



# **ASEAN-ROK Project : Building Resilience for Sustainable ASEAN (from Water- Related Disasters)**

## ***Synthesis Report***

**21 September 2017**

**10<sup>th</sup> HELP Meeting, Gyeongju, Republic of Korea**

# ***ASEAN-ROK PROJECT***

- **Objectives**
  - **To share the experience and know-how of participating countries to cope with water-related hazards and disasters**
  - **To present a policy-related agenda for a resilient ASEAN**
  - **To build regional cooperation in tackling water and water-related disaster issues from a policy-making perspective**

# ***ASEAN-ROK PROJECT***

- **Outputs**

- 1) A **National Assessment Report** on the current status of ASEAN water-related disasters and policy recommendations for each ASEAN Member State
  - To give an overview of current situation, the changing scenarios and the future direction
  - Identify the potential for technical assistance from Donor Countries

# ***ASEAN-ROK PROJECT***

- **Outputs**

2) A “Building Resilience for Sustainable ASEAN” Workshop to stimulate multi-lateral dialogue and to assist national policy-making processes and regional cooperation to deal more effectively with the negative consequences of water-related disasters

- To develop an ASEAN Regional Agenda for a safer ASEAN
- Identify the potential for technical assistance from Donor Countries

# ***ASEAN-ROK PROJECT***

- **Outputs**

3) To share the results and achievements at the global level so as to further contribute to the global discourse on water and water-related disasters

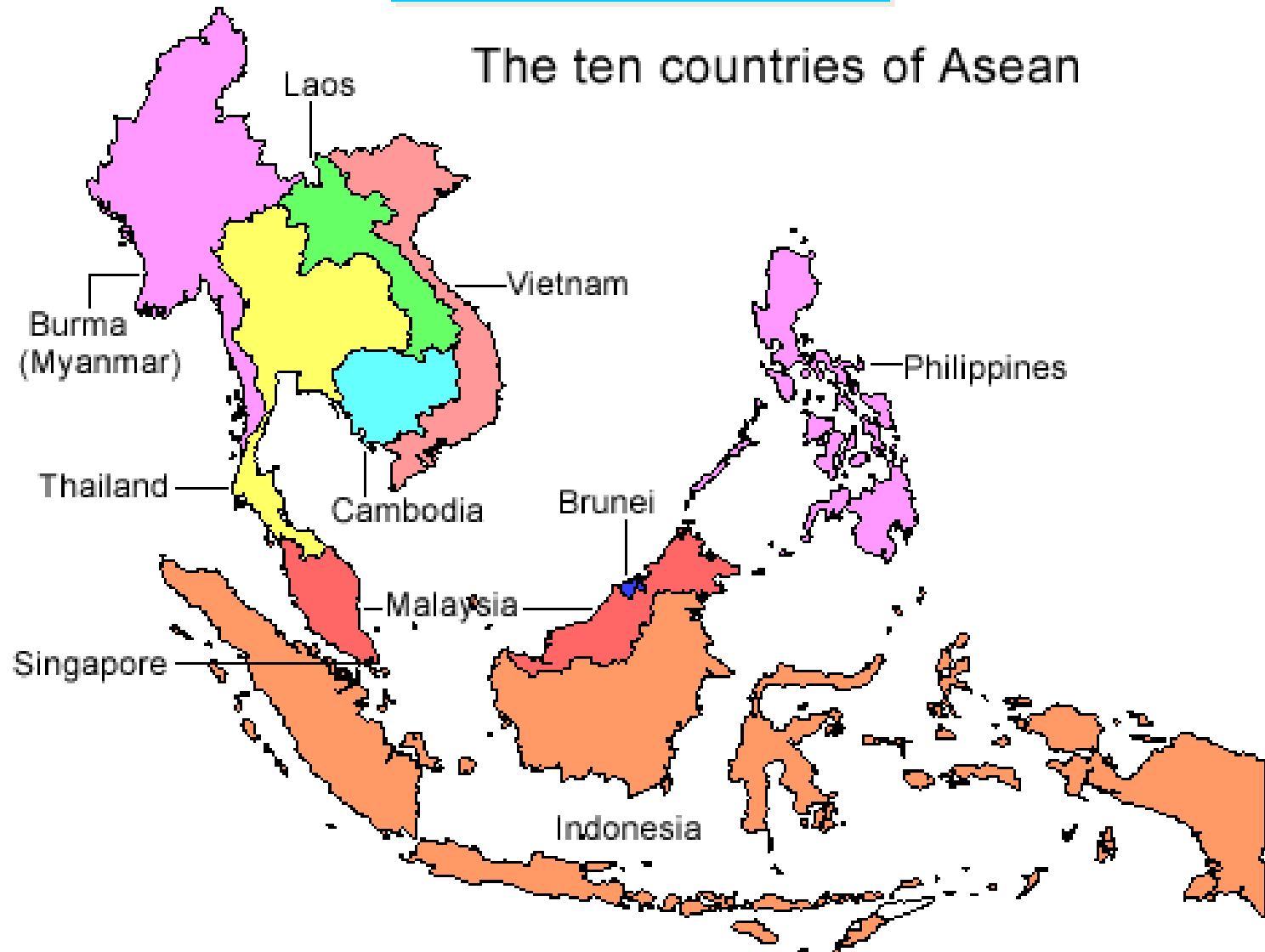
a) **HELP → High-Level Experts and Leaders Panel on Water and Disaster**

