and Regulations

The information released about laws and regulations for environmental pollution control concerning domestic companies in Brunei is limited, making details unclear.

5.4 Legislative Systems for Development including Land Use, Rivers, and Building Code in Brunei

Table 5.4 Laws and Regulations for Land, Rivers, and Building Code in Brunei

	Laws / Regulations	Supervisory Authority	Matter
Law	Land Code, Chap. 40	Land Department	Land Use
Law	Land Acquisition Act, Chap. 41	Land Department	Land Acquisition
Law	Town and Country Planning Act, Chap.142	Ministry of Development	Development
Law	Forest Act, Chap. 46	Ministry of Industry & Primary Resources, Forestry Department	Forestry
Plan	National Land Use Master Plan 2006-2025	Land Department	Land Use

Regulations about the possession and use of land are stipulated in the Land Code. However, acquisition of land is defined separately in the Land Acquisition Act. The National Land Use Master Plan 2006-2025 contains determinations about land use.

In Brunei, the Town and Country Planning Act stipulate development of city and rural areas. There are no items regarding land use or urban development in times of disaster, restoration, and/or reconstruction in any of the Acts.

Sufficient information could not be collected in this investigation about regulations for rivers or building standards

6. Implementation of BCP

6.1 Major Natural Disasters and Awareness Disaster Management

Floods caused by heavy rain, flash floods, and wind disasters such as gusting wind and haze are the main natural disasters expected to cause damage in Brunei. On the other hand, earthquakes and cyclones do not occur. Moreover, according to records of past disasters, floods have seldom brought extensive damage during heavy rain, and large-scale disasters are not expected. The risk that the economy and business conditions may suffer due to natural disaster damage in Brunei is considered quite low by the government and enterprises.

6.2 Current State of BCP Implementation

The concept of BCP is not generally recognized by enterprises in Brunei. Even among governmental agencies, BCP is not well known, with the exception of disaster-related ministries or departments such as the National Disaster Management Centre (NDMC). Although some major enterprises or enterprises handling utilities, oil, and other hazardous materials are thought to have prepared a BCP, most enterprises have not yet developed them. Additionally, most enterprises believe that disaster risk mitigation is not required because of their lack of experience with disasters, nor are they familiar with disaster risk management. A Standard Operating Procedure (SOP) is commonly developed by most enterprises including SMEs. Some SOPs contain a contingency management plan for natural disasters.

6.3 Efforts on Promoting BCP Implementation

The national disaster policy of the Brunei government primarily consists of a disaster management system based at the community level. Conversely, disaster management systems for corporations initiated by the government have not been promoted sufficiently. Although NDMC planned to hold seminars on corporate BCP due to the pandemic of new strains of influenza in 2008, awareness and

understanding of BCP among governmental agencies not related to disaster issues and private enterprises have not encouraged implementation.

In Brunei, natural disasters are not regarded as a significant risk on business conditions. To date, no efforts for BCP dissemination have been implemented by government or private agencies.

6.4 Problems Facing for Implementation of BCP

With the exception of some major enterprises, risk management for natural disasters is regarded as less important than other corporate risks due to the expected low frequency and impact of natural disasters. To encourage the development of a BCP or disaster management system in companies, a proper risk assessment is needed.

In addition, the government is requested to determine the roles of each ministry and department for BCP implementation. International support is also required to spread BCP in Brunei due to a lack of knowledge and experience in BCP development.

Appendix 1: Method for Evaluating Predominant Hazards

The “Damage Amount / GDP” and “Number of Deaths” are used as the indices to show the impacts of the disasters considered and 6 natural hazards will be studied and compared. At the beginning of the study, only the “Damage Amount / GDP” was used as an index because the results can be used for Area BCP planning. However, the scarcity of information related to damage amounts became clear as the study progressed. As the information on the “Number of Deaths” is substantial compared to the damage amount, the “Number of Deaths” has been added as an index of impact.

The process of the study is as follows;

- 1) Based on the Damage Amount / GDP or Number of Death, each disaster is classified according to the ranking system outlined in Table A1,
- 2) The number of disaster events for each country is added by type of hazard and disaster rank, and then classified into Table A2 below,
- 3) The above information is then plotted on the impacts - frequency matrix by country,
- 4) As for earthquakes, tsunamis and volcanic hazards, if an event occurred before 1983 that was of the same (or higher) disaster rank as the maximum disaster rank recorded between 1983 to 2012, a point is plotted on the matrix which corresponds to the relevant disaster and frequency rank (=1).

Table A1 Disaster Rank and Damage

Disaster Rank	Damage Amount / GDP ³	Number of Death
5	1.0% -	10,001 -
4	0.1% - 1.0%	1,001 - 10,000
3	0.01% - 0.1%	101 - 1,000
2	0.001% - 0.01%	11 - 100
1	- 0.001%	- 10

³ Gross domestic product based on purchasing-power-parity (PPP) valuation of country GDP, International Monetary Fund, World Economic Outlook Database, October 2012

Table A2 Frequency Rank and Number of Events

Frequency Rank	Number of Events from 1983 to 2012	Average Frequency (Events / Year)
5	7 or more	1/5 -
4	4 to 6	1/10 - 1/5
3	2 to 3	1/15 - 1/10
2	1	1/30
1	Large Events occurred before 1983	-

Appendix 2: Data Sheets Outline of Existing Investigations and Studies

No.:	FL-001	Published Year:	2010
Study/ Report Name:	Synthesis Report on Ten ASEAN Countries Disaster Risks Assessment		
Access to Information:	www.unisdr.org/files/18872_asean.pdf		
Research Organization:	UNISDR/World Bank		
Study Area (Country):	ASEAN (10 countries)		
Studied Hazard:	Flood		
Studied Damage/ Risk:	Flood		
Main Data Sources:	CRED EM-DAT, ADRC, NGDC, GSHAP, MRC, WAMIS, DWR, Munich Re, World Bank, UNISDR, GAR, In Terragate, IFNet, CCFSC, DESINVENTAR		

Summary of the Study:

1) Overview

Disaster risks are assessed for years (1970-2009) by 1) Scenario, Exposure, Vulnerability, Damage and Loss analysis using existing database. The dominant disaster risks are cyclonic storms (typhoons), earthquakes, tsunamis, floods, epidemics, landslides, droughts volcanic eruptions and forest-fires. In total 1,211 reported disasters caused over 414,900 deaths.

