UNESCO-IOC

Tsunami Preparedness Capacity Assessment Team And ESCAP Representatives

4 September 2024

National Disaster Warning Center
Department of Disaster Prevention and Mitigation

ACM Somneuk Swatteuk
Disaster Warning Specialist

Disaster Profile

Overview

Thailand most common natural hazards are flood, drought and landslide and has also experienced earthquake, tsunami, windstorm bush fire and cold-spell.

Common man-made disaster are urban fire and road accidents.

Past Major Disaster:

- Typhoon Harriet in Surat Thani Province (1962, Death : 911)
- Typhoon Gay in Chumporn Province (1989, Death: 537)
- Major landslides in northern and southern parts of Thailand (1988 and 2001, Death : 361)
- The Indian Ocean tsunami (2004, Fatalities : 5,393, Missing : 3,066)
- The 2011 Mega Flood (2011-2012, Death : 815, 13.6M people in 65 out of 77 provinces affected, Economic loss : USD 45.7 billion)
- Server Drought : 1979, 1986, 2005 and 2014

Thailand Disaster Management System

Overview: the Disaster management system in Thailand based on

* The 2007 Disaster Prevention and Mitigation Act
* The National Plan on Disaster Prevention and Mitigation 2021-2027
* The National Committee on Disaster Prevention and Mitigation (Chaired by Prime Minister, DDPM is the Secretariat & executive arms)

Disaster Prevention and Mitigation Act 2007

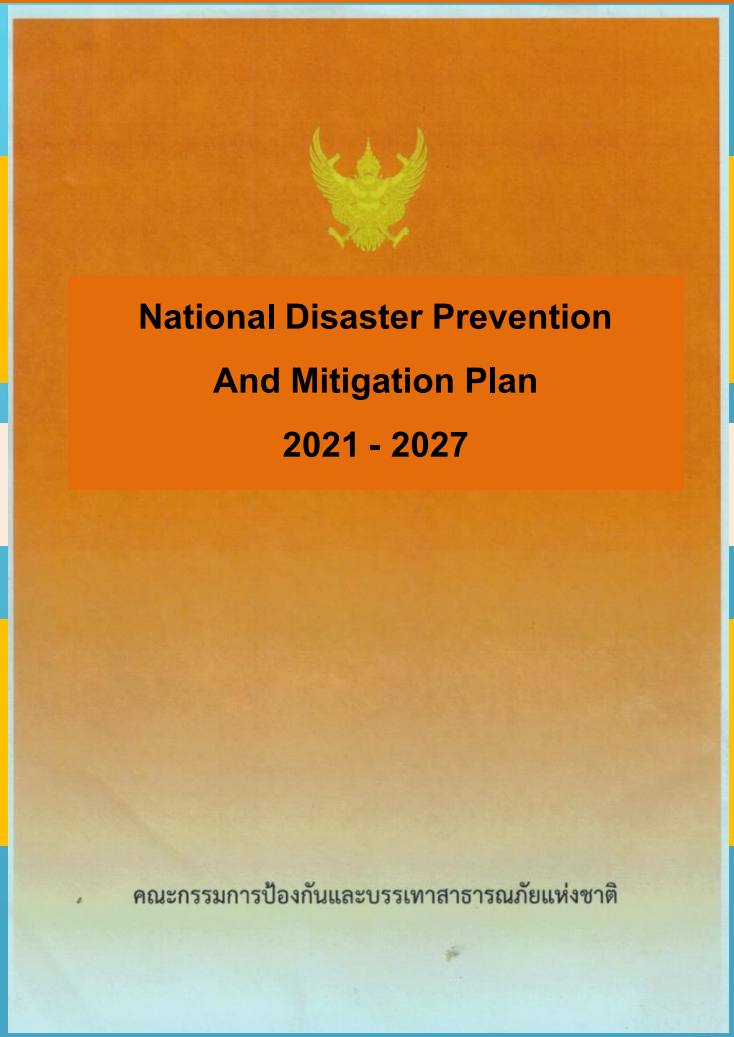
- Making and planning bodies.
- Prime Minister or an assigned Deputy PM as the National Commander.
- Department of Disaster Prevention and Mitigation(DDPM) is the core national government on Disaster Management.