b) **HLPW → High Level Panel on Water**

# Synthesis Report

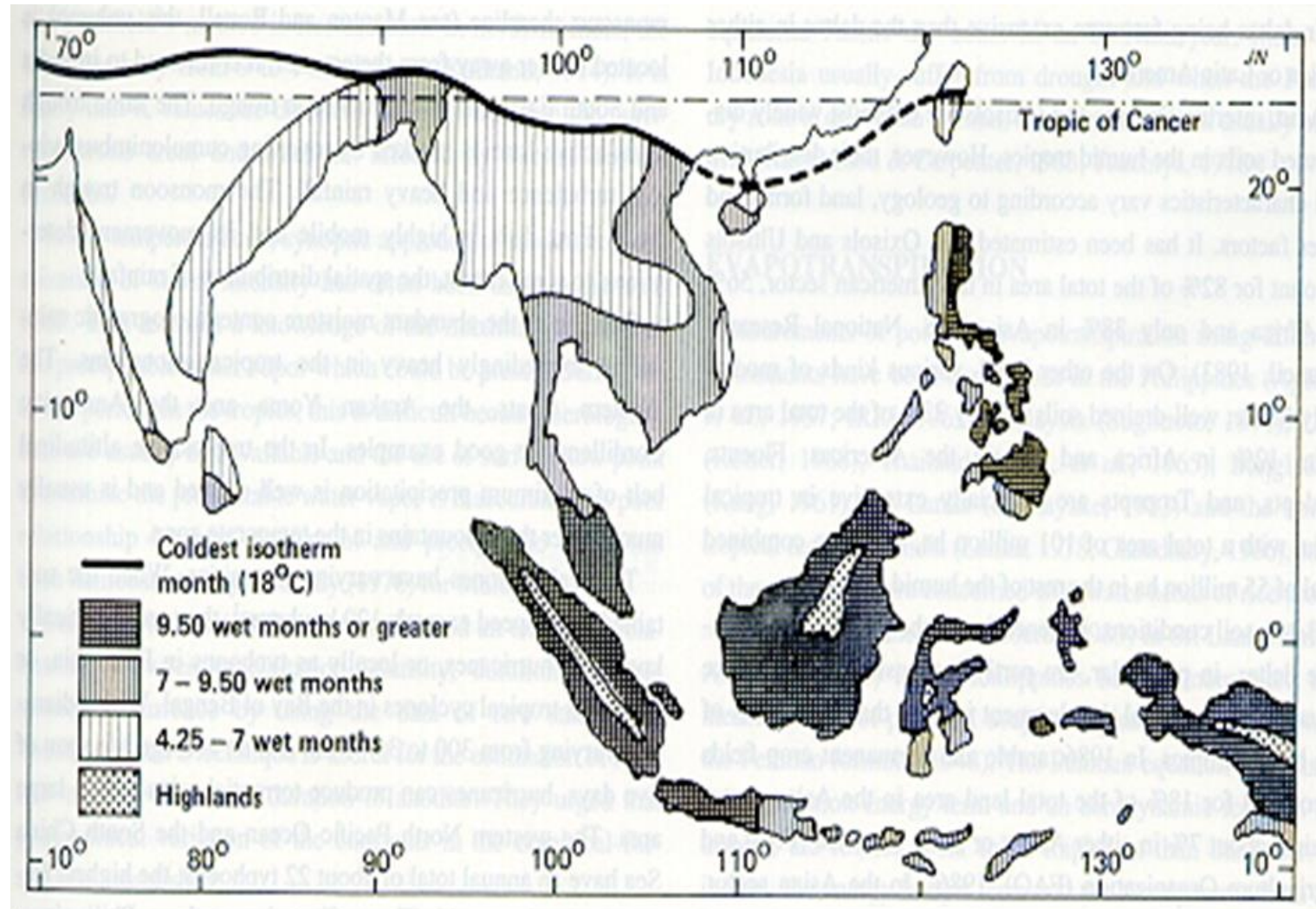
# ASEAN

The ten countries of Asean



**ASEAN - Association of South East Asian Nations**

# Climate & Hydrology



**Monsoonal Humid Tropics : Annual Rainfall : 1,500 to 5,000 mm**



# ***Climate & Hydrology***

<b>Country</b>	<b>Rainy Season</b>	<b>Annual Rainfall (mm)</b>
<b>Brunei DS</b>	<b>October to December</b>	<b>2,500 to 4,000</b>
<b>Cambodia</b>	<b>May to October</b>	<b>3,000</b>
<b>Indonesia</b>	<b>November to March</b>	<b>1800 to 6,000</b>
<b>Lao PDR</b>	<b>May to October</b>	<b>1,400 to 3,500</b>
<b>Malaysia</b>	<b>November to March</b>	<b>2,940 to 3,640</b>
<b>Myanmar</b>	<b>May to October</b>	<b>750 to 5,000</b>
<b>Philippines</b>	<b>July to November</b>	<b>1,000 to 4,000</b>
<b>Singapore</b>	<b>December to March</b>	<b>2,330</b>
<b>Thailand</b>	<b>May to October</b>	<b>1,000 to 4,000</b>
<b>Viet Nam</b>	<b>April to November</b>	<b>600 to 5,000</b>

# Climate & Hydrology

Country	Rainy Season	Annual Rainfall (mm)
Brunei DS	October to December	2,500 to 4,000
Cambodia	May to October	3,000
Indonesia	November to March	1800 to 6,000
Lao PDR	May to October	1,400 to 3,500
Malaysia	November to March	2,940 to 3,640
Myanmar	May to October	750 to 5,000
Philippines	July to November	1,000 to 4,000
Singapore	December to March	2,330
Thailand	May to October	1,000 to 4,000
Viet Nam	April to November	2,000 to 5,000

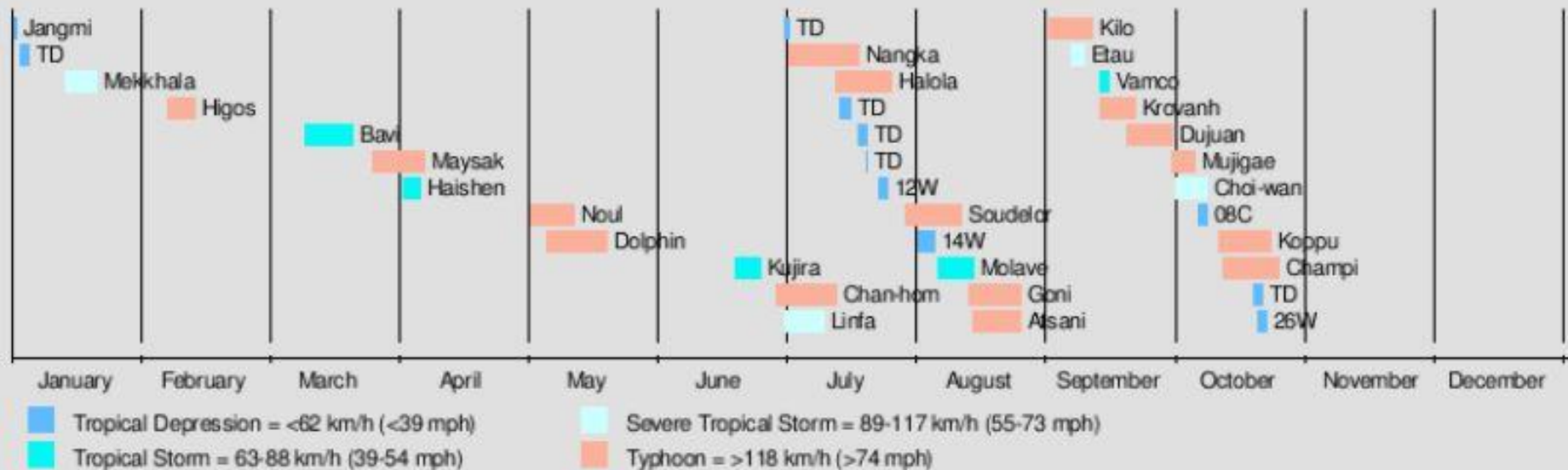
**North East Monsoon**

# ***Climate & Hydrology***

Country	Rainy Season	Annual Rainfall (mm)
Brunei DS	October to December	2,500 to 4,000
Cambodia	May to October	3,000
Indonesia	November to March	1800 to 6,000
Lao PDR	May to October	1,400 to 3,500
Malaysia	November to March	2,940 to 3,640
Myanmar	May to October	750 to 5,000
Philippines	July to November	1,000 to 4,000
Singapore	December to March	2,330
Thailand	May to October	1,000 to 4,000
Viet Nam	April to November	

