

South China Sea Region Tsunami Ready Training Course (Online)
22-23 December 2025

National Tsunami Programme in the Philippines

Ma. Mylene Martinez- Villegas
Philippine Institute of Volcanology and Seismology (PHIVOLCS)
Department of Science and Technology (DOST)



Philippine Institute of Volcanology and Seismology (PHIVOLCS)

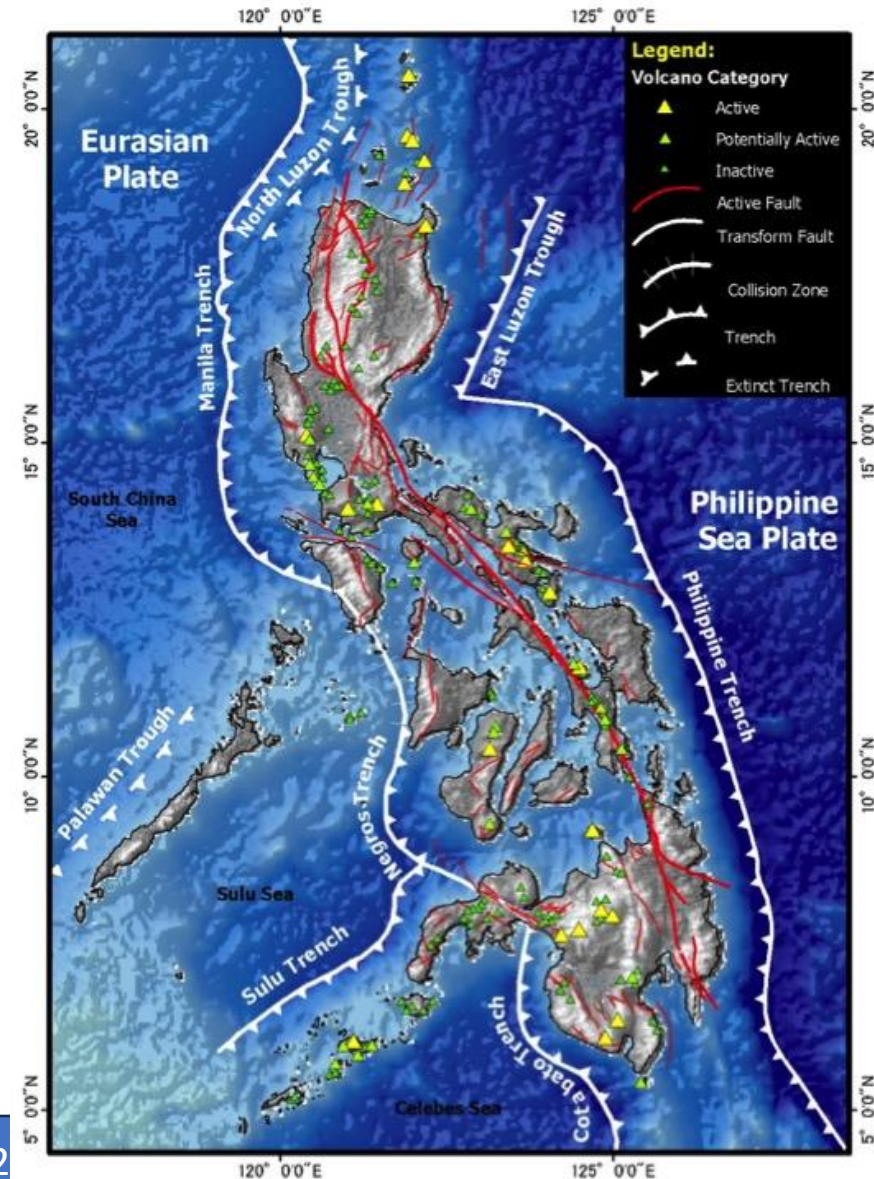
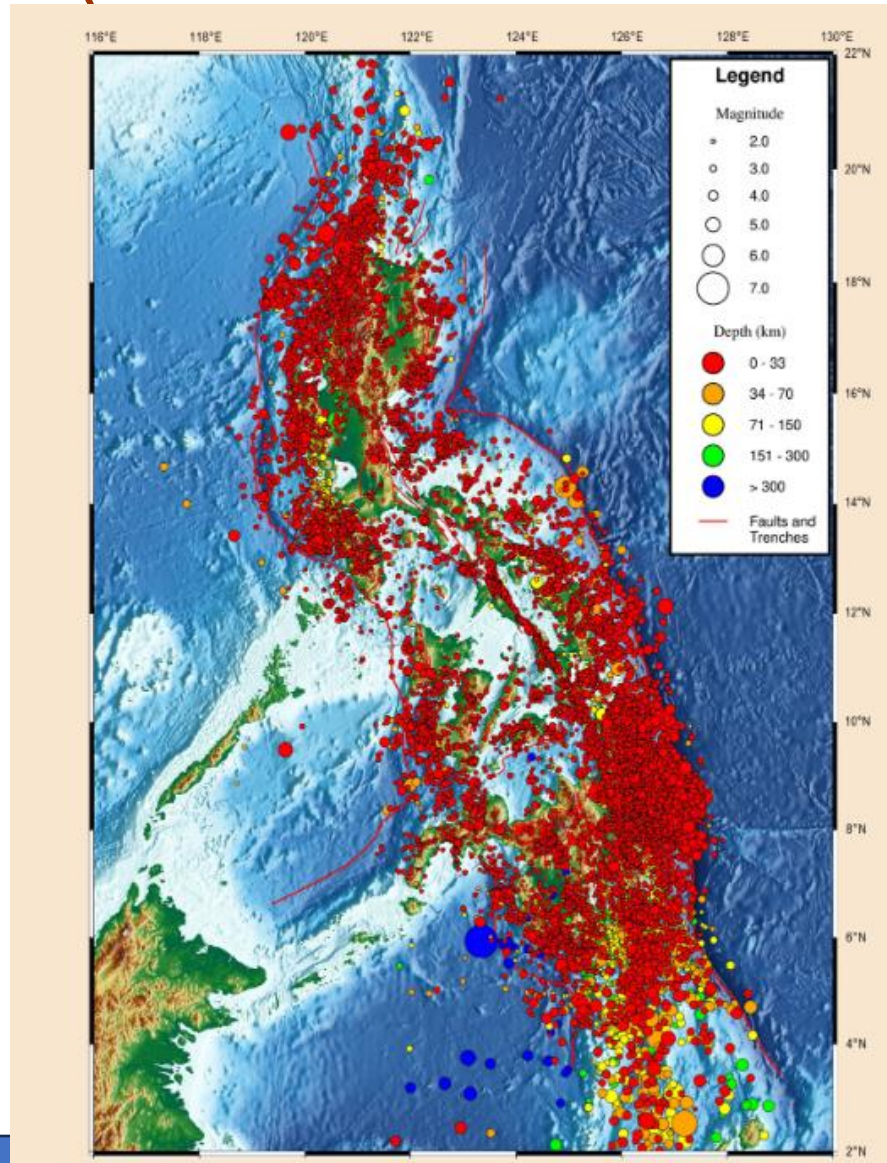
Focus on earthquakes, tsunamis, volcanic eruptions and related phenomena (ex. landslides)

- Monitoring and warning**
- Hazards and risk assessment**
- Evaluation of earthquake and volcano eruption potential**
- Public awareness, community preparedness, disaster risk reduction**