Issues to consider in preparing national DPM plan

1. National Economic and Social Development Plan

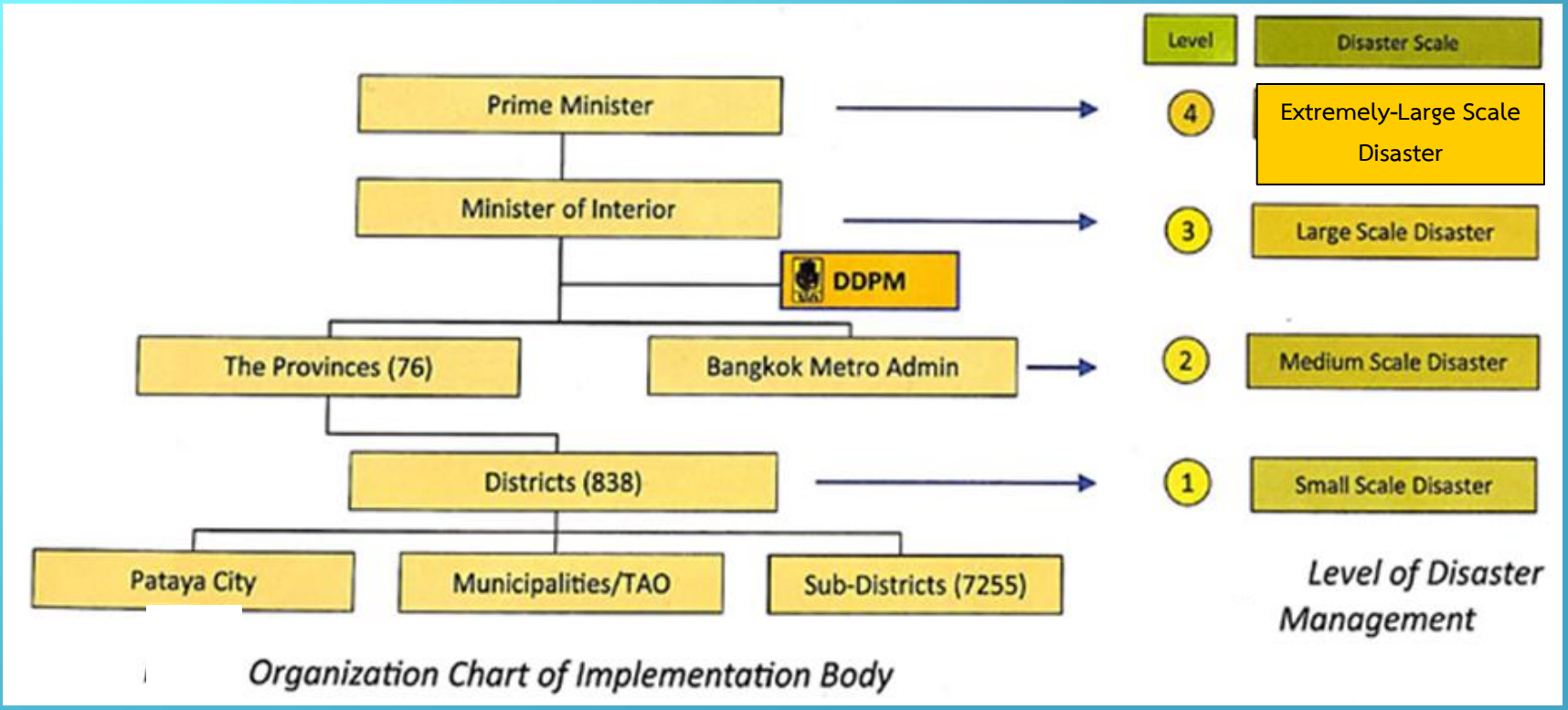
2. National Security Policy

3 Sendai Framework 2015 – 2030



Emergency and Incident Management

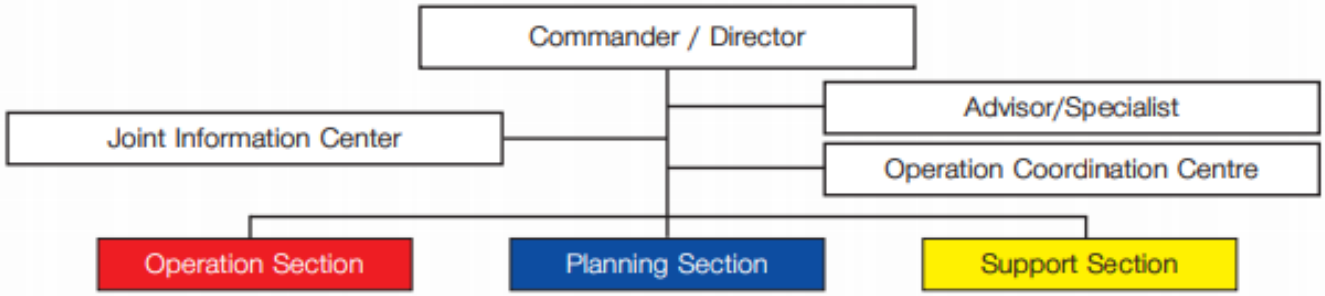
- An emergency and incident management in Thai context is classified into four levels based on a wide range of parameters