**Tropical Cyclones**

# *Typhoons (in red) Jan-Oct 2015*



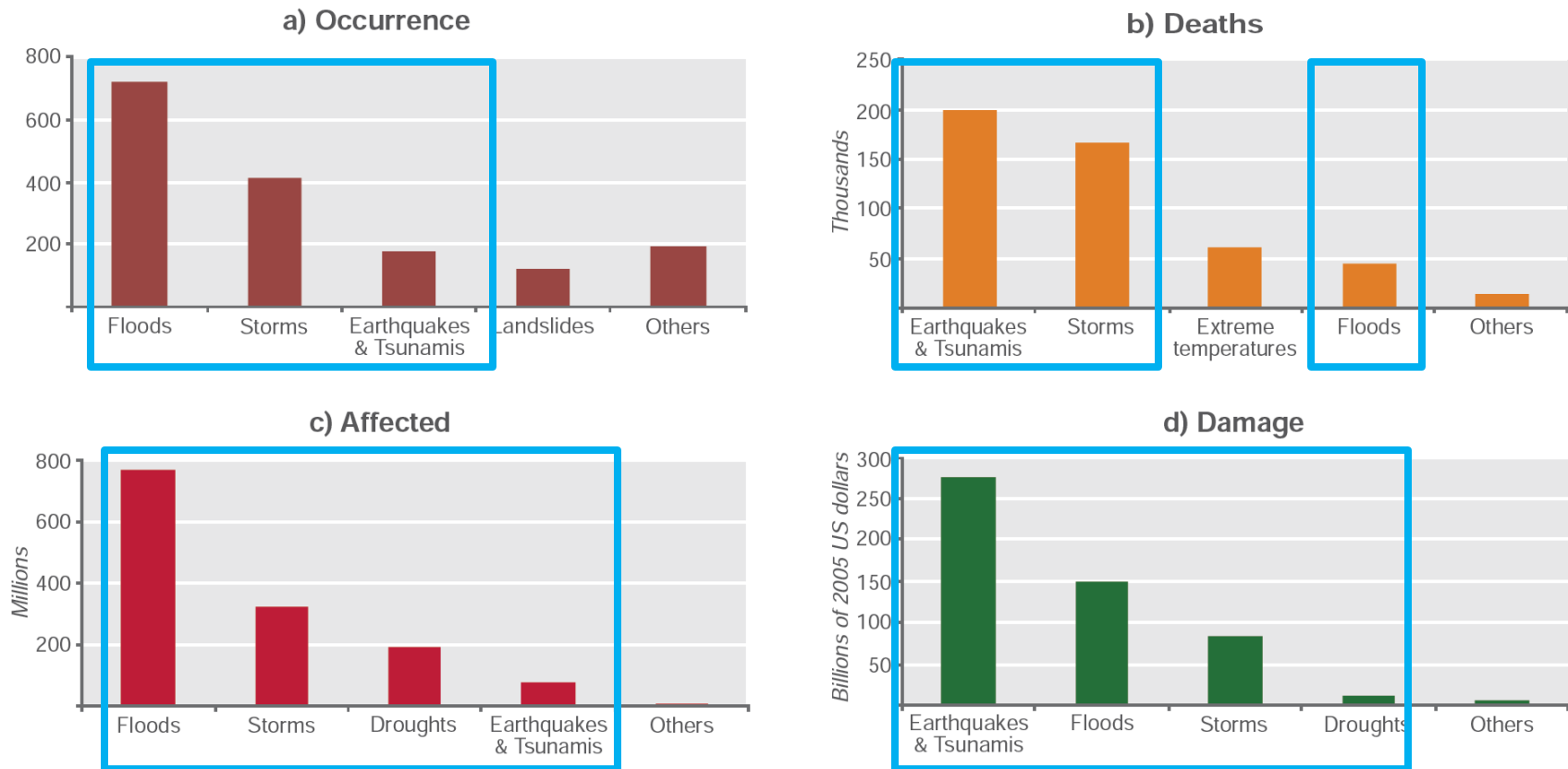
**Typhoon Season : July-October**

# **Water-Related Hazards and Disasters**

# Water-Related Hazards & Disasters

FIGURE I-1

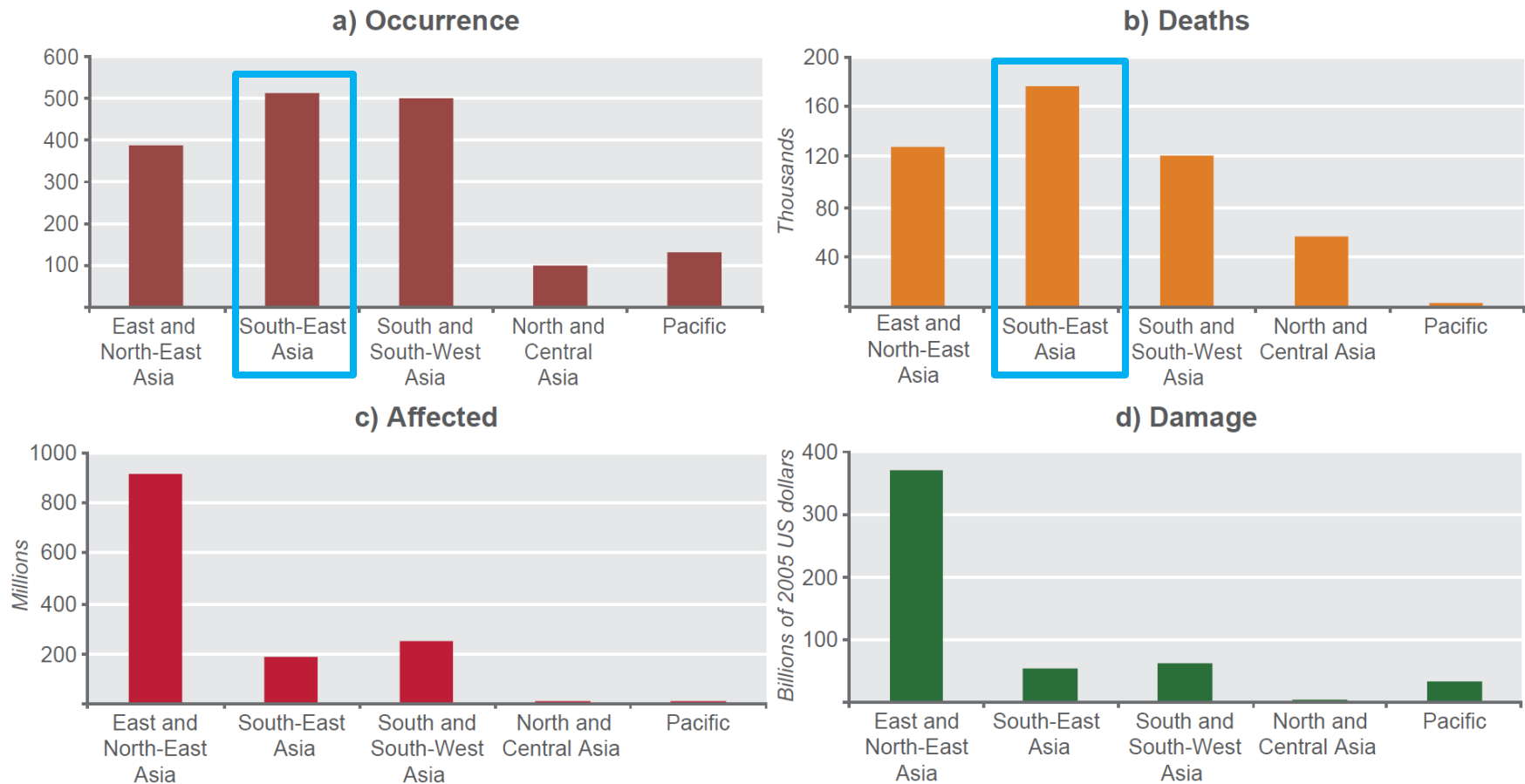
Disaster occurrence and impacts in Asia and the Pacific, total 2005-2014