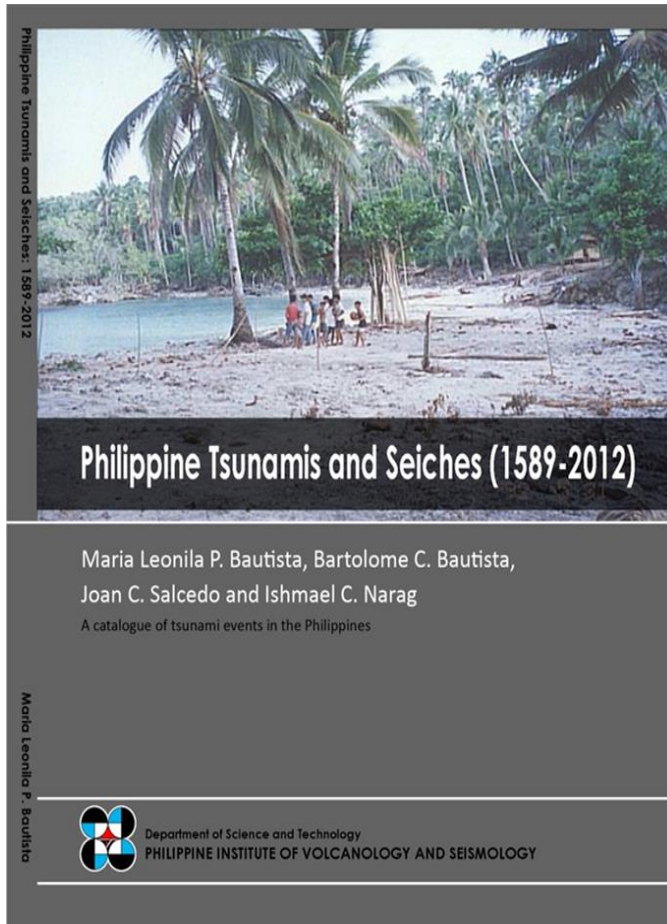


Earthquake Activity in the Philippines

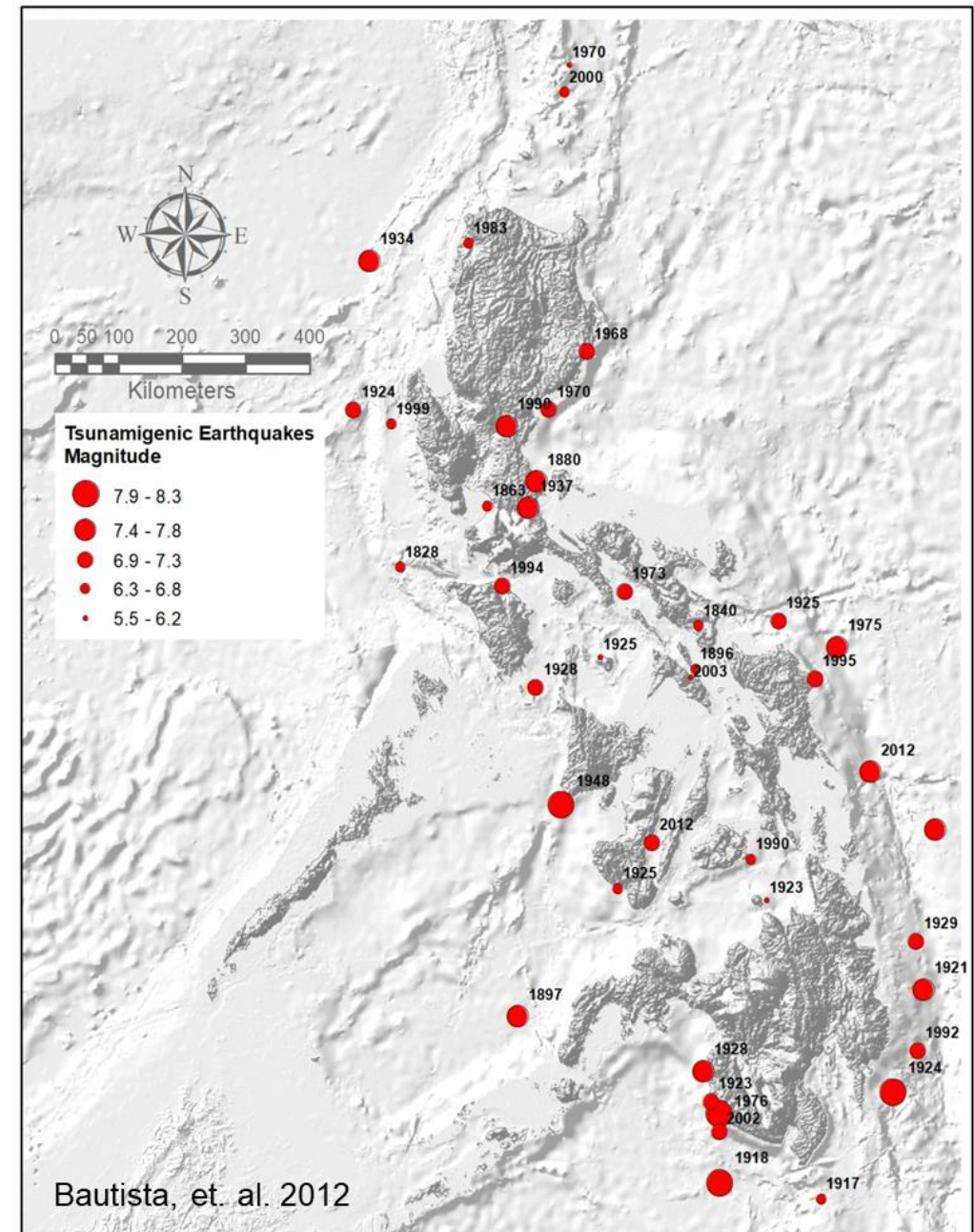
(~90 destructive earthquakes for past 400 years)



Historical Tsunami in the Philippines



- 41 confirmed tsunami events based on historical accounts and earthquake events catalogues from 1828 to 2012



<https://www.phivolcs.dost.gov.ph/index.php/publications/books/tsunami-and-seiches>



Societal Outcome: Communities have achieved resilience to volcanic eruptions, earthquakes, tsunamis, and other related hazards. **2023-2028**

Enhanced safety of communities

1. Accurately predicted and simulated geological phenomena
2. Provided highly accurate and timely warning & information
3. Developed cost-effective monitoring & warning system
4. Empowered partners to lead in reducing risks from geologic hazards down to the barangay level
5. Enhanced collaboration with stakeholders

Highly responsive and competent organization

1. Highly prominent, globally recognized experts
2. Motivated, rewarded and competent staff
3. Effective and efficient systems, procedures, structures
4. Inspiring, dynamic leadership

1. National Volcano Monitoring & Warning (NVMW)
2. National Earthquake Monitoring and Information (NEMI)
3. National Tsunami Monitoring and Early Warning (NTMEW)
4. Earthquake Hazards Assessment and Research and Development (EHARD)
5. Volcanic Hazards Assessment and R&D (VHARD)
6. PHIVOLCS Risk Information Management Assessment (PRIMA)
7. Landslide Monitoring, Early Warning and Risk Assessment (LMEWRA)
8. Volcano, Earthquake, and Tsunami Disaster Preparedness and Risk Reduction (VETDPRR)
9. Leadership Enhancement and Development (LEAD)
10. Strategic Human Resource Mgmt. & Dev't. (SHRMD)
11. Strategic Performance Assessment & Development for Excellence (SPADE)
12. Strategic ICT Management and Development (StrICT)
13. Financial Management and Administrative Support (FMAS)

Various activities and projects contributing to Earthquake and Tsunami Program

- **Earthquake and Tsunami Monitoring**
- **Tsunami Warning and Dissemination**
- **Tsunami Hazard Mapping**
- **Community Capacity Building/Community-based Tsunami Early Warning**
- **Tsunami Information Materials**
- **Tsunami Information Dissemination for Preparedness and Awareness Promotion**



1.EARTHQUAKE MONITORING and TSUNAMI WARNING



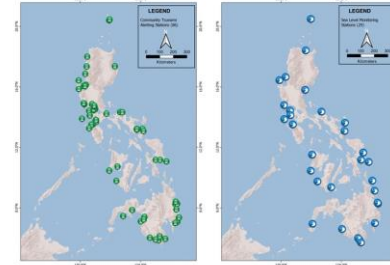
Seismic
Network
Development



Management
and Operation
of Seismic
Stations



Seismic and
Tsunami Data
Management



Management,
Operations and
Implementation
of Systems for
Tsunami
Monitoring and
Warning
(MOIST)



EARTHQUAKE MONITORING NETWORK

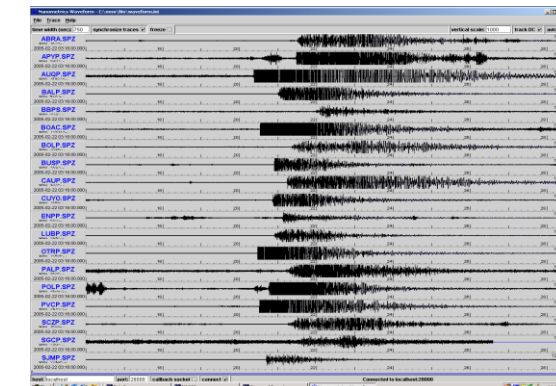
- **125** -station network (seismographs)
- 30 staff-controlled, 95 satellite-telemetered + 8 volcano stations



Data Receiving Center at Main Office



Unmanned stations with satellite communication



Sea Level Monitoring Network

Network	Existing
Real-time tide gauges	*19 (PHIVOLCS thru JICA) 5 (PTWC, RIMES, GLOSS) 5 (PHIVOLCS thru Satreps)
Community tsunami detection and warning system	10 (PHIVOLCS)



- PHIVOLCS thru JICA
 - ★ PHIVOLCS Community
- Tsunami Detection



Capacity Enhancement of Technical Staff

Secondment of short-term international staff from NTWCs of WG-SCS Member States to the SCSTAC



Regional Training on “Strengthening Standard Operating Procedures for Tsunami Warning and the use of the ICG/PTWS SCSTAC Tsunami Advisory Products” May 8-11, 2018; Yu Long Hotel, Haidian District, Beijing, China



Capacity Enhancement of Technical Staff



ITIC Training Programme—Hawaii (ITP-HAWAII) on Tsunami Early Warning Systems and the PTWC Enhanced Products, Tsunami Evacuation Planning and UNESCO IOC Tsunami Ready Recognition Programme, Honolulu, Hawaii, 07-18 August 2023



ITIC Training programme (ITP) on Tsunami Early Warning Systems ITP- TEWS Honolulu, Hawaii 15-26 September 2025



2.TSUNAMI HAZARD MAPPING



Tsunami Risk Mitigation Program (2006-2007)

Nationwide Tsunami Hazard Maps (1:50,000 scale)



(READY PROJECT) (2006-2009)

Hazards mapping and assessment for Effective Community-Based Disaster Risk Management