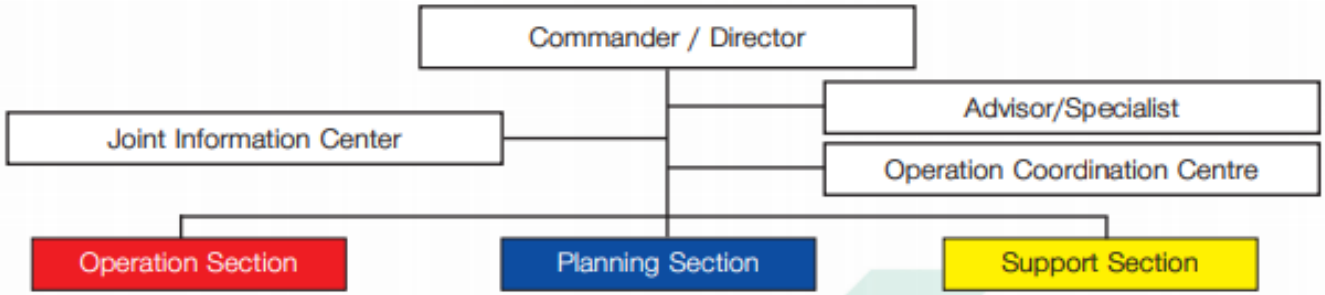
Disaster Management Scale

Level	Management scale	Authority in charge
1	Small scale disaster	District Director, Local Director and/or BMA Assistant Director commands and controls
2	Medium scale disaster	Provincial Director or BMA Director controls, directs and commands
3	Large scale disaster	Commander of National Emergency Operation Headquarter controls, directs and commands
4	Extremely large scale disaster	Prime Minister or assigned Deputy Prime Minister controls, directs and commands

Organizational Structure of National Emergency Operation Headquarter/Incident Command Centre



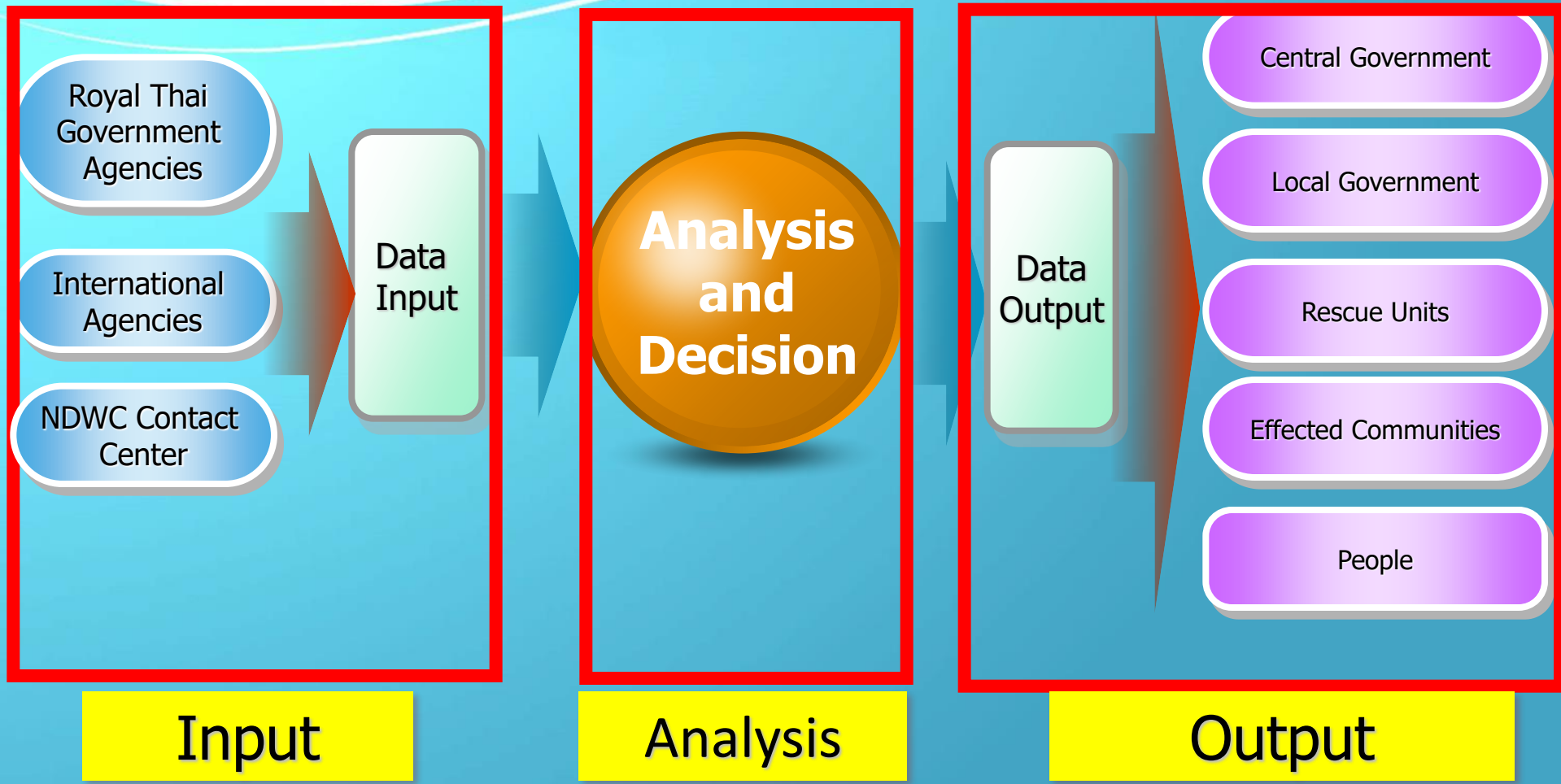
Emergency Support Functions (ESF)