# Water-Related Hazards & Disasters

FIGURE I-3

Occurrence and impacts by subregion, total 2005-2014



# ***Water-Related Hazards & Disasters***

<b>Country</b>	<b>Water-Related Hazards</b>
<b>Brunei DS</b>	<b>Floods, Flash Floods</b>
<b>Cambodia</b>	<b>Floods, Droughts, Storms, River Bank Collapse</b>
<b>Indonesia</b>	<b>Tsunamis, Floods, Landslides, Droughts, Debris Mudflows</b>
<b>Lao PDR</b>	<b>Floods, Droughts, Storms</b>
<b>Malaysia</b>	<b>Floods, Flash Floods, Droughts, Landslide, Debris and Mud Flows</b>
<b>Myanmar</b>	<b>Tropical Cyclones, Floods, Droughts, Landslides</b>
<b>Philippines</b>	<b>Typhoons, Floods, Tsunamis, Landslides, Droughts</b>
<b>Singapore</b>	<b>Flash Floods</b>
<b>Thailand</b>	<b>Floods, Droughts</b>
<b>Viet Nam</b>	<b>Floods, Typhoons, Storms, Flash Floods, Droughts, Landslides</b>



# ***Water-Related Hazards & Disasters***

Country	Water-Related Hazards
Brunei DS	Floods, Flash Floods
Cambodia	Floods, Droughts, Storms, River Bank Collapse
Indonesia	<b>Tsunamis</b> , Floods, Landslides, Droughts, Debris Mudflows
Lao PDR	Floods, Droughts, Storms
Malaysia	Floods, Flash Floods, Droughts, Landslide, Debris and Mud Flows
Myanmar	Tropical Cyclones, Floods, Droughts, Landslides
Philippines	Typhoons, Floods, <b>Tsunamis</b> , Landslides, Droughts
Singapore	Flash Floods
Thailand	Floods, Droughts
Viet Nam	Floods, Typhoons, Storms, Flash Floods, Droughts, Landslides

# ***Water-Related Hazards & Disasters***

- **Tsunamis**
  - **Most devastating water-related disaster to hit ASEAN → 26 Dec 2004 - Aceh tsunami**
  - **Death toll → 230,000 to 280,000 people**

# ***Water-Related Hazards & Disasters***

Country	Water-Related Hazards
Brunei DS	Floods, Flash Floods
Cambodia	Floods, Droughts, Storms, River Bank Collapse
Indonesia	Tsunamis, Floods, Landslides, Droughts, Debris Mudflows
Lao PDR	Floods, Droughts, Storms
Malaysia	Floods, Flash Floods, Droughts, Landslide, Debris and Mud Flows
Myanmar	<b>Tropical Cyclones</b> , Floods, Droughts, Landslides
Philippines	<b>Typhoons</b> , Floods, Tsunamis, Landslides, Droughts
Singapore	Flash Floods
Thailand	Floods, Droughts
Viet Nam	Floods, <b>Typhoons</b> , Storms, Flash Floods, Droughts, Landslides