2) Vulnerability

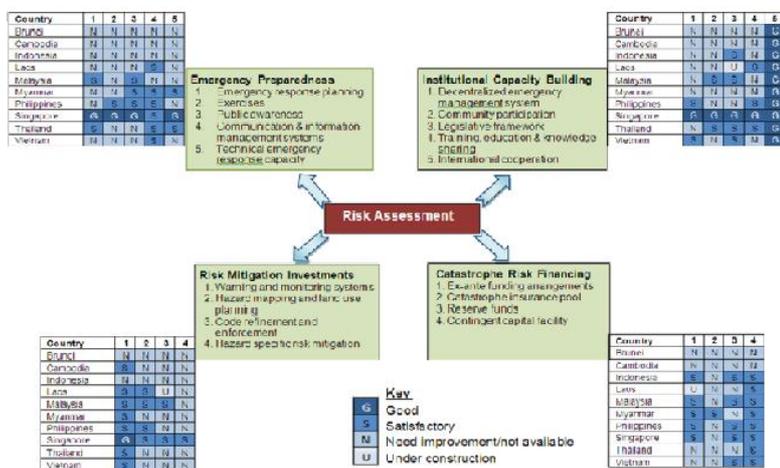
Method: the number of disaster events, deaths, affected population and economic losses are plotted against hazard types for 5 year intervals.

To estimate social vulnerability=> the average number of people killed.

ASEAN 17.7 death/year/million, Cambodia 3.56, Indonesia 20.38, Lao PDR 4.22, Malaysia 1.26, Myanmar 72.35, Philippines 11.93, Thailand 4.63, Vietnam 4.60. Brunei and Singapore have no data.

3) Risk assessment framework

A status of risk assessment framework is assessed by country to view the current capacity of risk assessment. The evaluation table is show below.



No.:	FL-002	Published Year:	2012
Study/ Report Name:	Key Indicators for Asia and the Pacific 2012 43 rd edition		
Access to Information:	www.adb.org/publications/key-indicators-asia-and-pacific-2012		
Research Organization:	ADB		
Study Area (Country):	ASEAN (10 countries)		
Studied Hazard:	Flood		
Studied Damage/ Risk:	Vulnerability by % population and area		
Main Data Sources:			

Summary of the Study:

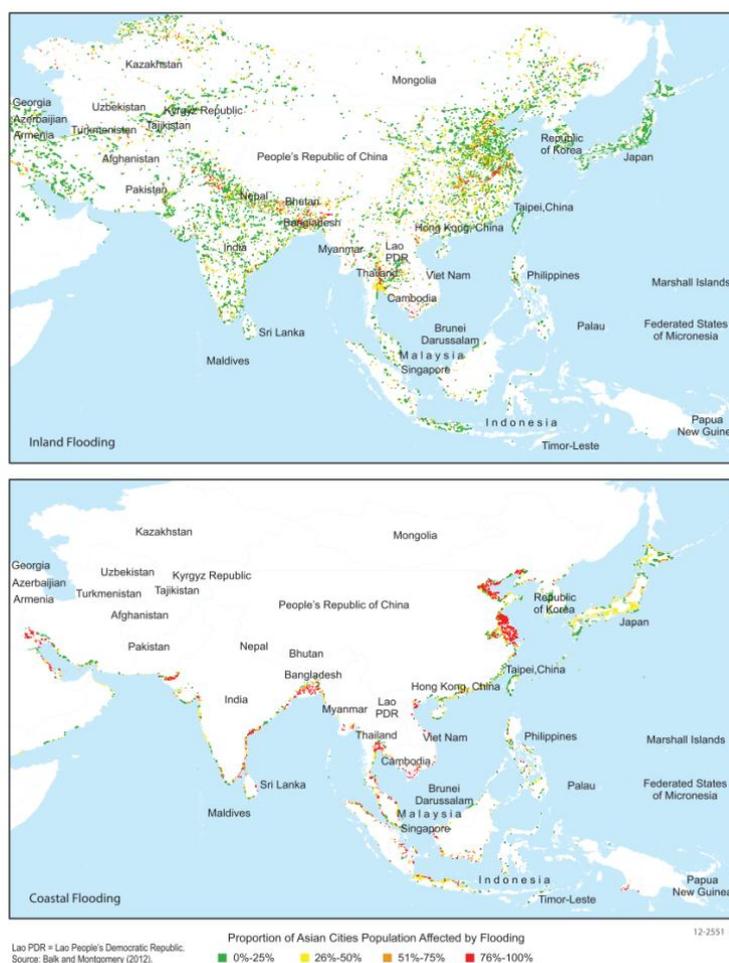
This report summarizes vulnerability of urban cities to flood in Asian and Pacific countries including the ASEAN region. The floods are classified as coastal flood and inland flood that may affect urban cities. Vulnerabilities are estimated by population and areas % at risk of flooding. Top 40 cities in Asian countries with 1 million of population or more that are vulnerable to flooding are listed.

Key findings:

The Southeast Asia (ASEAN) region's vulnerability to coastal flooding: 36.1% with Vietnam (73.9%), Thailand (60%).

In terms of inland flooding, the vulnerability for Southeast Asia is 14.7%. The estimated vulnerability: Vietnam (38.6%), the Lao PDR (34%), Thailand (29%).

Figure 19 Vulnerability to Inland (top) and Coastal (bottom) Flooding



No.:	FL-003	Published Year:	2010
Study/ Report Name:	Progress Report on Flood Hazard Mapping in Asian Countries ICHARM Publication No.16, ISSN 0386-5878/ Technical Note of PWRI No. 4164		
Access to Information:	http://www.icharm.pwri.go.jp/publication/pdf/2010/4164_progress_report_on_fhm.pdf		
Research Organization:	UNESCO (ICHARM)/PERI		
Study Area (Country):	ASEAN (10 countries)		
Studied Hazard:	Flood		
Studied Damage/ Risk:	Hazard Map		
Main Data Sources:			

Summary of the Study:

1) Overview

This is a seminar report on Flood Hazard Mapping production process for Asian Countries. Target countries were (China, Cambodia, Indonesia, Laos, Vietnam, Thailand, the Philippines and Malaysia).

2) Accuracy of Hazard Map

Two types of mapping methods are: i) interview based mapping (community-based), ii) quantitative hydrological data simulation models.

For the local usage, a simpler version is also effective. Examples of practical hazard maps are demonstrated as follows.