Operation Section	Planning Section	Support Section
ESF 1: Transportation	ESF 5: Emergency management	ESF 2: DE
ESF 4: Fire fighting	ESF 15: Foreign affairs	ESF 3: Public utilities and infrastructures
ESF 7: Military resources		ESF 6: Social welfares and human security
ESF 8: Medical services and health care	Also includes law and regulations advisory unit	ESF 11: Agriculture
ESF 9: Search and rescue		ESF 12: Energy
ESF 10: HAZMAT and CBRN		ESF 14: Recovery of economic, education and culture assets
ESF 13: Security		ESF 17: Natural resources and environment
		ESF 18: Budgeting and donation


DISASTER IMPACT
RESPONSE
RECOVERY
DEVELOPMENT
MITIGATION
PREPARED-NESS
DISASTER MANAGEMENT CYCLE

Concept of Operation



Operating System

- Gathering data and information from various organizations (Thai Government and International Organizations)
- Risk and Hazard Assessment
- Evaluation and Decision Making
- Dissemination

Input System

Thai Government Departments :

- Thai Meteorological Department
- Department of Mineral Resources
- Royal Thai Navy
- National Parks Wildlife and Plant Conservation Department
- Pollution Control Department
- Department of Disaster Prevention and Mitigation
- Electricity Generating Authority of Thailand
- Royal Irrigation Department
- Hydrographic Department
- Office of the National Water Resources
- National Water Authority

Input System

International Agencies :

- Pacific Tsunami Warning Center (PTWC)
- Japan Meteorological Agency (JMA)
- United States Geological Survey (USGS)
- National Oceanic and Atmospheric Administration (NOAA)
- European - Mediterranean and Seismological Center (EMSC)
- GEOFOrschugNetz (GEOFON)
- Indonesian Meteorological and Geological Agency (IMGA)
- Malaysian Meteorological Service (MMS)
- Tsunami Service Providers (Australia India, Indonesia)

Tsunami and Earthquake

Agency	Information/Data	Link
Domestic -**Thai Meteorological Department (TMD)** **International** **- TSPs** **- PTWC** **- JMA** **- National Data Buoy Center** **Free Website** **- GEOFON** **- EMSC** **- USGS**	1. Tsunami warning bulletin (Sea earthquake description : location, magnitude, time) 2. Situation map. (both sea earthquake and land earthquake) 3. ETA table (tsunami estimate time of arrival) 4. Land earthquake description : location, magnitude, time)	-https://earthquake.tmd.go.th/eq-monitor.html -https://www.tsunami.gov/ https://www.jma.go.jp/bosai/#lang=en&pattern=default -https://www.ndbc.noaa.gov/ -https://geofon.gfz-potsdam.de/ -https://www.emsc-csem.org/#2 - https://earthquake.usgs.gov/earthquakes/map

Storm

Agency	Information/Data	Link
- TMD - JMA	- Storm Tracking - Storm Level	-https://www.tmd.go.th/index.php https://www.jma.go.jp/bosai/#lang=en&pattern=default

Floods, Flash Floods and Landslide

Agency	Information/Data	Link
- TMD - Office of the National Water Resource (ONWR) - Royal Irrigation Department (RID) - Bangkok Department of Drainage and Sewage - Department of Water Resource (DWR) - Department of Mineral Resource (DMR) - National Disaster Warning Center (NDWC) - Hydro-Information Institute (HII) - Electricity Generation Authority of Thailand (EGAT) -National Water Command (NWC)	-Weather Condition -Precipitation -Rain Forecast -Risk areas (flood, fast flood, landslide) -Reservoir water level -Watershed level -Bangkok water level -Water level station CCTV -WRF	-https://www.tmd.go.th/index.php -http://www.onwr.go.th/ -https://www.rid.go.th/main/ -https://dds.bangkok.go.th/ -http://mekhala.dwr.go.th/situation-cctv.php -http://www.dmr.go.th/index_.php -http://www.onwr.go.th -http://www.hii.or.th -http://www.egat.co.th