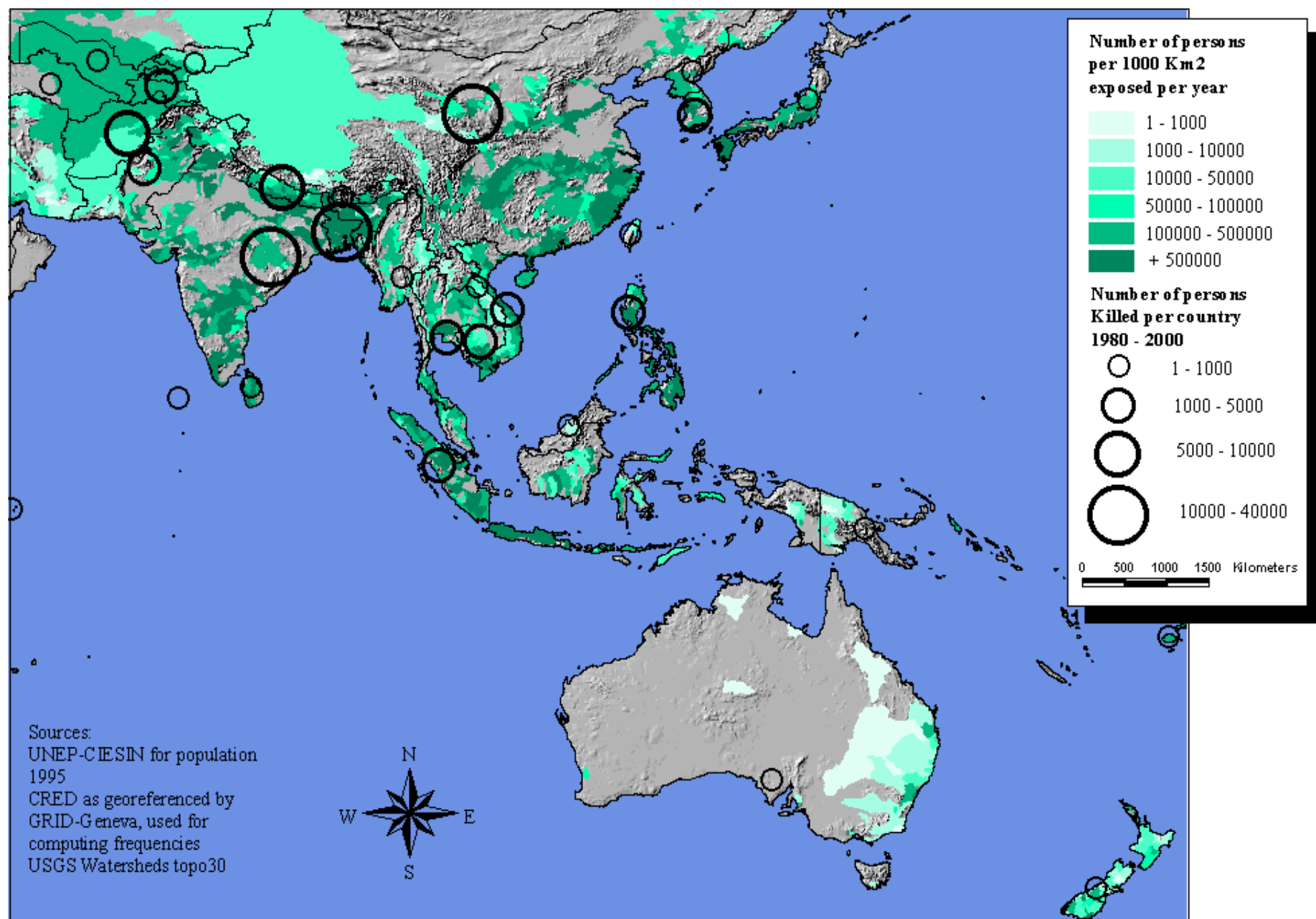
# ***Water-Related Hazards & Disasters***

- **Tsunamis**
- **Tropical Cyclones**
  - **Myanmar → Tropical cyclone Nargis → 2 May 2008**
  - **Death toll → 138,000 people**
  - **2.4 million people severely affected**
  - **Philippines → Super Typhoon Haiyan (Yolanda) : Nov 2013**
  - **Strongest typhoon ever to strike landfall**
  - **6,300 people killed, US\$ 9.7 billion losses**

# ***Water-Related Hazards & Disasters***

Country	Water-Related Hazards
Brunei DS	<b>Floods, Flash Floods</b>
Cambodia	<b>Floods</b> , Droughts, Storms, River Bank Collapse
Indonesia	Tsunamis, <b>Floods</b> , Landslides, Droughts, Debris Mudflows
Lao PDR	<b>Floods</b> , Droughts, Storms
Malaysia	<b>Floods, Flash Floods</b> , Droughts, Landslide, Debris and Mud Flows
Myanmar	Tropical Cyclones, <b>Floods</b> , Droughts, Landslides
Philippines	Typhoons, <b>Floods</b> , Tsunamis, Landslides, Droughts
Singapore	<b>Flash Floods</b>
Thailand	<b>Floods</b> , Droughts
Viet Nam	<b>Floods</b> , Typhoons, Storms, <b>Flash Floods</b> , Droughts, Landslides

# Density of persons exposed to Flood in Asia and Pacific

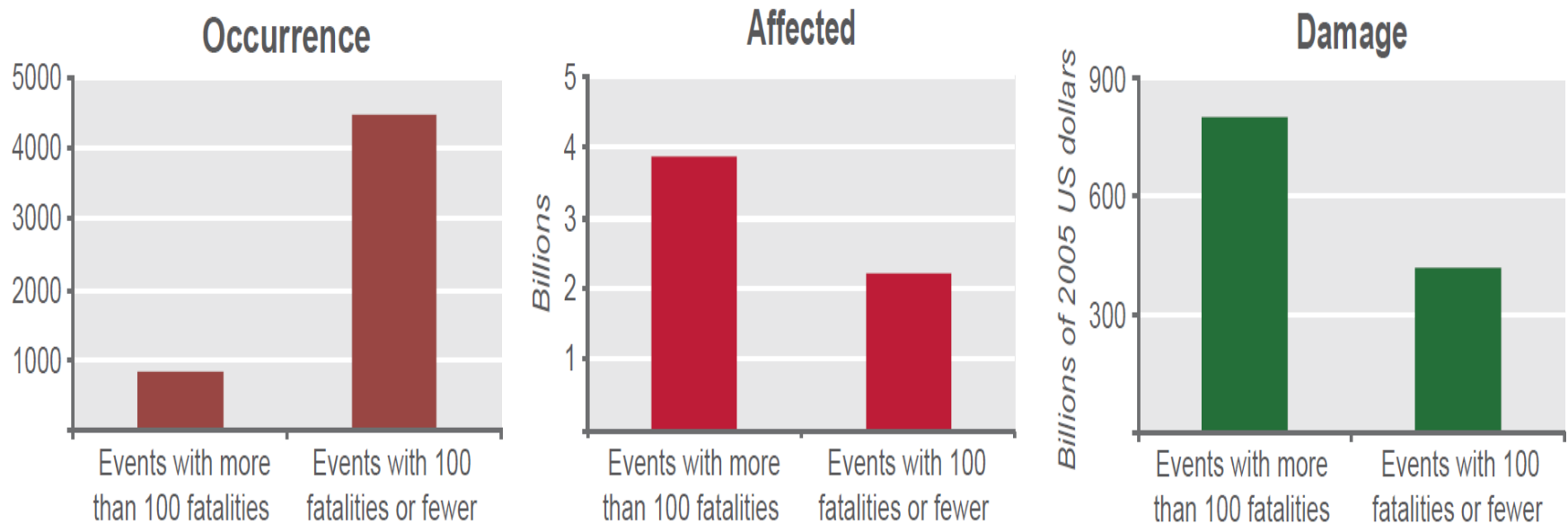


# ***Water-Related Hazards & Disasters***

- **Tsunamis**
- **Tropical Cyclones**
- **Floods**
  - **The most pervasive water-related hazard**
  - **Thailand → Great Flood of 2011**
  - **Total damage and losses → US\$46.5 billion**
  - **A few large scale events, but majority are smaller events**
  - **Cummulatively, smaller events have affected more people and caused higher damage**

# Water-Related Hazards & Disasters

Cumulative impacts of smaller, recurrent disasters, 1970-2014



Source: ESCAP based on data from EM-DAT: The OFDA/CRED International Disaster Database. Available from <http://www.emdat.be/> (Accessed April 2015).