Map without inundation area

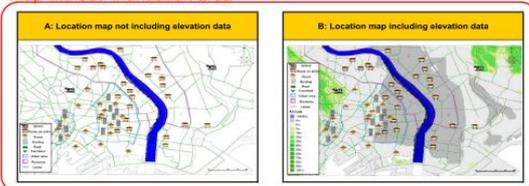


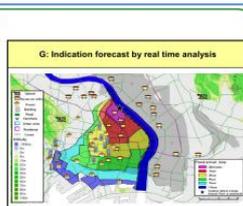
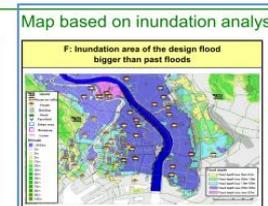
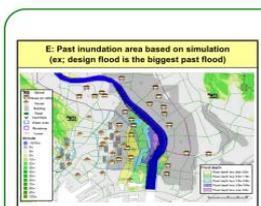
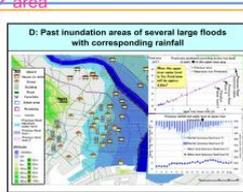
Table 3-2 List of Maps according to the level

Map showing past inundation areas



Map without inundation analysis but including past inundation area

Map predictable inundation area



No.:	FL-004	Published Year:	2005
Study/ Report Name:	A Primer: Integrated Flood Risk Management in Asia 2		
Access to Information:	www.adpc.net/maininforesource/udrm/floodprimer.pdf		
Research Organization:	Asian Disaster Preparedness Center (ADPC)/UNICEF		
Study Area (Country):	Asia including ASEAN countries		
Studied Hazard:	Flood		
Studied Damage/ Risk:	Assessment method		
Main Data Sources:			
<p>Summary of the Study:</p> <p>This is a comprehensive and practical how-to-handbook for policy makers and implementation stakeholders of flood risk management in Asia, with updated resources to (1) authorize programs; (2) formulate decisions; (3) plan, develop and implement decisions; (4) support implementation of decisions. There are extensive glossaries of words and concepts in relation to flood risk management.</p> <p>Topics include:</p> <p>Chapter 2: Types and levels of flood: riverine flood, slow-onset, rapid-onset, normal flood (1 year flood), catastrophic flood (100 year flood). Causes of flood: meteorological, hydrological and anthropogenic.</p> <p>Chapter 3: Policies, legal and institutional arrangement plans:</p> <p>Chapter 4: Flood risk assessment, data required for an assessment of potential damages and losses, Flood frequency calculations</p> <p>Chapter 5: Importance of watershed and floodplain management for flood risk management</p> <p>Chapter 6: Structural interventions: flood storage reservoir, dykes, levee and embankment, EIA, cost benefit analysis</p> <p>Chapter 7: Flood-proofing measures, relocation, elevation, dry-flood proofing, wet-flood proofing, flood-proofing measures categories: permanent, contingent and emergency measures</p> <p>Chapter 8: Flood preparedness planning: preparedness framework, activities, flood forecasting, public awareness</p> <p>Chapter 9: Effective emergency response in environment health management, evacuation camps, delivery of goods</p> <p>Case studies of ASEAN countries include:</p> <p>Disaster Management and Relief in Malaysia,</p> <p>Hazard Assessment in the Philippines,</p> <p>Flood mitigation mix measures/community level management in Thailand,</p> <p>Mekong River Commission Mediation of Transboundary Flood Issues</p>			

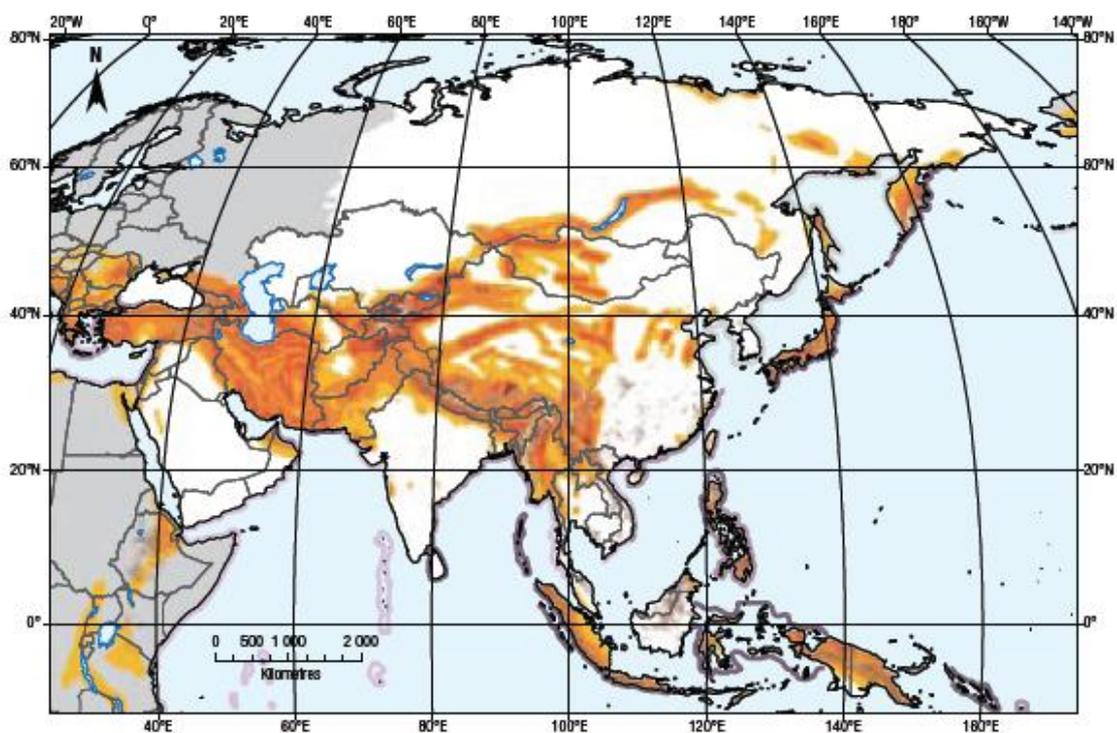
No.:	FL-006	Published Year:	2012
Study/ Report Name:	Reducing Vulnerability and Exposure to Disasters The Asia-Pacific Disaster Report 2012		
Access to Information:	http://www.unisdr.org/we/inform/publications/29288		
Research Organization:	ESCAP/UNISDR		
Study Area (Country):	ASEAN (10 countries)		
Studied Hazard:	Hydro-meteorological Hazard		
Studied Damage/ Risk:	Economic losses, fatalities, houses, risk-sensitive plans of investment		
Main Data Sources:			
<p>Summary of the Study:</p> <p>1) Overview</p> <p>The Asia-Pacific region represents 75% of all global disaster fatalities. The economic and population growth contribute to a greater exposure to natural disasters. The population was doubled from 2.2 to 4.2 billion between 1970 and 2010. But the number of people who are exposed to flooding has increased from 29.5 to 63.8 million. The urban settlements are more vulnerable as the urban population increased from 17 to 44% of the total population between 1950 and 2010.</p> <p>2) Vulnerability</p> <p>Generally, smaller and less diversified economies are more vulnerable to disaster risks. Flood mortality risks are higher in rural areas with a densely concentrated and rapidly growing population with weak governance.</p> <p>3) Risk</p> <p>Risks are associated with economic and mortality risks. The exposure to flooding events constantly increases as of 1980 but mortality risks are decreasing as countries strengthened their risk governance capacities. However economic risks are increasing, due to slow adaptation of the existing fixed assets, such as old buildings and infrastructure, and institutional instruments such as land use planning and building regulation to cope with flooding particularly in rapidly urbanizing areas.</p> <p>4) Spatial and land use plan</p> <p>The national spatial and land use plans and policies are a key to reduce flood risks. Brunei, Indonesia, Lao PDR, Malaysia, Philippines, Singapore and Vietnam have land-use policies, plans or measures for DRR.</p>			