Evaluation & Decision

- Technical Knowledge
- Technical Experts
- Criteria
- Risk and Hazard Assessment
- Evaluation and Decision Making
- Computerized Support
- Standard of Operations (SOP)

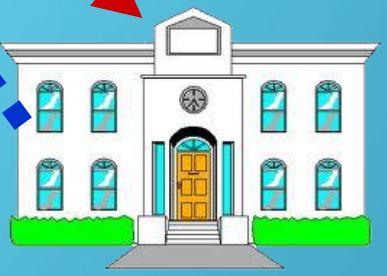
Output

- Prioritize of Dissemination
  - Central Government
  - Local Government
  - Rescue Units
  - Effected Communities
  - Publics
- Pre-formatted Bulletins
- Tools of Dissemination
  - SMS (5,000 Mobile Phones / Batch)
  - Warning Towers
  - Fax (150 units / Batch)
  - E-mail
  - Televisions (country-wide)
  - Contact Centers
  - Radios (280 stations country-wide)

Warning System

NDWC

301 Local Gov.
in Risk area



Provinces
City Hall

Provinces
Government Radio
Station

163 Warning Boxes

354 Warning Towers

674 Small Towers

Equipment and Tools

- SMS
- Fax. (16 ports)
- E-mail
- Send Information to TV Station TV Pool
- Hot line (12 Numbers)
- Warning Tower (354 Towers)
- Warning BOX (163 boxes)
- Local Government's Relay stations (301 stations)
- Local Dissemination Network (674 small towers)
- Government Radio Station
- Call Center 1784
- DART :Deep-ocean Assessment and Reporting of Tsunami
- WRF Model

Disaster notification Process

Input

- Royal Thai Government Agencies
- International Agencies
- Tsunami measurement System
- Community Allied Network (empirical data)

Data Input

Evaluation & Decision

- Technical Knowledge
- Technical Experts
- Criteria
- Risk and Hazard Assessment
- Evaluation and Decision Making
- Computerized Support
- Standard Operation Procedure (SOP)

Disseminations

Tools and Equipments

354 Warning Towers

163 EVAC (Warning Box Sets)

301 CSC (radio relay stations)

674 Small warning Towers

Dissemination channel

BAS

17 TV stations
3 Radio stations

Application

LINE — Thai Disaster Alert

Social Media

Line@ Twitter Facebook

Village & community Warning tower

Next Step

Cell Broadcast

Tsunami Warning Operational Process

Thailand Tsunami Disseminations

NDBC
NOAA

Via Satellite

Thailand Buoy

23401

23461

IOTWMS
TSP's
Australia
India
Indonesia

NEOH
DDPM

NDWC
SOP

Fax, SMS

EVAC
(warning box set)

6 Provinces
Andaman Sea

-Warning towers
-CSC (radio relay stations)
-Small towers

Affected Districts

Affected
Sub Districts

EVAC
(warning box set)