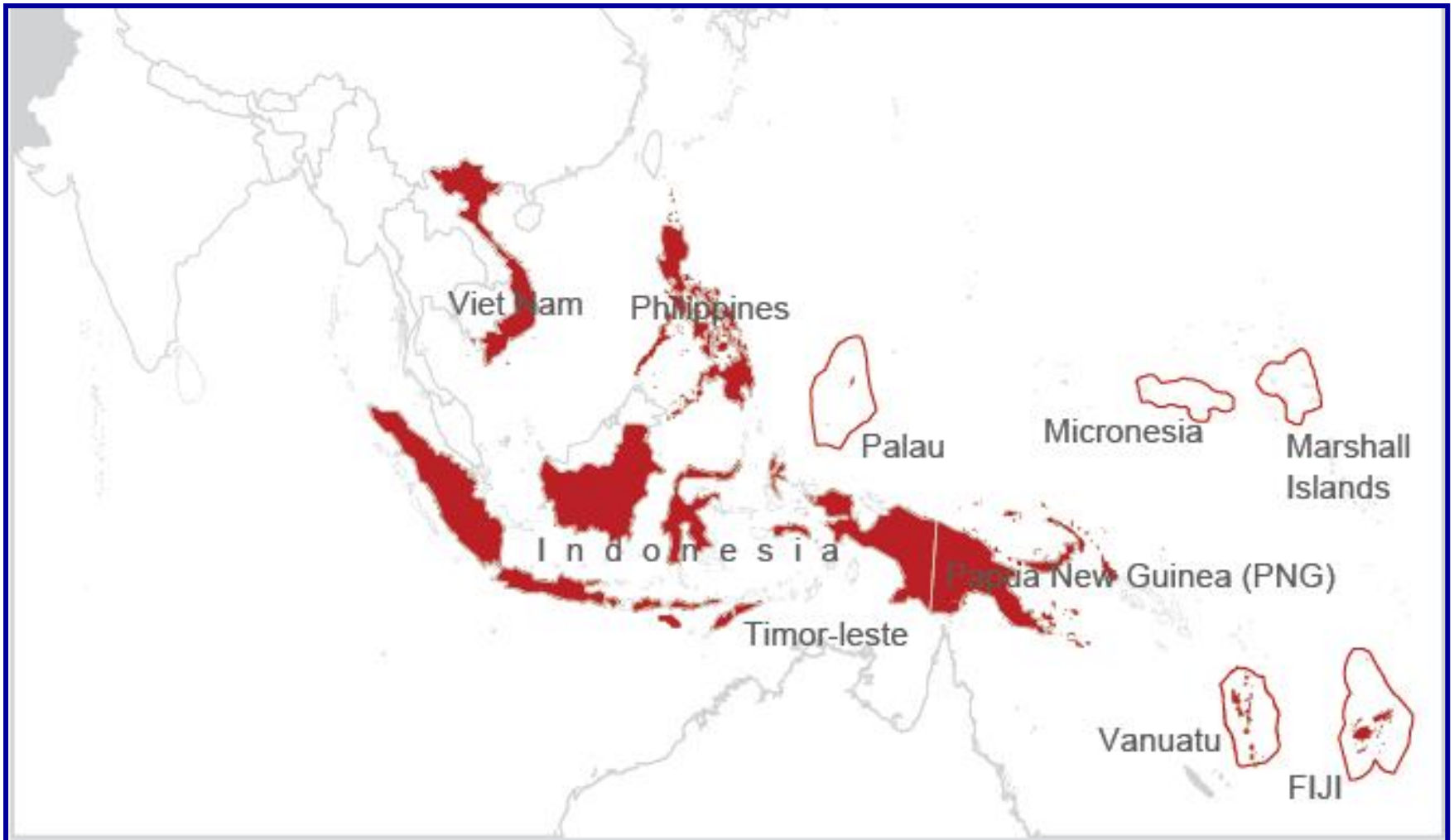
# ***Water-Related Hazards & Disasters***

<b>Country</b>	<b>Water-Related Hazards</b>
<b>Brunei DS</b>	<b>Floods, Flash Floods</b>
<b>Cambodia</b>	<b>Floods, Droughts, Storms, River Bank Collapse</b>
<b>Indonesia</b>	<b>Tsunamis, Floods, Landslides, Droughts, Debris Mudflows</b>
<b>Lao PDR</b>	<b>Floods, Droughts, Storms</b>
<b>Malaysia</b>	<b>Floods, Flash Floods, Droughts, Landslide, Debris and Mud Flows</b>
<b>Myanmar</b>	<b>Tropical Cyclones, Floods, Droughts, Landslides</b>
<b>Philippines</b>	<b>Typhoons, Floods, Tsunamis, Landslides, Droughts</b>
<b>Singapore</b>	<b>Flash Floods</b>
<b>Thailand</b>	<b>Floods, Droughts</b>
<b>Viet Nam</b>	<b>Floods, Typhoons, Storms, Flash Floods, Droughts, Landslides</b>

# ***Water-Related Hazards & Disasters***

- **Tsunamis**
- **Tropical Cyclones**
- **Floods**
- **Droughts**
  - **Lesser impact**
  - **Strongly influenced by El Niño**
  - **Affects agriculture production**
  - **Sometimes domestic and industrial water supply**