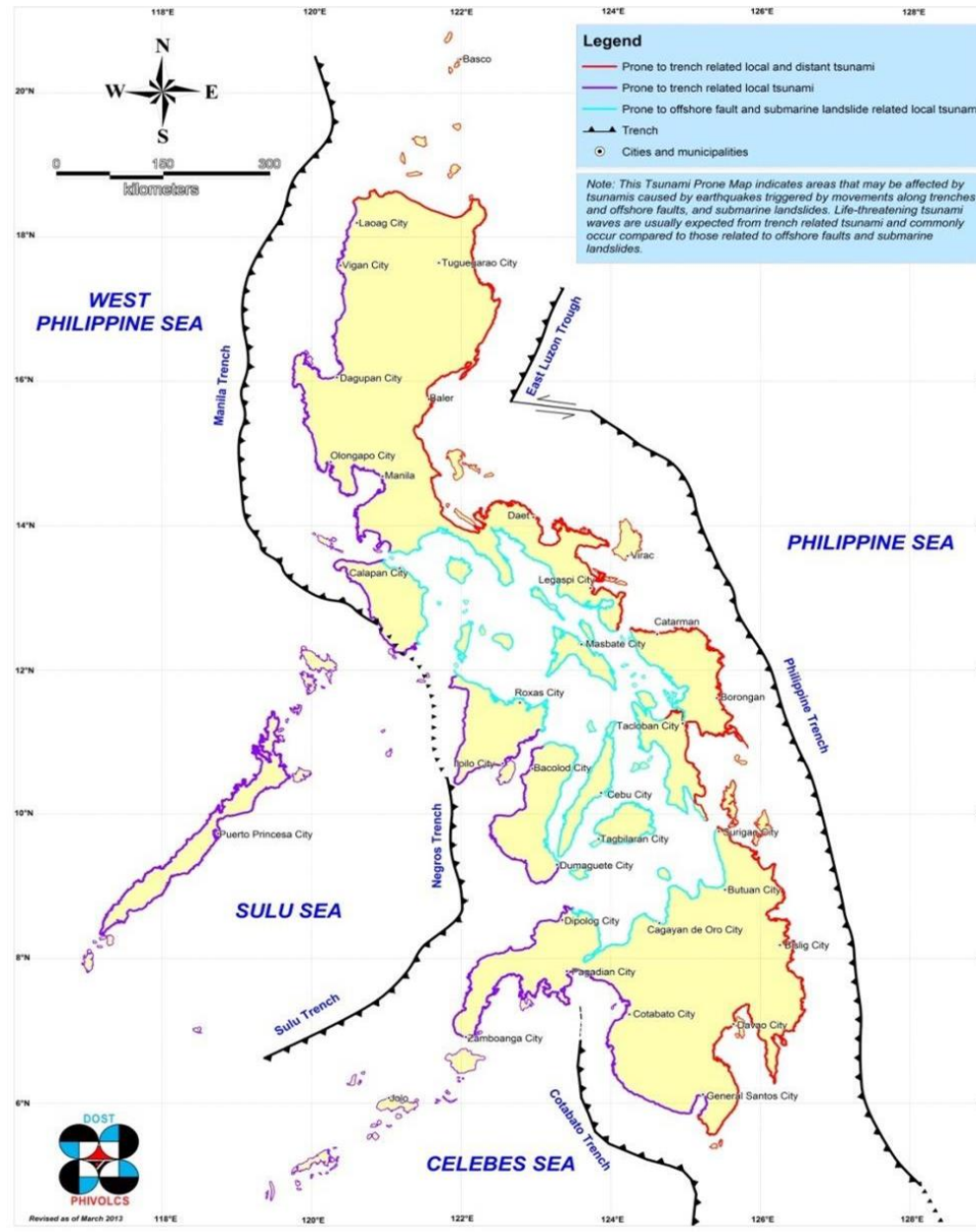


CoAsT PH (2023-present)

Coast Assessment, Mapping and Research of Tsunami Hazards in the Philippines



Tsunami Prone Areas in the Philippines



Prone to trench related local and distant tsunami

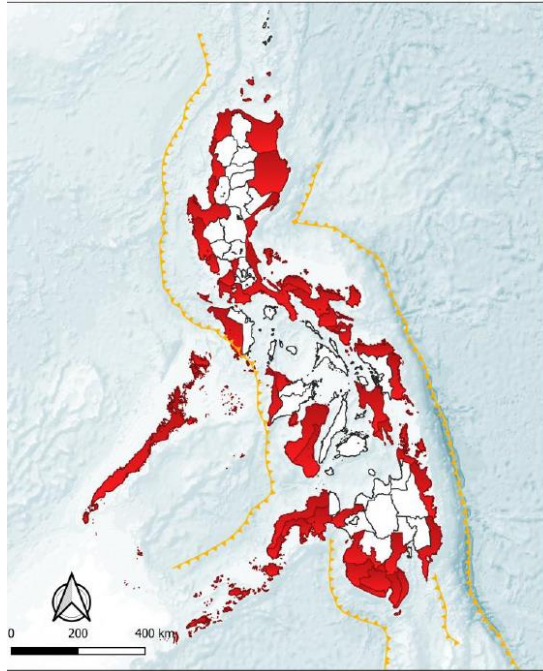
Prone to trench related local tsunami

Prone to offshore fault and submarine landslide related local tsunami



Tsunami Hazard Mapping through the years

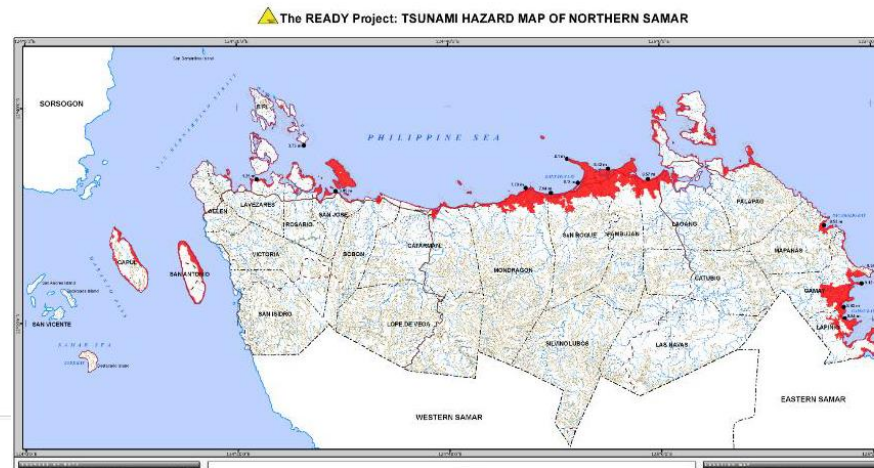
PHIVOLCS DOST-GIA 2006-2007



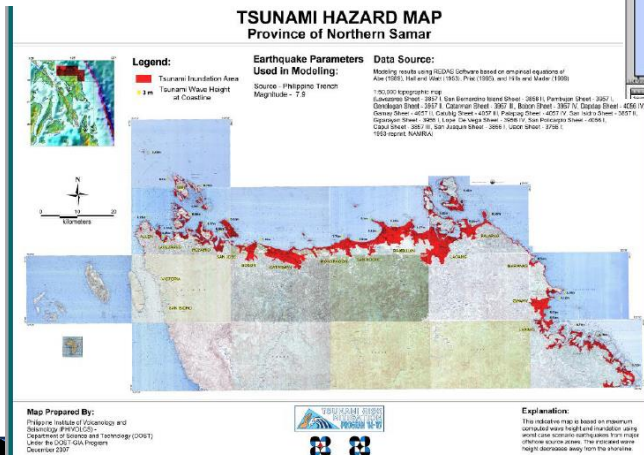
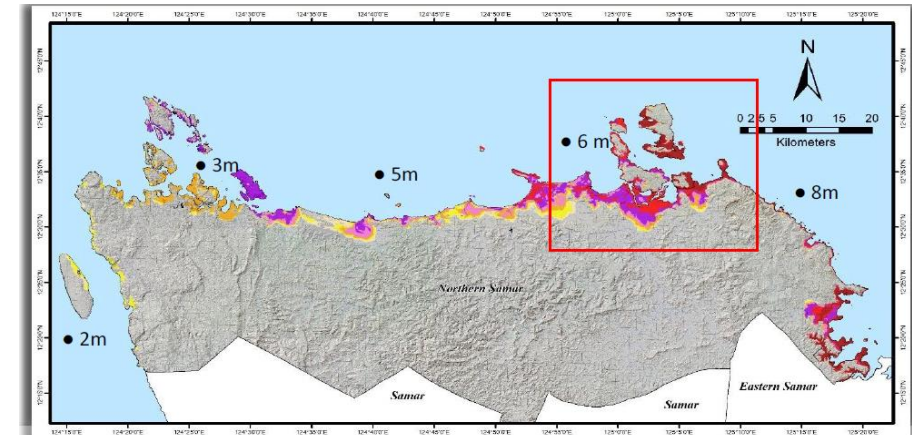
Nationwide First-Generation maps

Refinement of first-generation maps with availability of more detailed information