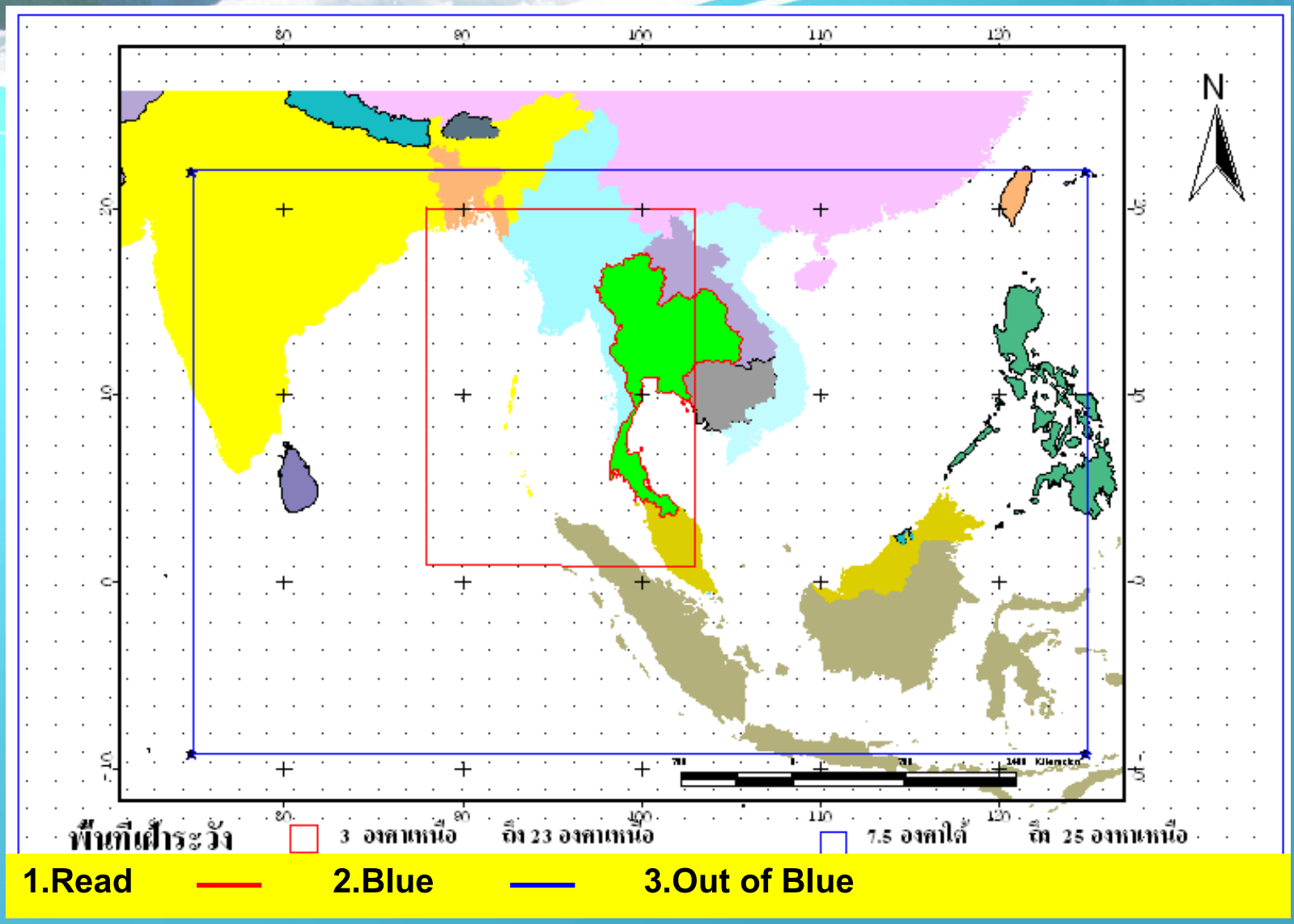
Provinces
Government
Radio Stations

-BAS (Broadcast Alert System)
-Application : Line,
Thai Disaster Alert

General
Public

-Social Media :
Line @, Twitter, Facebook
-Next Step : Cell Broadcast

Seismic awareness zones of Thailand tsunami preparedness



1.Read — 2.Blue — 3.Out of Blue

SOP for tsunami warning of the NDWC

Zone1: Red Box (3°N – 23°N and 88°E – 103°E)

Depth: / Magnitudes	Hypocenter	
	<100 km	>100 km
5.0 - 6.5 Richter	Do not generate tsunami Reporting	Do not generate tsunami Reporting
6.6 – 7.7 Richter	Potential to generate tsunami Watching (tracking more information)	Potential to generate tsunami Watching (tracking more information)
> 7.8 Richter	High tsunami potential Warning	Tsunami potential Watching (tracking more information)

Zone 2: Blue Box (75°S – 25°N and 75°E – 125°E)

Depth: / Magnitudes	Hypocenter	
	<100 km	>100 km
5.7 - 7.0 Richter	Do not generate tsunami Reporting	Do not generate tsunami Reporting
	(tracking more information)	
> 7.1 Richter	Potential to generate tsunami Watching (tracking more information)	Potential to generate tsunami Watching (tracking more information)
	If no tsunami occurs, then status changed to Warning	If a tsunami occurs, then status changed to Warning

Zone 3: Other areas not included in the Red and Blue Boxes

Depth: / Magnitudes	Hypocenter	
	<100 km	>100 km
> 7.0 Richter	Have no impact on Thailand Reporting	Have no impact on Thailand Reporting

Standard Operating Procedure for Tsunami

Sequence of event or data	Operating Procedure			
	Input	Supervisor	Analysis	**Output**
		Examine data on magnitude If it lies within any criteria, inform officers to follow SOP.		
		Command officers to complete information distribution form. When complete, instruct analysts to give information to output officers and call centers and update it in the website		Updating Website
		For watching or Warning Criteria, Supervisor will use information as specified in fax to broadcast Instruct officers to prepare for broadcasting by communicate with the TV Channel 5 for preparation.		
		Supervisor enter into Studio for broadcasting. When the TV 5 channel is ready, supervisor goes for announcement		

26 December 2004 Tsunami

- Time 07.58 am.