No.:	FL-008	Published Year:	2011
Study/ Report Name:	Advancing Disaster Risk Financing and Insurance in ASEAN Countries: Framework and Options for Implementation, Volume2: Appendix 1		
Access to Information:	https://www.gfdr.org/sites/gfdr.org/files/documents/DRFI_AS_EAN_Appendices_June12.pdf		
Research Organization:	GFDRR/World Bank		
Study Area (Country):	ASEAN (10 countries)		
Studied Hazard:	Flood (multiple disasters)		
Studied Damage/ Risk:	Damage, affected population, vulnerability index		
Main Data Sources:	World Bank, EM-DAT, Relief Web, GFDRR, CIA fact book		
<p>Summary of the Study:</p> <p>1) Overview</p> <p>Disaster risks were compiled for ASEAN countries with data between 1982 and 2011. The following items are analyzed: disaster profile (% of different disasters), damage (\$), affected population, vulnerability index (estimated number of people killed/year).</p> <p>2) Disaster profile: Typhoon is the dominant incidence causing flood and landslide in most countries except Singapore and Brunei</p> <p>Cambodia: 45% flood (Mekong river), 9% storm, 16% drought, 29% epidemic</p> <p>Indonesia: west and dry zones most severely hit (Jakarta, Medan, Bandung)</p> <p>Lao PDR: 50% flood, 22% epidemics, 13% storm, 13% drought</p> <p>Malaysia: dominantly flood</p> <p>Myanmar: multiple hazards, earthquake serious risk</p> <p>Philippines: dominantly typhoons causing other hazards in conjunction</p> <p>Thailand: multiple hazard (flood, drought, storms and landslide)</p> <p>Vietnam: 49% storm, 37% floods, 5% epidemic, 3% landslide, 2% drought</p> <p>3) Vulnerable areas</p> <p>Mekong River Delta in Vietnam, all regions of the Philippines, most regions in Cambodia, North and East Lao PDR, Bangkok in Thailand, the west and south of Sumatra and western and eastern Java in Indonesia.</p> <p>4) Vulnerability</p> <p>Urban (especially coastal) areas are more vulnerable against disasters due to a rapid population growth, urbanization, deforestation, and unplanned land use.</p>			

No.:	EQ-001	Published Year:	2009
Study/ Report Name:	Global assessment report on disaster risk reduction (2009) Risk and poverty in a changing climate		
Access to Information:	http://www.unisdr.org/we/inform/publications/9413		
Research Organization:	United Nations International Strategy for Disaster Reduction Secretariat (UNISDR)		
Study Area (Country):	Worldwide		
Studied Hazard:	Tropical cyclones, Floods, Landslides, Earthquakes (10% in 50 years MMI), Drought, Tsunamis, Forest and other biomass fires		
Studied Damage/ Risk:	Multi-hazard risk		
Main Data Sources:			

Summary of the Study:

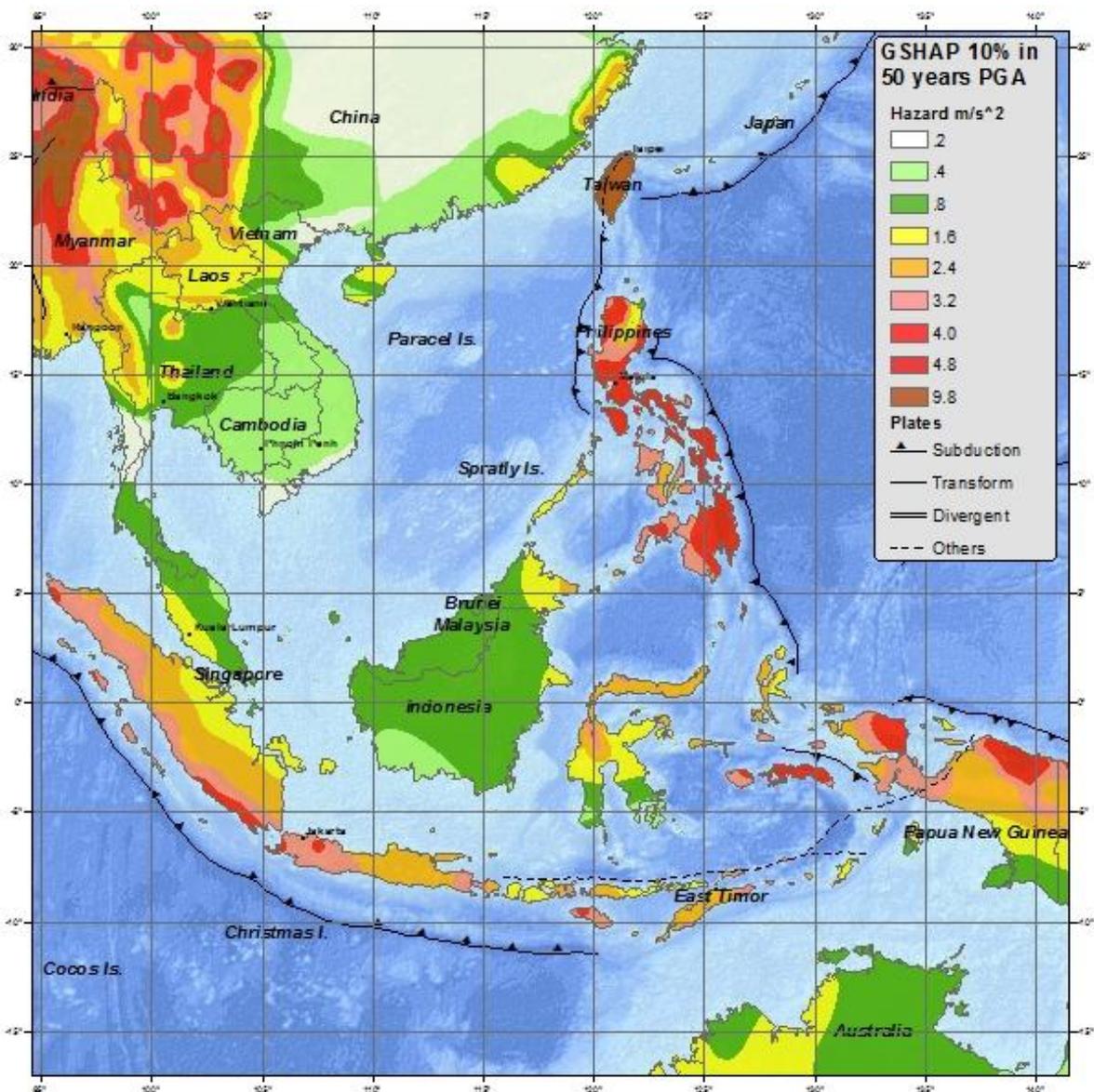
An observation of disaster risk patterns and trends at the global level allows a visualization of the major concentrations of risk described in the report and an identification of the geographic distribution of disaster risk across countries, trends over time and the major drivers of these patterns and trends.