READY PROJECT, 2006-2013



PHIVOLCS Tsunami Hazard Mapping 2019-present

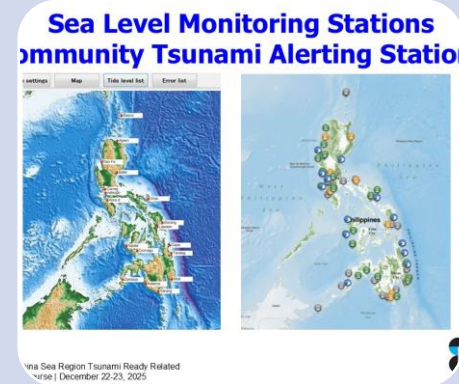


3.COMMUNITY-BASED TSUNAMI MONITORING AND WARNING



Establishment of a Cost- Effective Local Tsunami Early Warning System for Selected High-Risk Coastal Communities of the Philippines ;
2010-2012

Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines
Tsunami Scenario Database
2010-2015



Improvement of Tsunami Monitoring
2013-2018
19 JMA-type sea level monitoring equipment installed
JICA

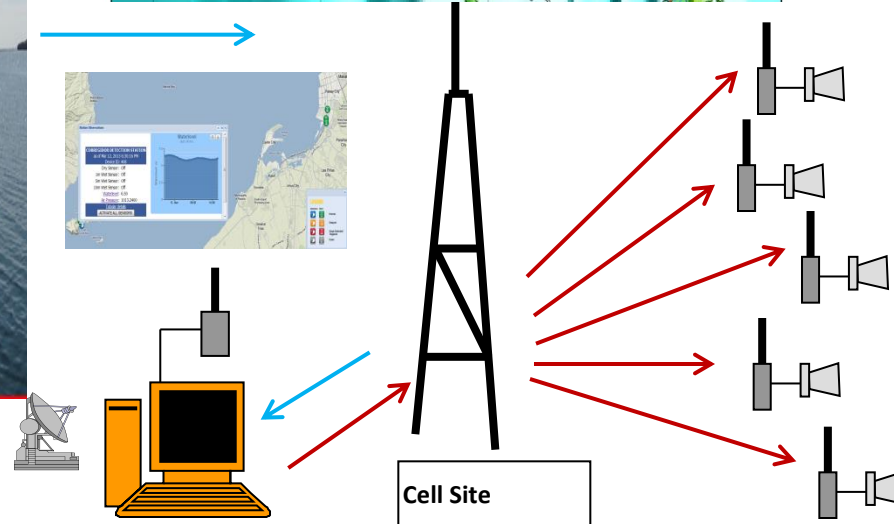
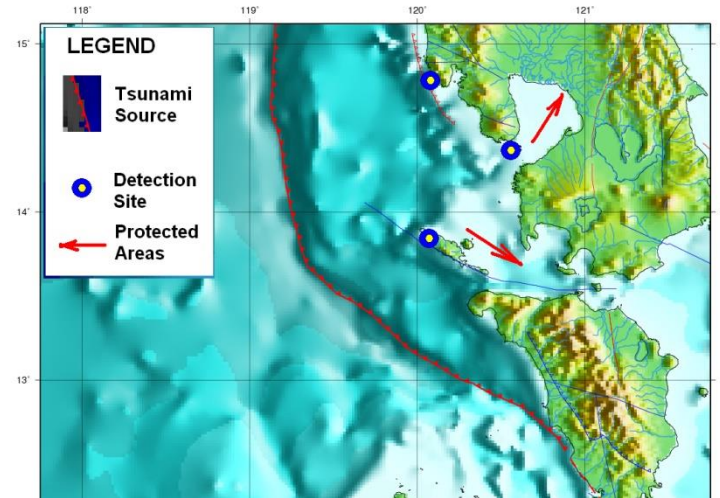


Tsunami Observation for community Warning Evacuation and Resilience (TOWER)



Community Tsunami early Warning System – PHIVOLCS

Tsunami Detection Stations



PHIVOLCS/ASTI and LGUs
Tsunami Visualization and Decision Tool



Communities

2006-2007 READY PROJECT

GMMA READY, LGU-initiated

National-Initiated Community- Based Early Warning System (CBEWS)

2006

Gen Luna, Surigao del Norte
Diatagon, Linaga, Surigao del Sur

2007

Tandag, Surigao del Sur Bislig,
Surigao del Sur Canmanico,
Valencia Bohol San Pedro, Duero,
Bohol San Roque, Tolosa, Leyte
Bulak, Abuyog, Leyte

2008

Sogod, Southern Leyte
Pondol, Hinunangan, S. Leyte
Himatagon, Malibago, Sug-angon,
St Bernard, S. Leyte
Sta Mercedes, Maragondon, Cavite
Bucana, Ternate, Cavite
Mapalad, Dinalunga, Aurora
Palanan, Isabela

2009

Barobaybay, Lavezarez,
Northern Samar
Cabatuan, Palapag, N. Samar
Japitan, Dolores, Eastern Samar
Suribao, Borongan, E. Samar San
Miguel, Llorente, E. Samar

Post-READY Project

2011

Patar, Bolinao, Pangasinan

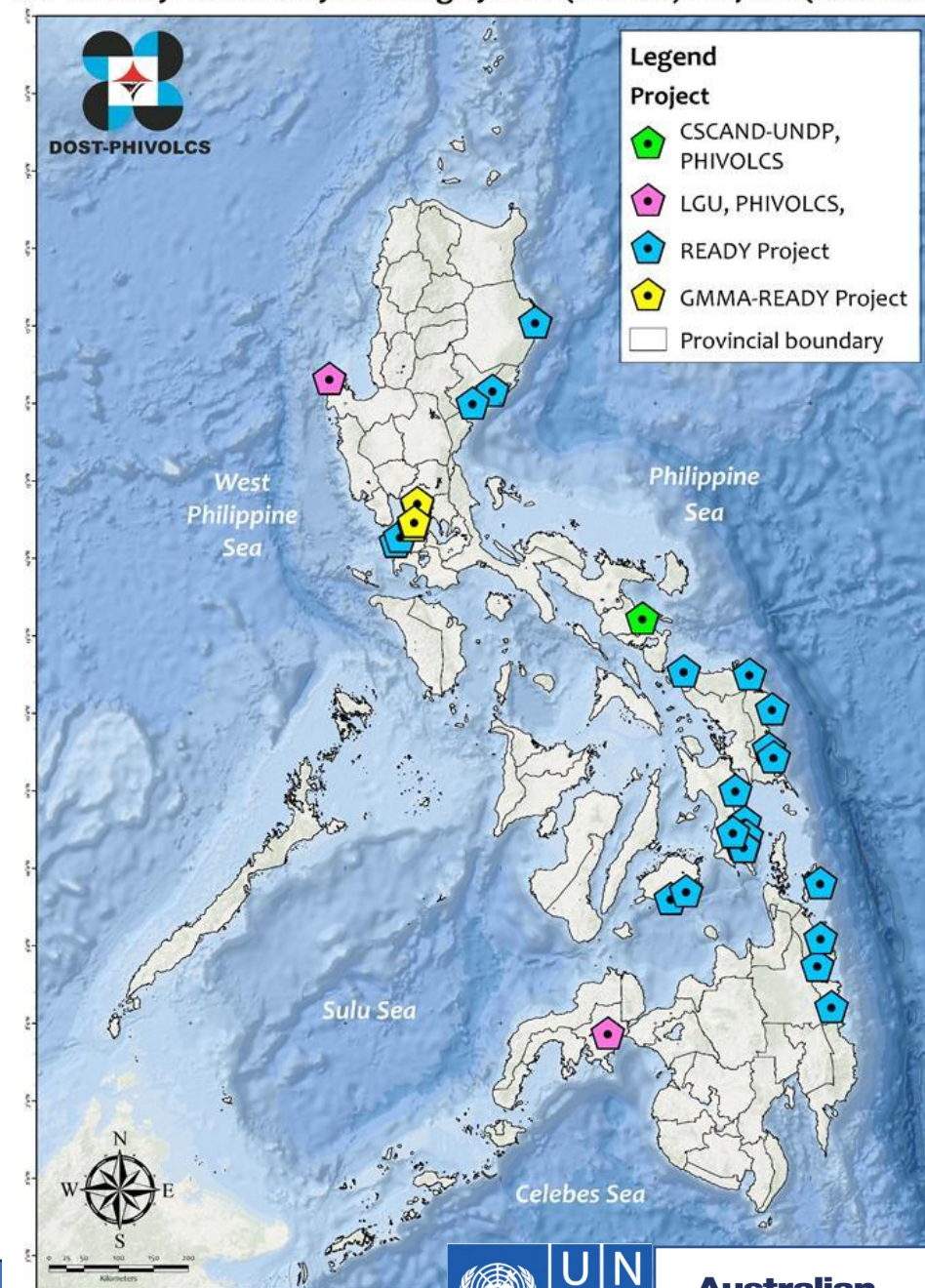
2014

Tanza, Navotas City
Hulo, Obando, Bulacan

2015

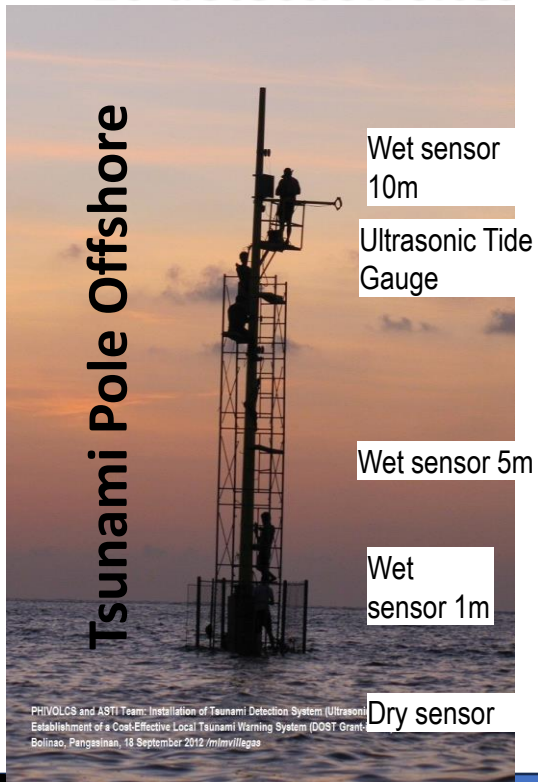
Lao-Lao, Cavite City
San Rafael, Novoleta