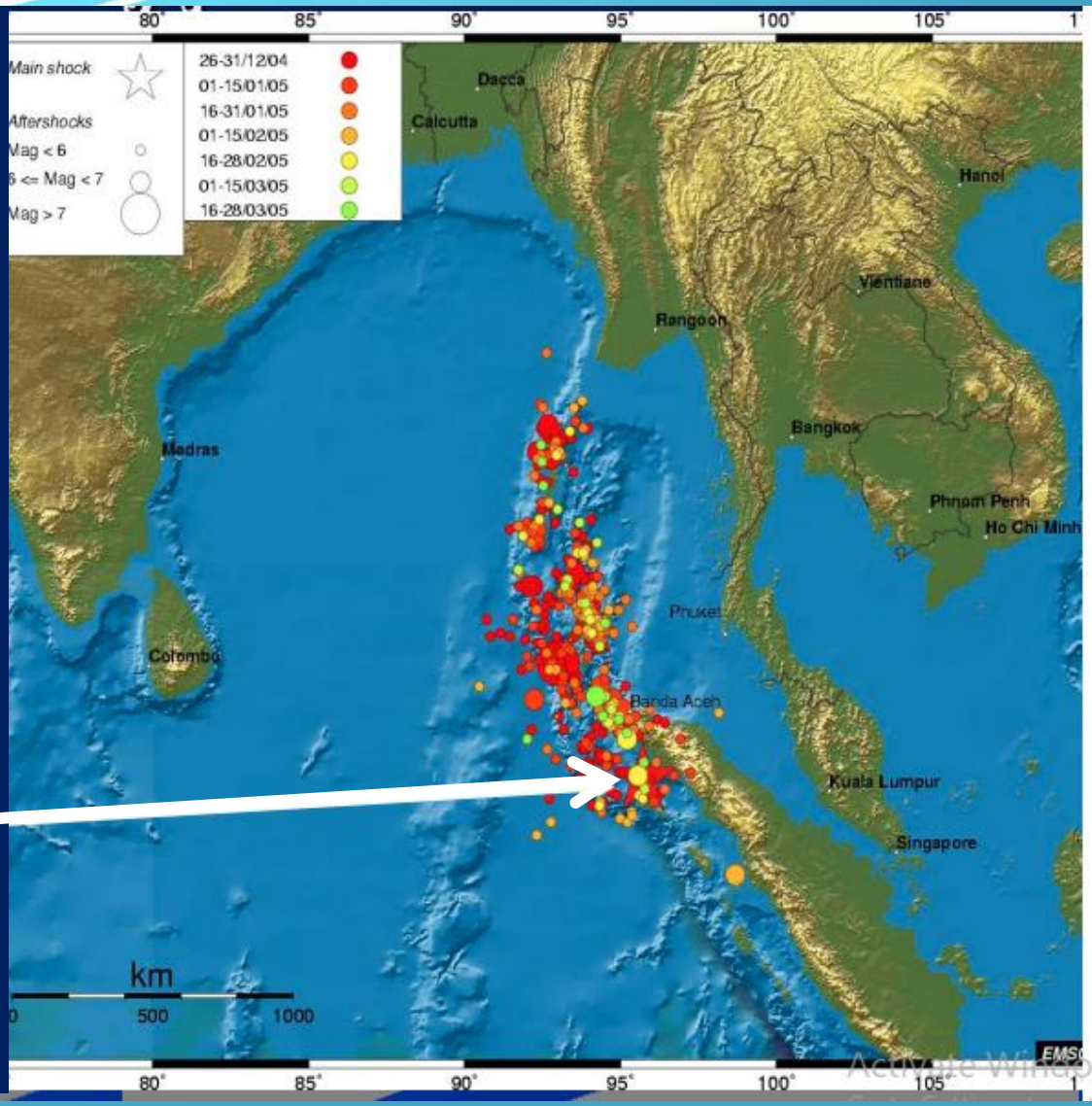
  Dec 26, 2004
- Location

  Northern Sumatra

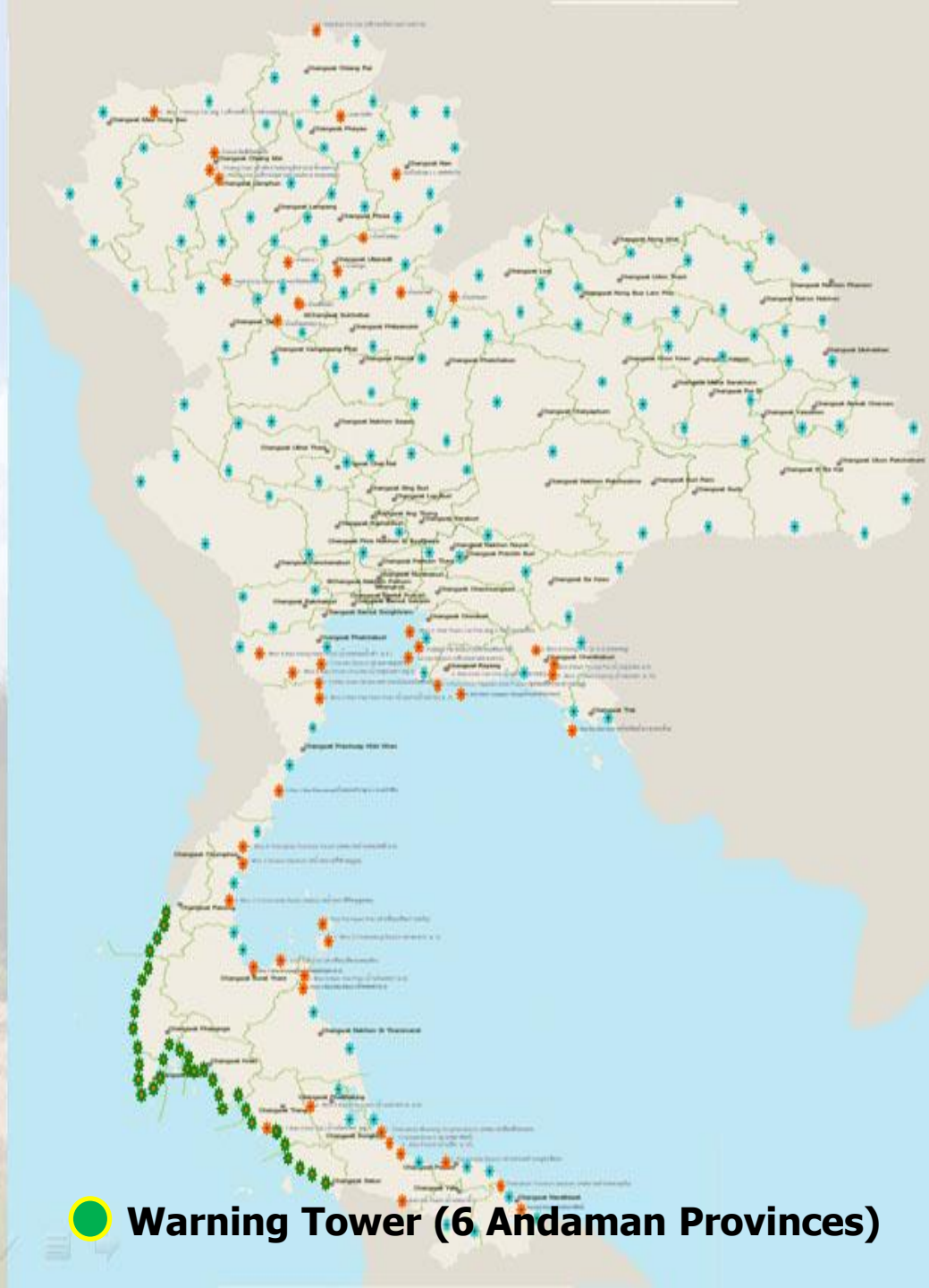
  Indonesia
- Magnitude

  Earthquake Magnitude 9.3
- Wide Spread Impact

  Indian Ocean Countries



79 Towers

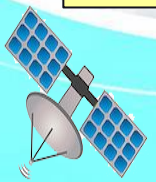


Warning Tower (6 Andaman Provinces)

NEOH

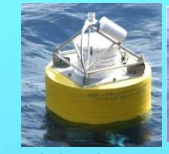
DDPM

NOAA

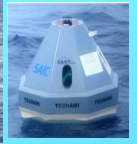


Irridium

Thailand Buoy



23401



23461

NDWC

SOP

IOTWMS TSP's

Australia

India

Indonesia

M2

Attention please, Attention please, there is an earthquake in the sea. Tsunami is expectative. Please leave the beach as far as possible for higher ground urgently.

M3.1

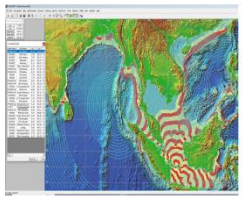
Attention please, Attention please. There is a tsunami. Please leave the beach as far as possible for higher ground urgently.

M3.2

M9

Attention please, Attention please, The situation is back to normal. Please continue to rescue the victim

NDWC uses the winITDB program to evaluate the arrival time of the wave and sent BULLETIN NUMBER 1, 2 to 6 Provinces (Andaman Sea).



winITDB

forecast arrival time

Confirm Tsunami event by data buoy and bulletin form TSP's and sent BULLETIN NUMBER 3.1 to 6 Provinces (Andaman Sea).

Confirm the first wave estimated to Koh mueang and sent BULLETIN NUMBER 3.2 to 6 Provinces (Andaman Sea).

Confirm the last wave estimated to Satun and sent BULLETIN NUMBER 4 End of situation to 6 Provinces (Andaman Sea).

Mitigation System

National Plan > Province Plan > District Plan > Sub-District Plan

Thank You

National Disaster Warning Center

Department of Disaster Prevention and Mitigation

THAILAND

4353 Sukumvit Rd. BangNa Bangkok. 10260
Tel: 0 2399 4114, 0 2399 1128, 0 2399 0881-4
Fax: 0 2399 1133
www.ndwc.go.th