# ***Climate & Hydrology***



**El Niño Affected Countries**

Figure A: El Niño and La Niña over the last century for March-May

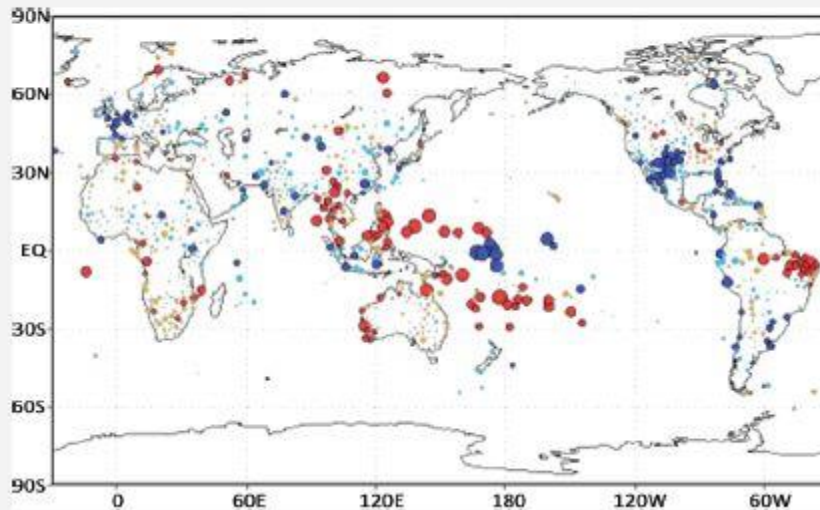


Figure B: El Niño and La Niña over the last century for June-August

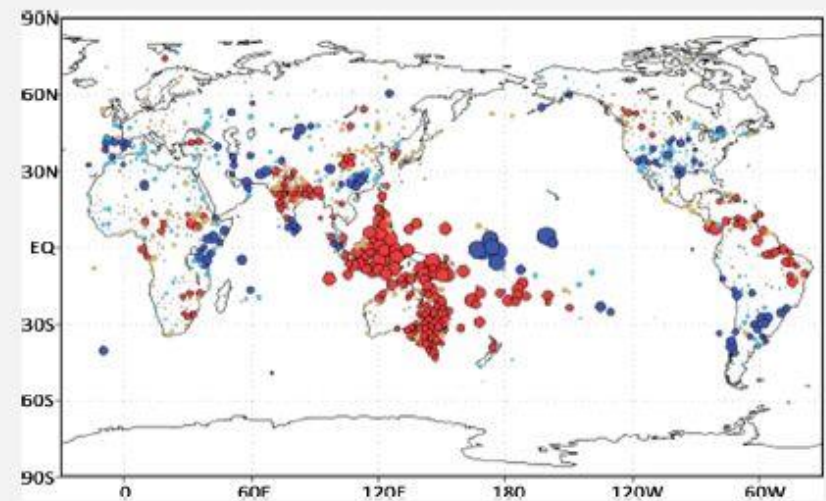
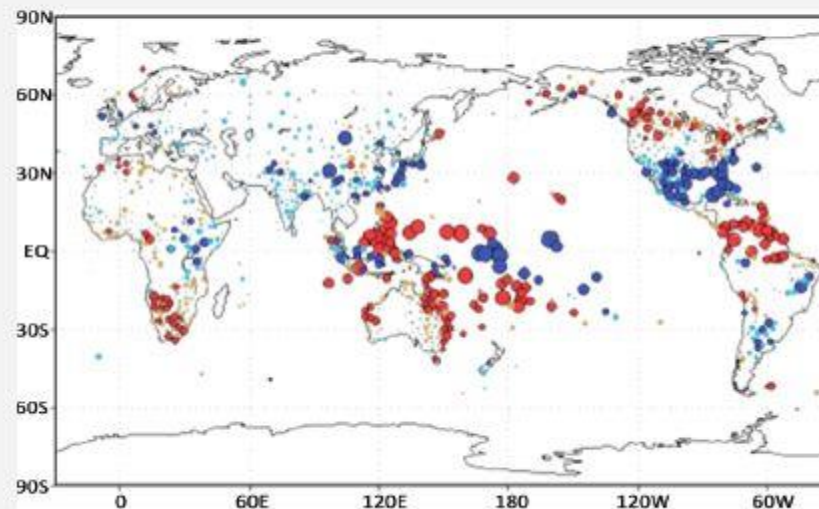


Figure C: El Niño and La Niña over the last century for December-February



Source: KNMI, 2014.

# ***Water-Related Hazards & Disasters***

- **Dealing with floods, ASEAN countries utilize**
  - **Structural measures**
    - **River improvement, bunds/dykes/levees, dams, flood retention ponds, diversion channels, tidal barrages, etc.**
  - **Non-structural measures**
    - **Land use planning and zoning, flood hazard maps, flood forecasting and warning, flood proofing, etc.**

# ***Water-Related Hazards & Disasters***

- **Dealing with droughts, ASEAN countries focus on**
  - **Developing more water supply systems both for domestic and industrial use as well as for irrigated agriculture**

# **Governance Setup**

# ***Governance Setup***

<b>Country</b>	<b>Legislation</b>
<b>Brunei DS</b>	<b>Disaster Management Order (2006)</b>
<b>Cambodia</b>	<b>Law on Disaster Management (2015)</b>
<b>Indonesia</b>	<b>Law No. 24/2007 on Disaster Management Other laws revised → accommodate principles of DRR</b>
<b>Lao PDR</b>	<b>No specific law on water-related hazards &amp; disasters.</b>
<b>Malaysia</b>	<b>No specific law on water-related hazards &amp; disasters.</b>
<b>Myanmar</b>	<b>No specific law on water-related hazards &amp; disasters.</b>
<b>Philippines</b>	<b>Philippine Disaster Risk Reduction and Management Act 2010</b>
<b>Singapore</b>	<b>No specific law on water-related hazards and disasters</b>
<b>Thailand</b>	<b>National Disaster Prevention &amp; Mitigation Act, BE 2550</b>
<b>Viet Nam</b>	<b>Law on Natural Disaster Prevention and Control (2014)</b>



# ***Governance Setup***

<b>Country</b>	<b>Institutional Setup</b>
<b>Brunei DS</b>	<b>National Disaster Council</b>
<b>Cambodia</b>	<b>National Committee for Disaster Management</b>
<b>Indonesia</b>	<b>National Agency for Disaster Management</b>
<b>Lao PDR</b>	<b>National Disaster Management Committee</b>
<b>Malaysia</b>	<b>National Security Council. A National Disaster Management Agency was established in 2015</b>
<b>Myanmar</b>	<b>Department of Meteorology and Hydrology &amp; Department of Relief and Resettlement</b>
<b>Philippines</b>	<b>National Disaster Risk Reduction and Management Council</b>
<b>Singapore</b>	<b>Public Utilities Board</b>
<b>Thailand</b>	<b>Department of Disaster Prevention and Mitigation</b>
<b>Viet Nam</b>	<b>Steering Committee for Natural Disaster Prevention and Control.</b>

# ***Governance Setup***

Country	Institutional Setup
Brunei DS	<b>National</b> Disaster Council
Cambodia	<b>National</b> Committee for Disaster Management
Indonesia	<b>National</b> Agency for Disaster Management
Lao PDR	<b>National</b> Disaster Management Committee
Malaysia	<b>National</b> Security Council. A National Disaster Management Agency was established in 2015
Myanmar	Department of Meteorology and Hydrology & Department of Relief and Resettlement
Philippines	<b>National</b> Disaster Risk Reduction and Management Council
Singapore	Public Utilities Board
Thailand	Department of Disaster Prevention and Mitigation
Viet Nam	Steering Committee for Natural Disaster Prevention and Control.