Community-Based Early Warning System (CBEWS) Projects (2006-2015)

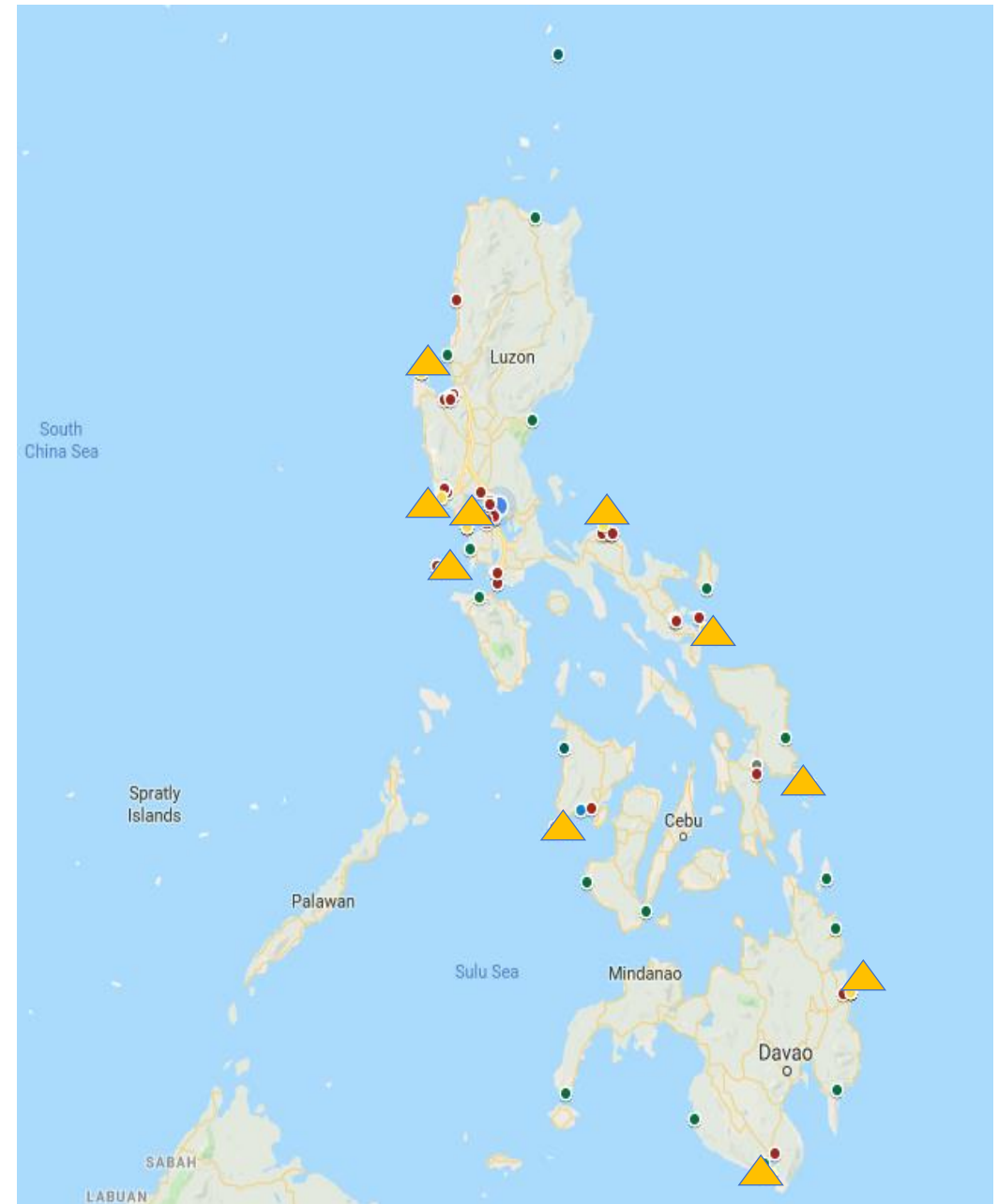


2010-2012: Establishment of a Cost-Effective Local Tsunami Early Warning System for Selected High-Risk Coastal Communities of the Philippines

▲ 10 detection sites



● 47 warning sirens



4.TSUNAMI INFORMATION MATERIALS DEVELOPEMNT



Tsunami Risk
Mitigation Program
(2006-2007)

Development of
Tsunami Information
materials

2015 Learning from the experiences of others



Fig. 6. A JICA-Philippines representative with the Director of PHIVOLCS unveiling the first two comics at the launching event, March 2013.



Enhancement of
Earthquake and
Volcano Monitoring
and Effective
Utilization of Disaster
Mitigation
Information in the
Philippines

Tsunami Comics on the
2011 event



DANAS Project: Earthquake,
tsunami and Volcano Disaster
Narratives for an Experiential
Knowledge-based Science
Communication

Earthquake and Tsunami
descriptions in the local
languages: Tagalog,
Kapampangan, Ilocano,
Cebuano (Visayas), Cebuno
(Mindanao) and Hiligaynon

2006-2007 DOST GIA Risk communication at the local level

TSUNAMI

A **TSUNAMI** is a series of giant sea waves commonly generated by under-the-sea earthquakes and whose heights could be greater than 5 meters. It is erroneously called tidal waves and sometimes mistakenly associated with storm surges. Tsunamis can occur when the earthquake is shallow-seated and strong enough to displace parts of the seabed and disturb the mass of water over it.



The coastal areas in the Philippines especially those facing the Pacific Ocean, South China Sea, Sulu Sea and Celebes Sea can be affected by tsunamis that may be generated by local earthquakes.

On 17 August 1974, a M7.5 earthquake in Moro Gulf produced tsunamis which devastated the southwest coast of Mindanao and left more than 3,000 people dead, with at least 1,000 people missing. More than 8,000 people were injured and approximately 12,000 families were rendered homeless by more than 5-meter high waves.

The 15 November 1984 Mindoro Earthquake also generated tsunamis that left 23 casualties.

These tsunamis occurred within a very short time, with a first wave reaching the shoreline nearest the epicenter, 2 to 5 minutes after the main earthquake. These tsunamis were both locally generated. There will not be enough time for warning in case of locally generated tsunamis.

Tsunamis may also be generated from distant locations, such as those coming from other countries bordering the Pacific Ocean like Chile, Alaska in the USA and Japan (for *tsunami*). The tsunami of 2 May 1960 that was generated by a strong earthquake from Chile killed 61 in Hilo, Hawaii while 20 people were reportedly killed in the Philippines. Travel times for tsunamis generated in distant locations are longer (1 to 24 hours) and will generally give enough time for warning from the Pacific Tsunami Warning Center (PTWC) and Northwest Pacific Tsunami Advisory Center (NWPATAC).

Reprinted 2007 from DOST

SOME NATURAL SIGNS OF AN APPROACHING LOCAL TSUNAMI



A fish earthquake.
Unusual sea level change: tides are water retreat or rise.
Furrowing sound of approaching waves.

TSUNAMI PREPAREDNESS AND SAFETY



Do not stay in low-lying coastal areas after a strong earthquake. Move to higher grounds immediately.
Never go down the beach to watch for a tsunami. When you can see the waves, you are too close to escape it.

Conduct community-level awareness about earthquakes and tsunamis focused on natural signs of an approaching tsunami, warning and evacuation procedures. Pre-determine high ground in your area and identify routes to get there. Put up signage.

If unusual sea conditions like rapid lowering of sea level are observed, immediately move towards high ground.

During the retreat of sea level, interesting sights are often revealed. Fishes may be stranded on dry land thereby attracting people to collect them. Also, sandbars and coral flats may be exposed. These scenes tempt people to flock to the shoreline thereby increasing the number of people at risk. Stay out of danger areas until an "all clear" is issued by competent authority. A tsunami is not a single wave but a series of waves.

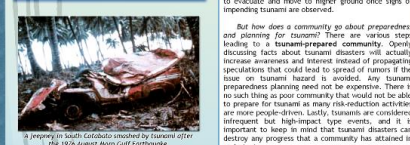


PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY (PHIVOLCS) Department of Science and Technology (DOST) DEVELOPING A TSUNAMI PREPARED COMMUNITY

Together we can save lives

In the past, people have assumed that emergency planning and preparedness is the sole responsibility of the government, but as proven in the many disasters that have occurred in recent years, positive community response to a crisis can save more lives especially if all sectors in the community have a role to play in its disaster risk mitigation efforts.