Tectonic hazards			
Earthquakes (MMI for 10% in 50 years)	Landslides (intensity and frequency)	Tsunami height (coasts covered by the model)	
 IX +	 Very High	 >5 m	 Lakes and oceans
 VIII	 High	 2-5 m	 Regional extent
 VII	 Medium	 <2 m	 Other regions
 V - VI		 Not studied	

No.:	EQ-002	Published Year:	unknown
Study/ Report Name:	Seismic Hazard Map		
Access to Information:	http://earthquake.usgs.gov/earthquakes/world/indonesia/gshap.php		
Research Organization:	GSHAP, USGS		
Study Area (Country):	ASEAN		
Studied Hazard:	Earthquake / 10% in 50 years		
Studied Damage/ Risk:			
Main Data Sources:			

Summary of the Study:



No.:	TN-002	Published Year:	2005
Study/ Report Name:	From Disaster to Reconstruction: A Report on ADB's Response to the Asian Tsunami		
Access to Information:	http://www.adb.org/publications/disaster-reconstruction-report-a-dbs-response-asian-tsunami		
Research Organization:	Asian Development Bank		
Study Area (Country):	ASEAN		
Studied Hazard:	Tsunami		
Studied Damage/ Risk:			
Main Data Sources:			

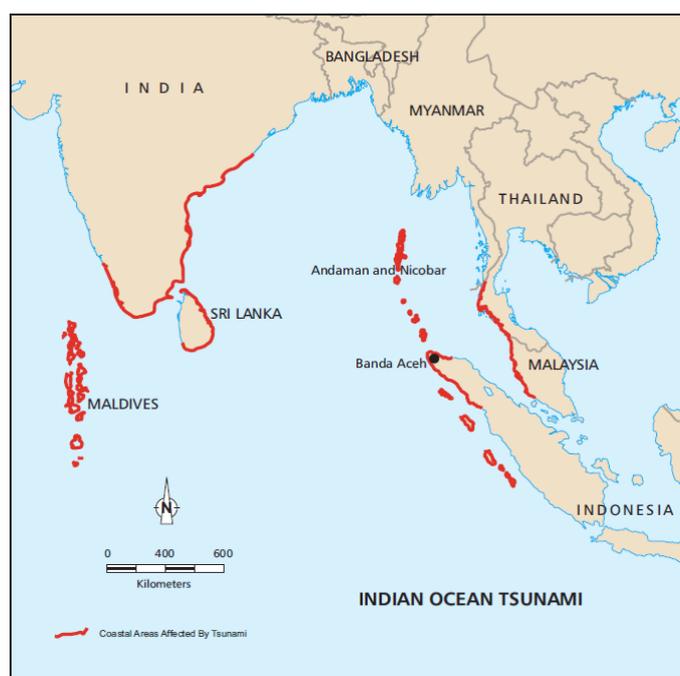
Summary of the Study:

This report summarizes ADB's response to the earthquake and tsunami during the first year. It highlights major activities, detailed project components, and identifies challenges ahead and lessons learned in responding to this unprecedented regional natural disaster.

Table 1: Tsunami Losses

Country	Number of			Estimated Overall Damage (\$ billion)
	Dead	Missing	Displaced/ Injured	
India	12,405	5,640	6,913	2,560
Indonesia	131,029	37,000	556,638	4,500
Maldives	82	26	29,577	0.472
Sri Lanka		35,322	516,150	1,000
Thailand	5,395	2,817	54,500	0.711

Sources: Government of India: United Nations Development Programme; Government of the Maldives: Government of Sri Lanka: UN Resident Coordinator, Thailand.