# ***Governance Setup***

- **Institutional setup**
  - **National level Council/Committee/Agency chaired by Prime Minister, Deputy Prime Minister, or Minister**
- **Most of the ASEAN countries have adopted the Hyogo Framework for Action as the key instrument for implementing disaster risk reduction (DDR)**
- **ASEAN Agreement on Disaster Management and Emergency Response**

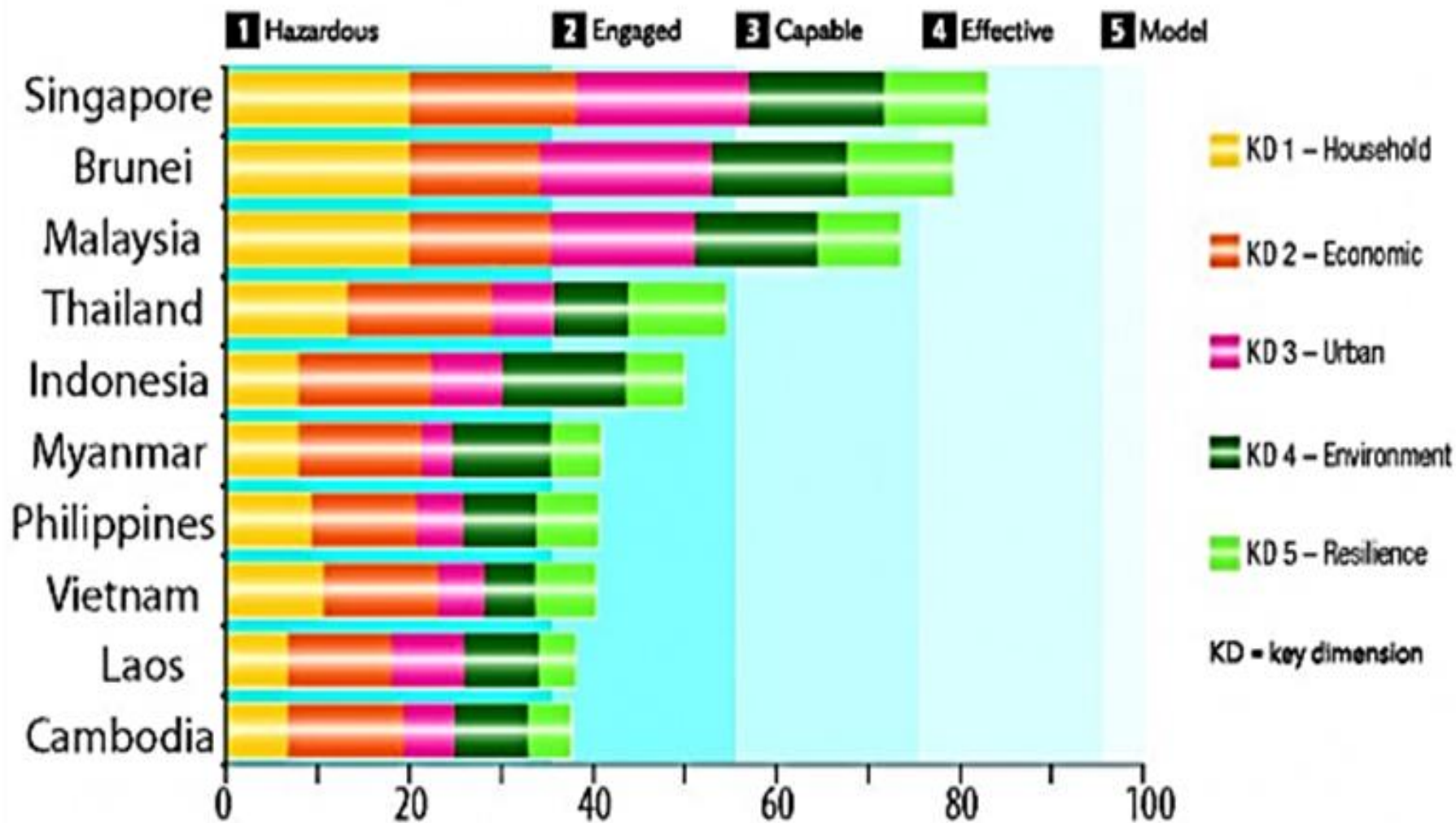
# **Water Security**

# ***Water Security***

- **Asian Development Bank & Asia-Pacific Water Forum**
  - **Prepared the Asian Water Development Outlook (AWDO)**
  - **AWDO provided the first quantitative and comprehensive review of water security**
  - **Water security framework based on 5 key dimensions**
  - **Fifth key dimension → Resilience to Water-related Disasters**

# Water Security

## National Water Security Index Score



# **Lessons Learnt**

# ***Lessons Learnt***

- Many similarities with respect to water-related hazards and disasters
- Floods → the most frequent water-related hazard
- All ASEAN countries suffer from drought problems, especially during El Niño years
- Cambodia
  - Conducted Community-based Flood Mitigation and Preparedness Project → to establish sustainable, replicable non-governmental mechanisms for disaster mitigation and preparedness with focus on floods



# ***Lessons Learnt***

- **Indonesia**
  - **Considerable experience in disaster management and emergency response from Aceh tsunami**
  - **Paradigm shift in disaster management : from disaster response to disaster risk reduction**
- **Malaysia**
  - **Introduced a new Urban Stormwater Management Manual → change from rapid disposal of stormwater to one based on controlling the problem at source**

# ***Lessons Learnt***

- **Thailand**
  - Land subsidence due to excessive extraction of ground water → solved problem based on pricing policy i.e. increased the unit price of water pumps by 6 times
- **All ASEAN countries**
  - Difficulty to convince the government to invest more in preventing disasters
  - Governments tend to react rather than to be proactive

# **Regional Cooperation**

# Regional Cooperation

	Bn	Ca	Id	La	My	Mm	Ph	Sg	Th	Vn
Guidelines, Practices, SOP, Models	✓	✓		✓	✓	✓	✓			✓
Knowledge Sharing, Case Studies (success/failures)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Capacity Building, Training	✓	✓		✓	✓		✓	✓	✓	
Info/Expert Network		✓					✓		✓	
Transboundary			✓		✓					✓
Hazard Maps, Community Involvement				✓	✓					
ODA, Projects, Research				✓	✓	✓			✓	

# ***Regional Cooperation***

- **Knowledge Sharing**
  - **Acknowledged as important area for regional cooperation**
  - **Can share knowledge, experiences, information, guidelines**
  - **Broad scope → Need to identify priority areas**

# ***Regional Cooperation***

- **Knowledge Sharing**
- **Capacity Building**
  - **Need to build capacity in both people and organisations**
  - **Train the Trainers → Bigger outreach**

# ***Regional Cooperation***

- **Knowledge Sharing**
- **Capacity Building**
- **Next Phase**
  - **How to put more value into output of next phase**
  - **Solutions for water-related disasters → can be solutions for water supply**
  - **Water as hazards, water as resources**
  - **WMO → Integrated Flood Management**
  - **Chuncheon GWF → prepare draft proposal**



A scenic landscape photograph featuring a river in the foreground, surrounded by dense green forests on both banks. In the background, there are rolling hills and mountains under a clear sky. The text "Thank you" is overlaid in the center of the image.

*Thank you*