The role of national government agencies is to help the local government units and the communities by developing and implementing national programs that would cooperate the communities for disaster preparedness. These include advocacy to policy makers and planners to integrate specific disaster mitigation plans in the national development plan and generating and providing the right information that can be used towards developing a disaster-resilient nation. However, the activities at the national level alone will not save any lives if people at the community level will not use the information made available and are not prepared mentally and physically to respond. For the case of tsunami based on a strong earthquake, the coastal communities must take on the responsibility for their own safety.



But how does a community go about preparedness and planning for tsunami? There are various steps leading to a tsunami-prepared community. Openly discussing facts about tsunami disasters will actually increase awareness and interest instead of propagating speculations that could lead to spread of rumors. If the issue on tsunami hazard is avoided, any tsunami preparedness planning would be ineffective. There is no such thing as a poor community that would not be able to prepare for tsunami as many risk-reduction activities are more people-driven. Lastly, tsunamis are considered infrequent but high-impact type events and it is important to keep in mind that tsunami disasters can destroy any progress that a community has attained in an instant.

What is a tsunami? A tsunami is a series of sea waves commonly generated by under-the-sea earthquakes and whose heights could be greater than 5 meters. For so long, it has been erroneously called tidal waves and still often mistakenly associated with storm surges that coastal waves due to strong winds during a storm event. Tsunamis can occur when the earthquake is shallow-seated and strong enough to vertically displace parts of the seabed and disturb the mass of water over it.

The coastal areas in the Philippines can be affected by tsunamis that may be generated by local earthquakes. Locally generated tsunamis can occur within very short time, with the first waves reaching the nearest shoreline from the epicenter in 2 to 5 minutes after the main earthquake, before any official warnings can be transmitted from the national level to the community level.

KNOW THE HAZARD



PHIVOLCS TSUNAMI KOMIKS



PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY

TSUNAMI SAFETY AND PREPAREDNESS

Do not stay in low-lying coastal areas after a strong earthquake. Move to higher grounds immediately.

If unusual sea conditions like rapid lowering of sea level are observed, immediately move towards high grounds.

Never go down the beach to watch for a tsunami. When you see the wave, you are too close to escape it.

During the retreat of sea level, interesting sights are often revealed. Fishes may be stranded on dry land thereby attracting people to collect them. Also, sandbars and coral flats may be exposed. These scenes tempt people to flock to the shoreline thereby increasing the number of people at risk.

Stay out of danger areas until "all clear" is issued by competent authority. A tsunami is not a single wave but a series of waves.

- Conduct community-level awareness about earthquakes and tsunamis focused on natural signs of an approaching tsunami, warning and evacuation procedure.
- Pre-determine high ground in your area and identify routes to get there.
- Put up signage.

Department of Science and Technology
PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY
PHIVOLCS Bldg., C.P. Garcia Ave.,
U.P. Campus, Diliman, Quezon City, Philippines
Tel. Nos. 02-7681-6274/6284-9200/1-4261 exts to 79
PHIVOLCS Website: www.phivolcs.dost.gov.ph

Prepared by: M.L. Martinez-Villages
R.A. Arante

November 2006
Printed with support from DOST-GIA/Quadrant

Reprinted November 2008

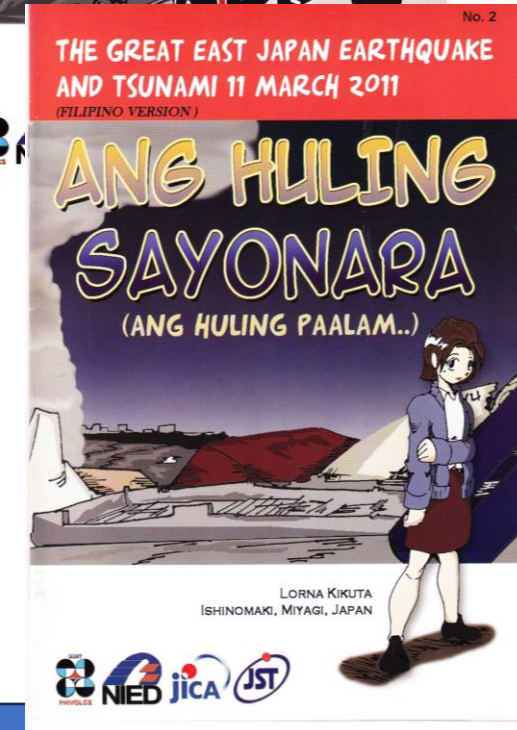
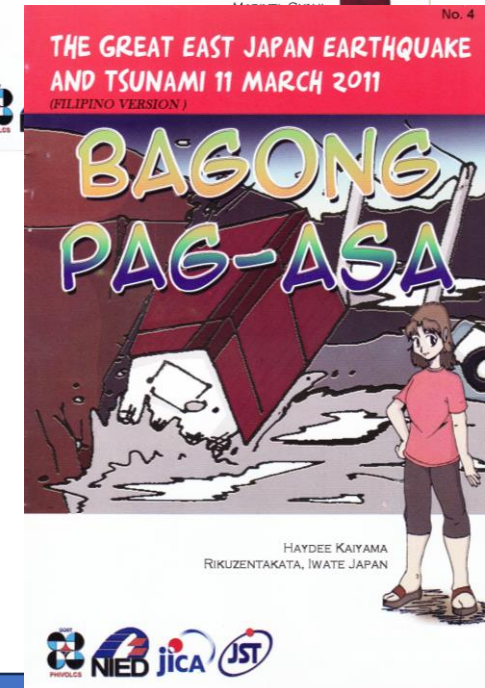
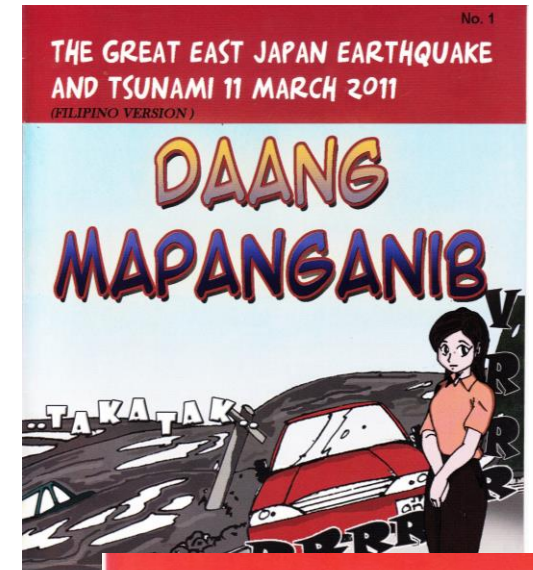
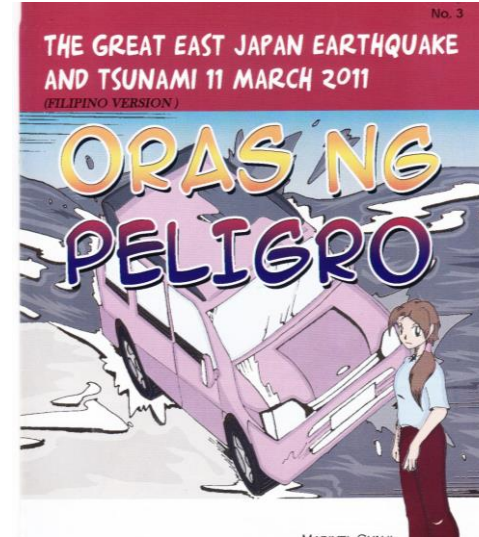
TSUNAMI RISK MITIGATION PROGRAM '06-'07



2010-2015 Learning from the experiences of others



Fig. 6. A JICA-Philippines representative with the Director of PHIVOLCS unveiling the first two comics at the launching event, March 2013.



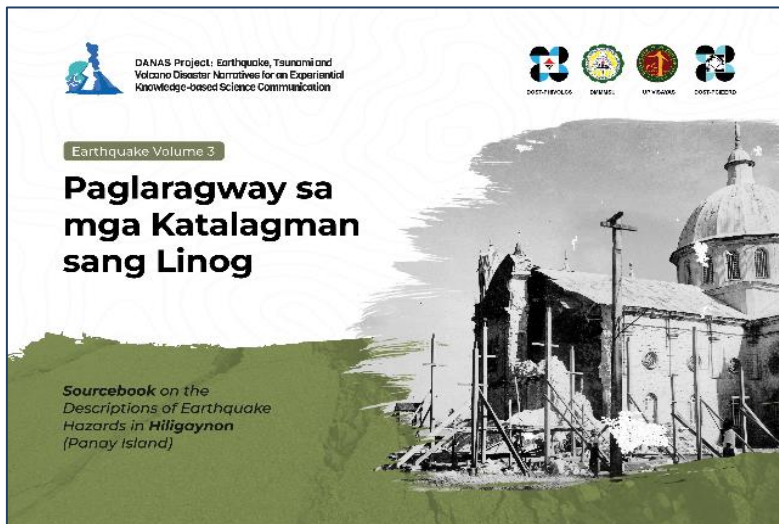
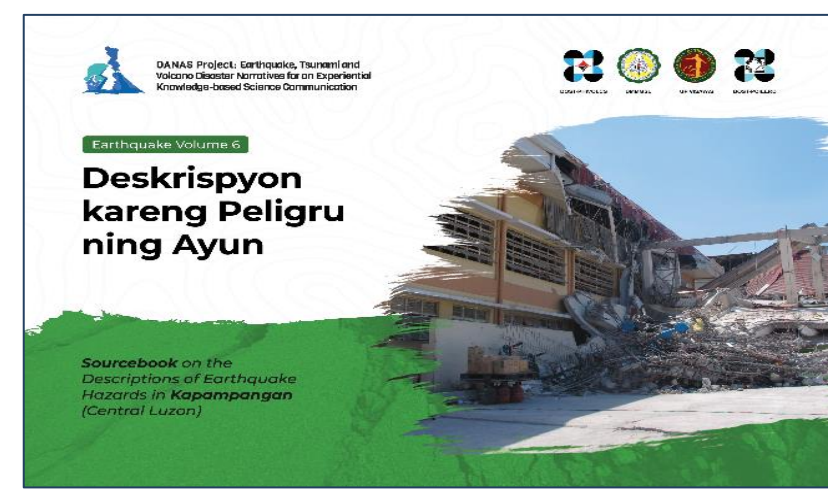
Ilocano for Northern Luzon Earthquakes