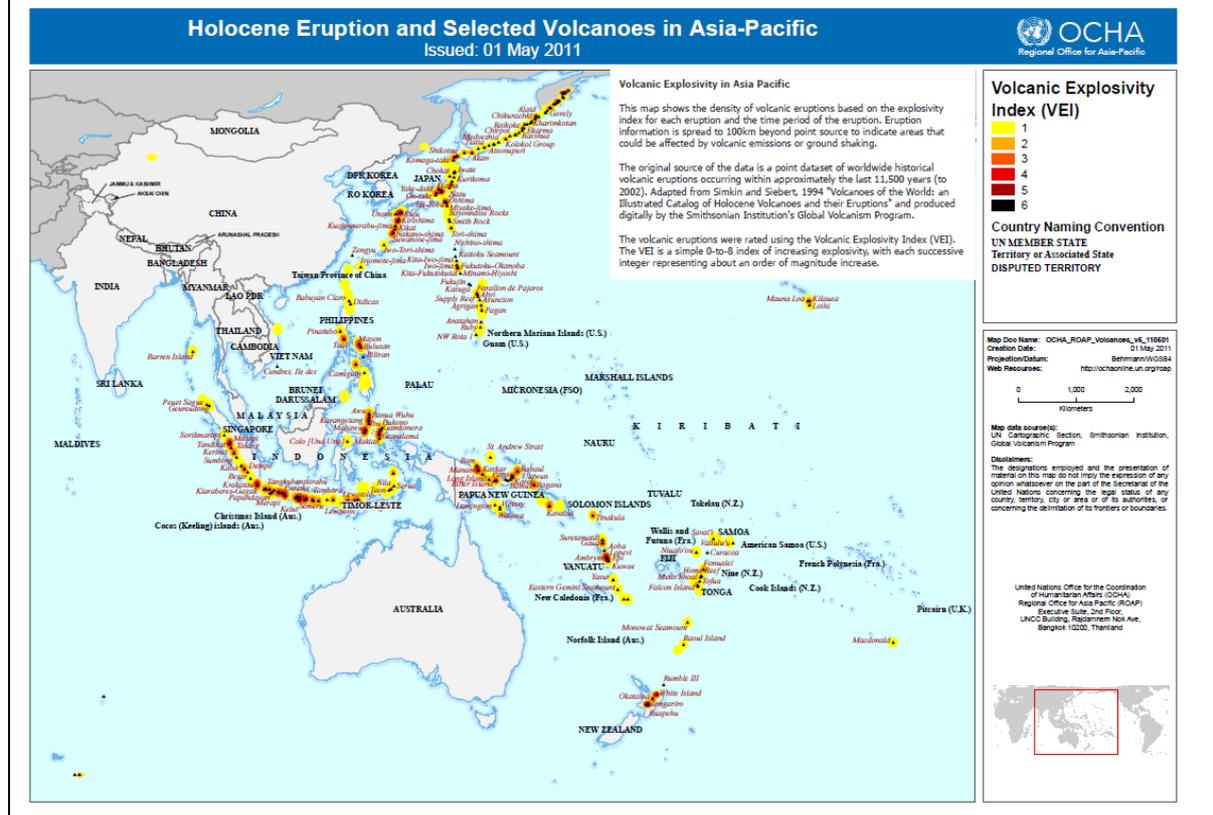


No.:	VE-001	Published Year:	2011
Study/ Report Name:	Holocene Eruption and Selected Volcanoes in Asia-Pacific		
Access to Information:	http://reliefweb.int/sites/reliefweb.int/files/resources/map_619.pdf		
Research Organization:	United Nations Office for the Coordination of Humanitarian Affairs, Regional Office for Asia Pacific (OCHA -ROAP)		
Study Area (Country):	Asia-Pacific		
Studied Hazard:	Volcanic Explosivity Index (VEI)		
Studied Damage/ Risk:			
Main Data Sources:	UN Cartographic Section, Smithsonian Institution, Global Volcanism Program		

Summary of the Study:

This map shows the density of volcanic eruptions based on the explosivity index for each eruption and the time period of the eruption. Eruption information is spread to 100km beyond point source to indicate areas that could be affected by volcanic emissions or ground shaking.

The volcanic eruptions were rated using the Volcanic Explosivity Index (VEI). The VEI is a simple 0 to 8 index of increasing explosivity, with each successive integer representing about an order of magnitude increase.



No.:	LS-006	Published Year:	2010
Study/ Report Name:	Synthesis Report on Ten ASEAN Countries Disaster Risks Assessment		
Access to Information:	http://www.unisdr.org/files/18872_asean.pdf		
Research Organization:	UNISDR/World Bank		
Study Area (Country):	An assessment of disaster risks in ten ASEAN countries		
Studied Hazard:	earthquakes, tropical cyclonic storms (typhoons), floods, landslides, tsunamis, droughts, and forest fires.		
Studied Damage/ Risk:	Hazard profile and Risk profile		
Main Data Sources:	CRED EM-DAT, ADRC, NGDC, GSHAP, MRC, WAMIS, DWR, Munich Re, World Bank, UNISDR, GAR, InTerragate, IFNet, and CCFSC, DESINVEN-TAR 1970-2009		

Summary of the Study:

1)overview

This synthesis report on the Ten ASEAN Countries is based on a desk review of existing studies by academia, governments and international governmental and non-governmental organizations. Risk assessments are carried out directly based on recorded historical losses. The economic loss probability estimates presented in this report are not intended for designing catastrophe insurance schemes, which require a much more detailed approach that models hazard, exposure and vulnerability of buildings and infrastructure.

2)landslide and mudslide analysis

Landslide and mudslide analysis data sources are shown in above table (Main Data Sources). The landslide hazard risks maps were derived from the GAR Preview platform (GAR, 2009; <http://previewgrid.unep.ch>), has 10km grid resolution. This report explains overview, Regional setting, Hazard profile and Risk profile of each 10 countries separately.

Assessment sample of Natural disaster (Indonesia)

Disaster Risk Statistics (1970-2009)				
Disaster type	No. of disasters / year	Total no. of deaths	Deaths / year	Relative vulnerability (deaths/year/ million)
Flood	3.20	5,420	135.50	0.56
Drought	0.20	1,329	33.23	0.14
Storm	0.23	1,692	42.30	0.18
Epidemic	0.83	3,886	97.15	0.40
Tsunami	0.08	83,525	2088.13	8.69
Earthquake	2.10	97,166	2429.15	10.11
Landslide	1.03	1,845	46.13	0.19
Volcano	0.93	661	16.53	0.07
Wildfire	0.23	300	7.50	0.03

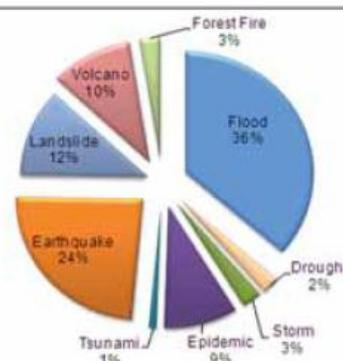


Figure 8: Percentage distribution of reported disasters in Indonesia

No.:	LS-007	Published Year:	2005
Study/ Report Name:	Natural Disaster Hotspots:A Global Risk Analysis		
Access to Information:	http://sedac.ciesin.columbia.edu/data/set/ndh-landslide-hazard-distribution/maps		
Research Organization:	World Bank,		
Study Area (Country):	Whole World		
Studied Hazard:	Flood, Landslide, Drought, drought, earthquakes, storms, volcanoes		
Studied Damage/ Risk:			
Main Data Sources:			

Summary of the Study:

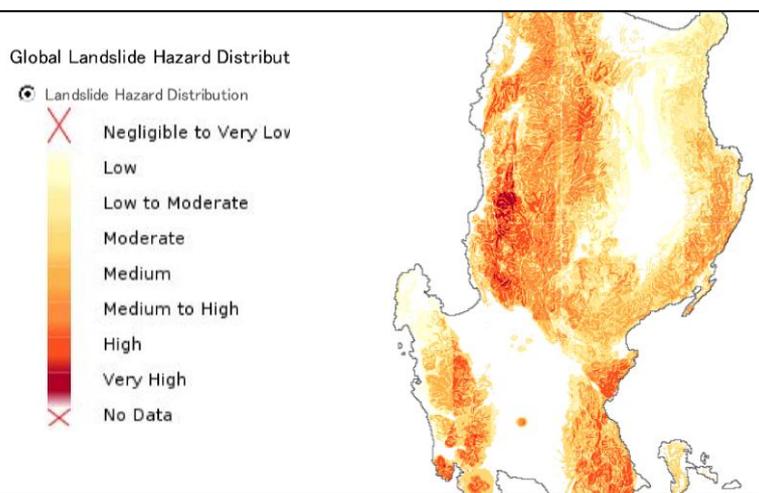
1)overview

This study presents a global view of major natural disaster risk hotspots—areas at relatively high risk of loss from one or more natural hazards. It summarizes the results of an interdisciplinary analysis of the location and characteristics of hotspots for six natural hazards. Data on these hazards are combined with state-of-the-art data on the sub-national distribution of population and economic output and past disaster losses to identify areas at relatively high risk from one or more hazards. This study belongs to the project of Global Risk Identification Program (GRIP) by the world bank, which objects a framework which is improved evidence base for disaster risk management to enable the application and prioritization of effective disaster risk reduction strategies at the national, regional and global scales.

2)

And a web site of CIESIN publishes detailed risk map of 6 hazards distribution studied in this project as shown in below. The maps are able to estimate risk levels at sub-national scales.

Sample of Landslide Hazard Distribution Map indicating Northern Philippines



Appendix 3: List of Industrial Parks in Brunei

ID	Short List	Long List	COUNTRY	PROVINCE	PARK NAME	ADDRESS
BN0001			Brunei		Baru Apoi	Jalan Selapon Brunei Darussalam
BN0002			Brunei		Beribi	Jalan Gadong Bandar Seri Begawan, Brunei Darussalam
BN0003			Brunei		Lambak Kanan - East	Simpang 29 Lambak Kanan BC2315, Brunei Darussalam
BN0004		XXBN02	Brunei		Lambak Kanan - West	Lebuhraya Muara-Tutong Bandar Seri Begawan, Brunei Darussalam
BN0005			Brunei		Muara Export Zone	Jalan Stadium Bandar Seri Begawan, Brunei Darussalam
BN0006			Brunei		Pekan Belait	Jalan Lorong 3 Barat Seria, Brunei Darussalam
BN0007			Brunei		Salar	Jalan Batu Marang Mentiri, Brunei Darussalam
BN0008		XXBN03	Brunei		Serambangan	Lebuhraya Tutong - Telisai Kampung Serambangan, Brunei Darussalam
BN0009		XXBN04	Brunei		Serasa	Simpang 276 Serasa, Brunei Darussalam
BN0010			Brunei		Sungai Bera	Jalan Tengah Seria, Brunei Darussalam
BN0011	XXBN05	XXBN05	Brunei		Sungai Liang (SPARK)	Simpang 1027 Sungai Liang, Brunei Darussalam
BN0012	XXBN01	XXBN01	Brunei		Kuala Lurah	Jalan Kuala Lurah Limau Manis, Brunei Darussalam
BN0013			Brunei		Pulau Muara Besar	Jalan Pelumpong Muara, Brunei Darussalam
BN0014			Brunei		Meragang	Muara-Tutong Hwy Brunei Darussalam
BN0015			Brunei		Lugu	Jalan Lugu Kampung Katimahar, Brunei Darussalam
BN0016			Brunei		Bukit Panggal	Jalan Bukit Panggal Kampong Bukit Panggal, Brunei Darussalam
BN0017			Brunei		Telisai	Jalan Tengah Seria, Brunei Darussalam
BN0018			Brunei		Seria	Jalan Lorong 3 Barat Seria, Brunei Darussalam
BN0019			Brunei		Tasek Meiribun	Jalan Rambai Rambai, Brunei Darussalam
BN0020			Brunei		Agrotech Park	No Address
BN0021			Brunei		Ulu-Ulu Temburong	Jalan Batang Duri Batang Duri, Brunei Darussalam

Appendix 4: General Investment Risk of Brunei

(1) Political Risk

Brunei enjoys a high degree of political stability. The Sultan has traditionally wielded complete authority, although this is slowly changing, with the introduction of a new-look parliament in September 2005, which will – in time – house elected representatives. It is, however, expected to take several years before the processes for elections are in place. The country's vast hydrocarbon wealth, which the government has attempted to distribute through a comprehensive welfare system and public sector employment, helps to ensure that the population acquiesces in the continuation of an undemocratic political system and there is still little room for open dissent. Some discontent may come to the fore in the longer term if the government fails to maintain Brunei's high standard of living. Nonetheless, at present the ruling royal family, which endorses a moderate form of Islam, is widely popular. As such, political instability and related business disruption are not an issue in Brunei.

Brunei has been ruled by decree under a regularly renewed state of emergency since an abortive revolt in December 1962. In July 2004, the Sultan surprised his subjects and most foreign observers by announcing that the system of government would be transformed from an absolute monarchy to a limited parliamentary democracy through the reactivation of the Legislative Council (Legco) that had been suspended since 1984. To this end, in September 2004 the Legco met for the first time since independence and voted to increase its representation from 21 members to 45, 15 of whom would be elected. Although the Legco has convened on a regular basis to review the government's budget in recent years, the reform is still incomplete. In June 2011, a new Legco was appointed for a five-year term, consisting of 33 appointed members. No organized opposition has materialized and it is expected to take several years before the processes for elections are in place.

(2) Economic Risk

Thanks to its significant hydrocarbon wealth, Brunei has one of the highest per-capita incomes in South-East Asia; however growth itself has been mediocre for most of the past 15 years and is unlikely to accelerate over the next five years. About half of GDP and 90% of exports are hydrocarbon related, making this one of the most

oil-dependent economies in the world. Even though reserves are declining, efforts to diversify the economy, such as developing Brunei into an offshore financial center, have so far registered little success. There is a lack of political consensus on the country's long-term economic strategies, and significant vested interests have slowed reforms. As long as hydrocarbon revenues remain substantial enough to allow the government to maintain current social programs, reforms in other areas of the economy will continue to lack a sense of immediacy.

The oil and gas sector slowed economic growth in 2012, highlighting Brunei's economic dependence on this industry. Despite moderately robust growth in the non-oil and gas sector, which expanded 3.3% y/y, overall GDP growth stood at a sluggish 0.6% y/y during 2012. The reason for this disappointing performance was an outright contraction in the energy sector, which began in late 2011 and extended into 2012. Within the non-energy sector, production was driven by solid expansion in the agricultural sector, as well as steady gains in the service sector, particularly in private services.