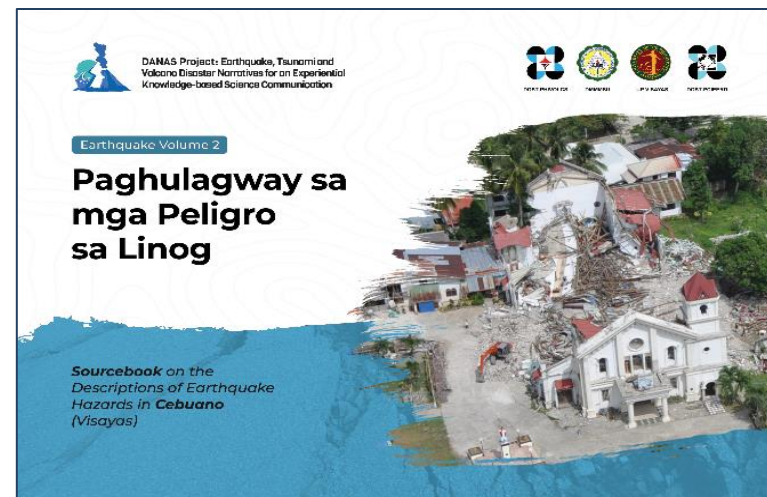
Tagalog for Aurora, Nueva Ecija Earthquakes



Kapampangan



Hiligaynon Panay Earthquakes



Cebuano for Negros and Bohol Earthquakes



Cebuano for Mindanao Earthquakes



5.COMMUNITY CAPACITY BUILDING



3R LGU (multi-hazard IEC campaign and includes topics about tsunami)
Developed roll out plan for provinces and monitoring tool

3R Tsunami Ready Community

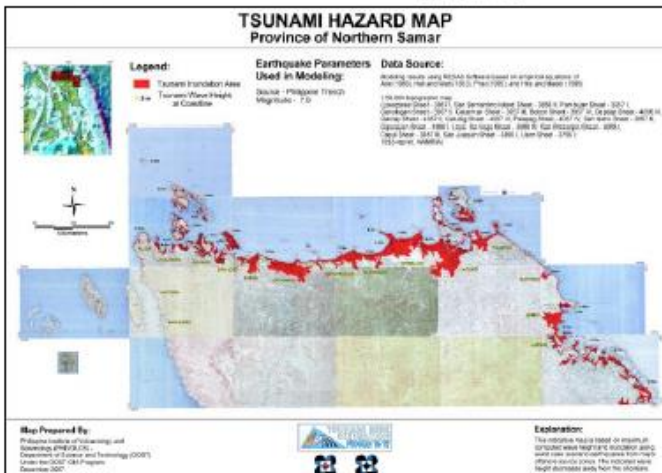
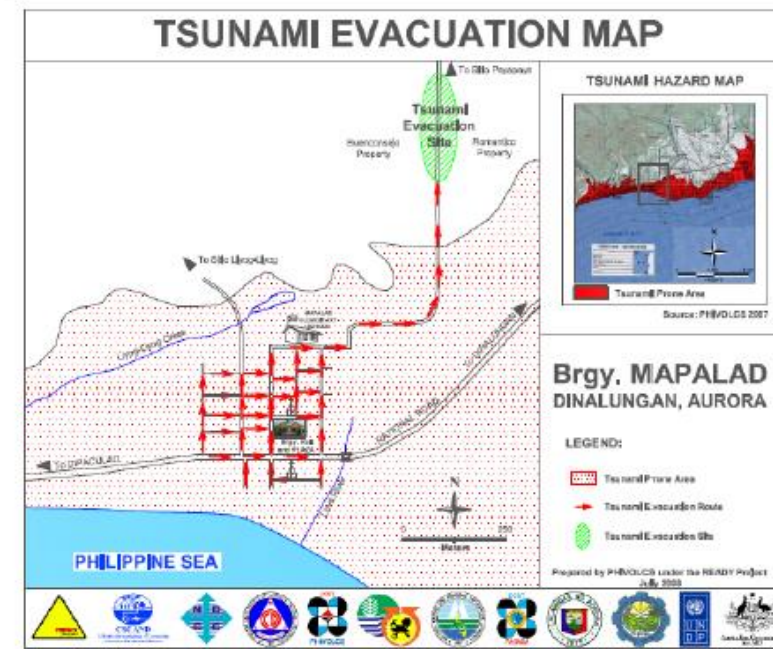


Develop Communities that are ready to evacuate in the event of tsunami occurrence

PHIVOLCS



COMMUNITY

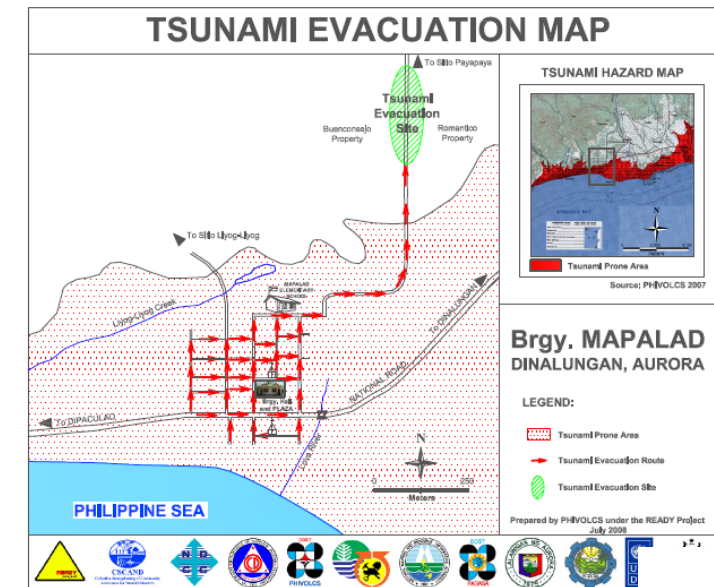


2006-2007 READY PROJECT

Community-based early warning system for tsunami and conduct tsunami preparedness drills in communities

- *Evacuation plans and maps*
- *Signage installation*
- *IEC seminars*
- *Community Drills*

Installed by partnership LGUs and implementing NGAs



6.PROMOTION OF AWARENESS AND PREPAREDNESS



Media
Seminar



PressCons



Exhibit
Tsunami
tank



World
Tsunami
Awareness
Day





National Consultation Workshop for Harmonized Tsunami Program 2019

- Venue for a coordinated multi-agency, multi-stakeholder discussion
- Identify current, ongoing initiatives of various organizations on Tsunami DRR
- Identify timetable of implementation of existing Tsunami DRR activities from various organizations for more coordinated activities



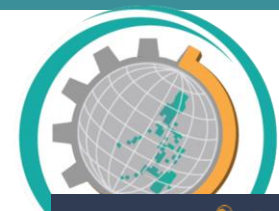
National Harmonized Tsunami DRR 2020 (virtual, focus on Clusters 1,2,3 (Mindanao))

- Platform/venue for a coordinated multi-agency, multi-stakeholder discussion
- Toolkit/manual/unified template for reporting past accomplishments, current initiatives and short-term plans/programs on Tsunami DRR
- Create and maintain platform for reporting Tsunami DRRM-related initiatives that is accessible to all partners



National Harmonized Tsunami DRR 2021 (virtual, Clusters 1-9)

- Platform/venue for a coordinated multi-agency, multi-stakeholder discussion
- Toolkit/manual/unified template for reporting past accomplishments, current initiatives and short-term plans/programs on Tsunami DRR
- Create and maintain platform for reporting Tsunami DRRM-related initiatives that is accessible to all



GeoRiskPH™

Nationwide Tsunami Coping Capacity Initiatives

GeoRiskPH
INNOVATIONS FOR RESILIENCE

Dashboard

OTHER GEORISKPH PLATFORMS



GeoAnalyticsPH



HazardHunterPH



PlanSmartPH



Philippine Standard Time: Friday, April 25, 2025 at 4:21:28 PM

Mara Joy Pancho



Data Collection Tool - For Trainings Only

Training GeoMapperPH

[View Application](#)



Data Collection Tool - For Trainings Only

Training GeoMapperPH

[View Application](#)

Nationwide Tsunami Coping Capacity Initiatives

GeoRiskPH Feedback Form HazardHunterPH GeoAnalyticsPH

Layer List Legend

- ☐ PSA - Barangay boundary (Tsunami DRR Survey) ...
- ☐ PSA - City/Municipal boundary (Tsunami DRR Survey) ...
- ☐ PSA - Provincial boundary (Tsunami DRR Survey) ...
- ☒ Tsunami Signages (point location) ...
- ☒ Community-based EWS (point location) ...
- ☒ Schools that Conducted Tsunami Drills ...
- ☒ Coastal and Tsunami-Prone LGUs (viewing only) ...
- ☐ LGUs that conducted TEWS (viewing only) ...
- ☐ LGUs with Mangrove Planting (viewing only) ...

Query

Search Results

- ☐ Search City/Municipality
- ☐ Search Province

Find address or place

1. Use the Query or Search bar to zoom in to your LGU

Tasks Results

- ☐ Search City/Municipality
- ☐ Search Province

2. Turn on the City/Municipal or Provincial boundary (Tsunami DRR Survey) in the Layer List

Layers

- ☐ Barangay boundary (Tsunami DRR Survey) ...
- ☒ City/Municipal boundary (Tsunami DRR Survey) ...
- ☒ Provincial boundary (Tsunami DRR Survey) ...

3. Click the LGU boundary on the map and select "Smart Editor" in the ellipse options

(1 of 2)

LGU used Tsunami Hazard Map from PHIVOLCS Yes

LGU used Tsunami Hazard Map from other sources Yes

Please provide tsunami hazard map details (year used, etc.)

Please identify specific LGUs with tsunami evacuation map

LGU conducted Tsunami risk assessment Yes

LGU identified training needs Yes

127.732 6.599 Degrees

Earthstar Geographics | Google | Acknowledge Department of Energy

esri

2019-2021 Tsunami Summit



National Tsunami Ready Board (NTRB) creation

2022

- Dec. 6/15 – PHIVOLCS request to OCD to create NTRB
- Dec 19 – OCD acknowledged and assigned PDPS

2023

- March 6 -Oct-Dec – Series of meetings, presentations and discussions, Writeshop, Drafting of MC

2024

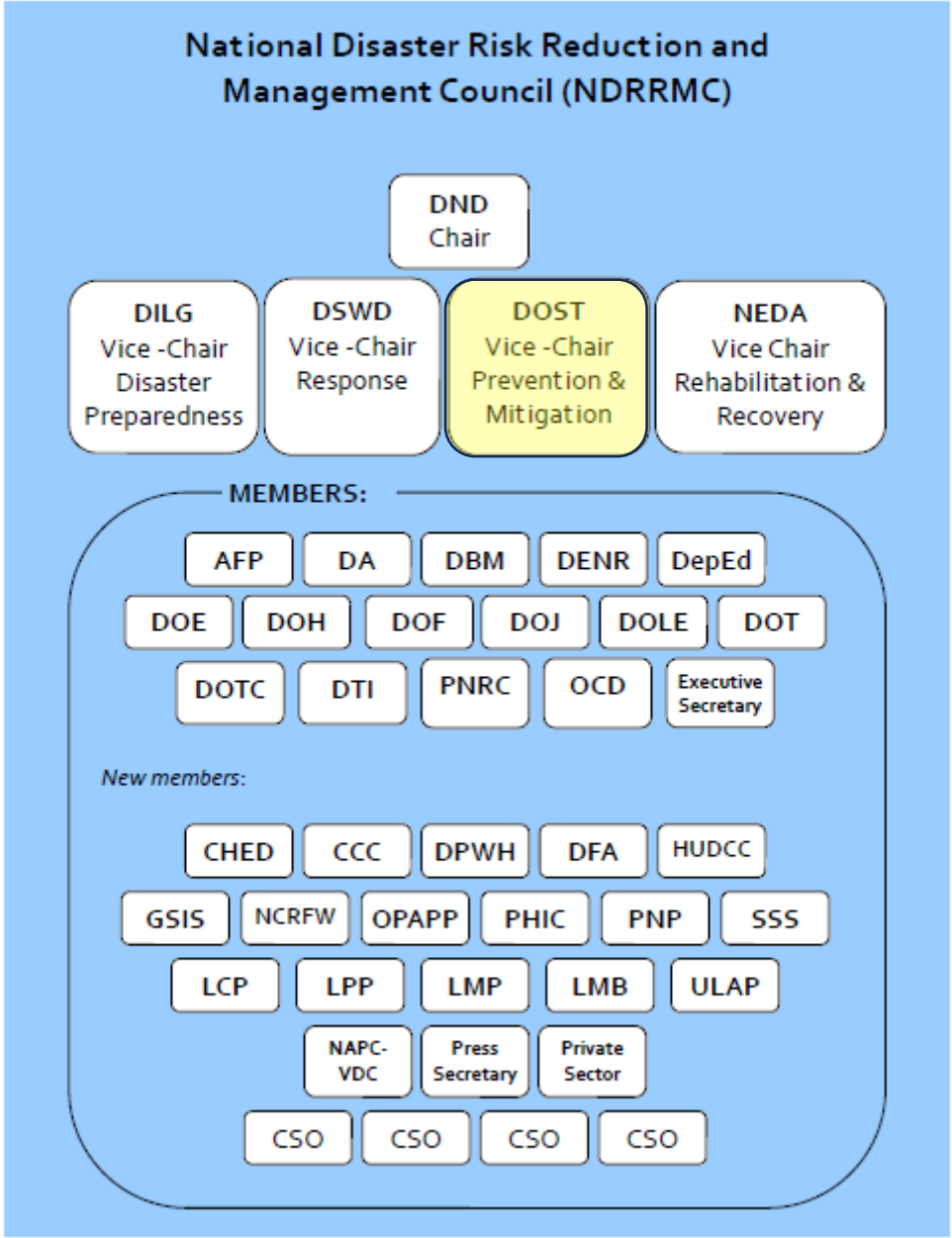
- Jan 17 – submitted draft MC to P&M Pillar
- Jan – Feb – series of discussions re MC

2025

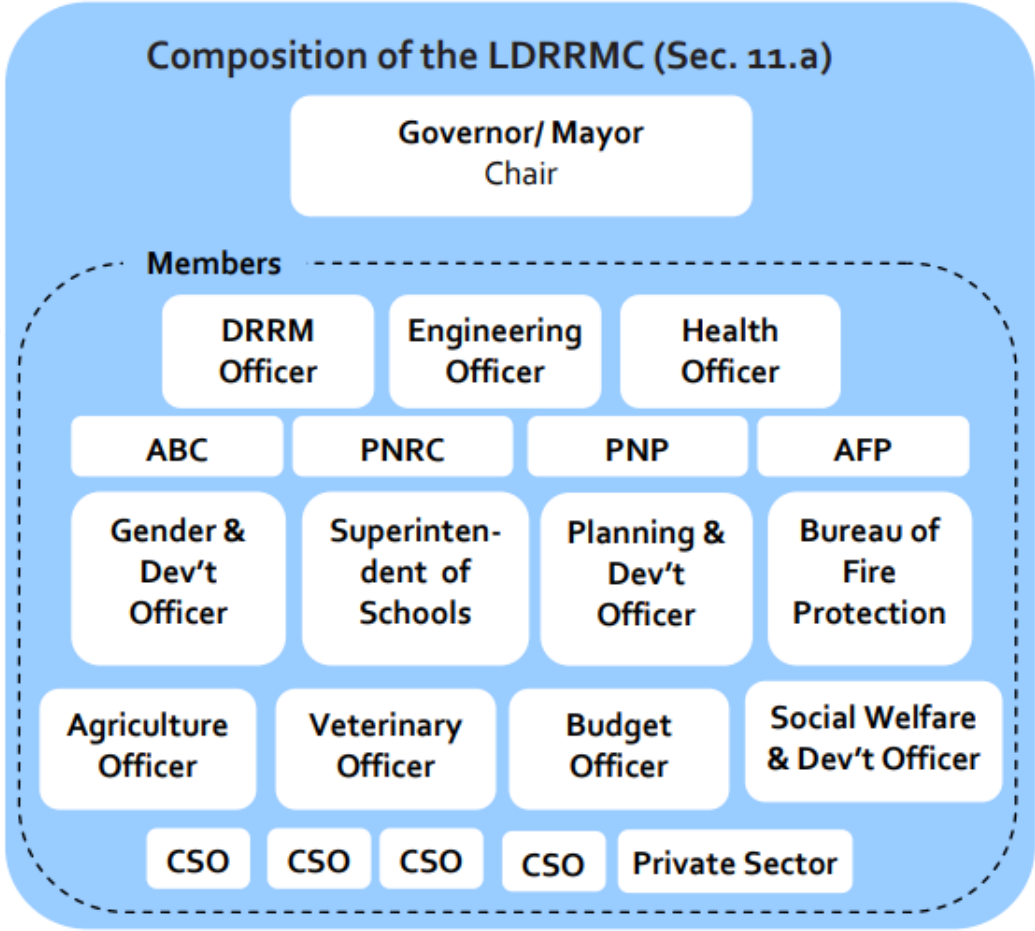
Ways Forward
Series of
meetings
October 2025

Composition
Office of Civil Defense
PHIVOLCS
DILG
+other agencies





R.A. 10121 of 2010- DRR Law



Tsunami Ready Philippines National Workshop

8-9 December 2025



2026-2030

- Establishment of the National Tsunami Ready Board (with NDRMO as Head, multi agency membership)
- Implementation of the Tsunami Ready Philippines Program