The Brunei dollar is linked to the Singaporean dollar through a currency board arrangement, so the exchange rate mirrors movements in the Singaporean dollar, which is likely to maintain financial stability. The currency board regime has been instrumental in promoting price and exchange-rate stability; indeed, Brunei has seen little exchange-rate volatility and has traditionally been a very-low-inflation country. Brunei's foreign-exchange reserve coverage has consistently surpassed 100% of the money supply. Inflation is likely to remain subdued over the next few years, facilitated by the same macroeconomic forces that have kept them so low in the past – exchange-rate stability and domestic price controls. In addition, increased labor imports should prevent domestic production costs from increasing rapidly, which would support a low-inflation outlook. IHS expects consumer price inflation to settle at just over 1.0% over the next couple of years.

(3) Legal Risk

The country's legal system is based on English common law and the Indian penal code and incorporates elements of sharia (Islamic law). It comprises an independent judiciary, a body of written common law judgments and statutes as well as legislation enacted by the Sultan. For Muslims, Brunei's civil law is superseded in a number of areas by sharia; this is not currently applied to non-Muslims. However, Brunei is working

to establish a hybrid legal system under which sharia is integrated into civil law in a way that renders the latter sharia-compliant. This will involve reviewing legislation to ensure it is sharia-compliant. The aim is to replace two parallel systems with one system in which crimes considered serious under sharia are contested in separate courts. In October 2011 Sultan Hassanal Bolkiah made it clear that he supported the implementation of this system. Civil law lacks the provisions allowing companies or individuals to sue the government, which traditionally resolves disputes with generous, non-negotiable settlements, or alternatively refuses to settle.

Brunei's company law is based on the British Companies Act, providing a good environment in which to conduct business. Businesses must be registered with the Registrar of Companies. A company incorporated in Brunei must have at least two directors and at least half of the directors should be residents of Brunei. The law recognizes a range of business entities; the most common is a limited liability or private company (Senidirian Berhad). Other forms include public companies and the branch of a foreign company. Foreigners can register for these business entities without approval. Foreigners cannot do business as sole proprietorships. Approval is required for foreigners to form joint ventures or partnerships. In the latter case, at least one partner must be either a Bruneian or a resident of Brunei. Information is widely available on Brunei's corporate law and the government has a positive attitude towards foreign investment. Nevertheless, the process of starting a business is difficult. A high number of procedures is required and the length of the average length of the process is 101 days. Brunei has been seeking to improve corporate governance, prompted by a number of high-profile fraud cases and questionable business practices. Brunei's Auditor General has indicated that more comprehensive checks will be carried out on the business and financial management of companies to ensure that the best corporate governance is achieved, in light of increased incorporation of government-owned companies to spearhead industrial growth in Brunei. To facilitate this task, Internal Audit Units have been established in all government ministries and departments.

(4) Tax Risk

Brunei offers a generous tax regime. There is no direct personal income tax, and corporate tax rates are low by regional and Organization for Economic Co-operation and Development (OECD) standards. The trend has been for the corporate tax rate

to be reduced, falling from 30% to 22% between 2009 and 2011, and dropping further down to 20% on 1 January 2013. Brunei has also endorsed more than 10 double-taxation agreements that may reduce the rates further or eliminate them altogether. The Brunei economy's excessive dependence on hydrocarbon revenues has distorted the tax system; higher taxes on companies in the petroleum sector permit unusually low tax rates elsewhere in the economy, and reduce the pressure on the state to reform. Moreover, Brunei's reliance on a single source of revenue carries with it the risk that taxes on other sectors could be raised in response to a sustained fall in petroleum production or prices.

Brunei's foreign policy priorities are to ensure the country's security by developing relations with a wide variety of states, while limiting involvement in formal alliances. Hence, Brunei joined the Non-Aligned Movement in 1992. The main focus points of Brunei's foreign policy are on maintaining good relations with fellow Association of Southeast Asian Nation (ASEAN) countries, the US and its former colonial power the UK. Although the richest country per capita within ASEAN, Brunei's size and its sidelining within the grouping has ensured that the sultanate lacks influence over ASEAN decisions.

Brunei has generally good relations with Malaysia, as the two countries share a number of cultural ties that aid international co-operation. However, the relationship with Malaysia is, in terms of the potential threat if ties are not managed well, Brunei's most complex and therefore most crucial diplomatic challenge. Tensions in relations stem from the then-sultan's decision not to join the Malaysian Federation and from the subsequent 1962 "Brunei revolt", variously ascribed to Indonesian, Malaysian and UK machinations intended to either push the country into the federation or keep it out. Brunei and Malaysia also have a long history of territorial spats, including a long-running dispute over the timber-rich Malaysian-held Limbang province. Maritime disputes with Malaysia, including over the Spratly Islands in the South China Sea, are likely at the very most to result in minor boat skirmishes and boarding of vessels in the next one to three years. As such, there are no business continuity threats resulting from war risks.

(5) Terrorism Risk

Brunei is unlikely to face threats from domestic or regional terrorist networks. As such, terrorism is not a threat to business continuity in Brunei. The government provides its

citizens with sufficient welfare, meaning that the probability of radicalization is low. There are no domestic militant groups and new groups are unlikely to be formed, as the sultanate's small size and retention of colonial-era security legislation makes it unlikely that any such movement would go unnoticed. Moreover, Brunei's defense expenditure in recent years has focused on efforts to control its maritime and land borders.

(6) Civil Unrest Risk

Brunei is a secure country in which to live and do business. The risk of civil unrest is low, with its circumscribed political opposition, hydrocarbon wealth, effective security forces and unified society. This means that protests and strikes pose little risk to business continuity. Brunei has not experienced any recent political violence or internal conflict. Although this could be largely ascribed to the tight restrictions that hinder the formation of political groups, there is also little significant opposition to the governing royal family. A prolonged decline in hydrocarbon revenues could force the government to introduce austerity measures which could prove unpopular, particularly if they led to cuts in the public service. Brunei also has a sizeable population of "stateless" people and permanent residents – mostly ethnic Chinese – who have not been accorded citizenship and its attendant rights. Although there is dissatisfaction surrounding the issue, there has been no incidence of violence as yet. It is also possible that religious tension could develop, although this is unlikely to result in violence. Despite constitutional provisions guaranteeing the full and unconstrained exercise of religious freedom, the government routinely restricts the practice of non-Islamic religions and of non-Shafi'i Islamic groups. Such tactics have been used to reinforce the legitimacy of the hereditary monarchy and the observance of traditional Islamic values through a national ideology known as the Melayu Islam Beraja, or "Malay Muslim Monarchy". There have been cases of Brunei's internal security apparatus investigating and detaining non-Muslims or people suspected of practicing radical Islam; for example, the Islamist Al-Arqam movement and the Bahai faith remain banned.