

Typhoon Haiyan 2013 Experience in the Philippines: Impacts in Water Disaster Management



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Outline of the Presentation

- Introduction
- Records of Disasters in the Philippines
- Typhoon Haiyan Experience
- Roles of Stakeholders in Disaster Management
- Future Perspectives
 - Academic Research
 - Collaboration and Networking with other country partners on Disaster Management

Introduction

- Disaster is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.
- Disasters are often described as a result of the combination of: the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences.

Source: Report on the Audit of Typhoon Yolanda Relief Operations (COA, Philippines 2014)

Introduction

- Disaster impacts may include loss of life, injury, disease and other negative effects on human, physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation.

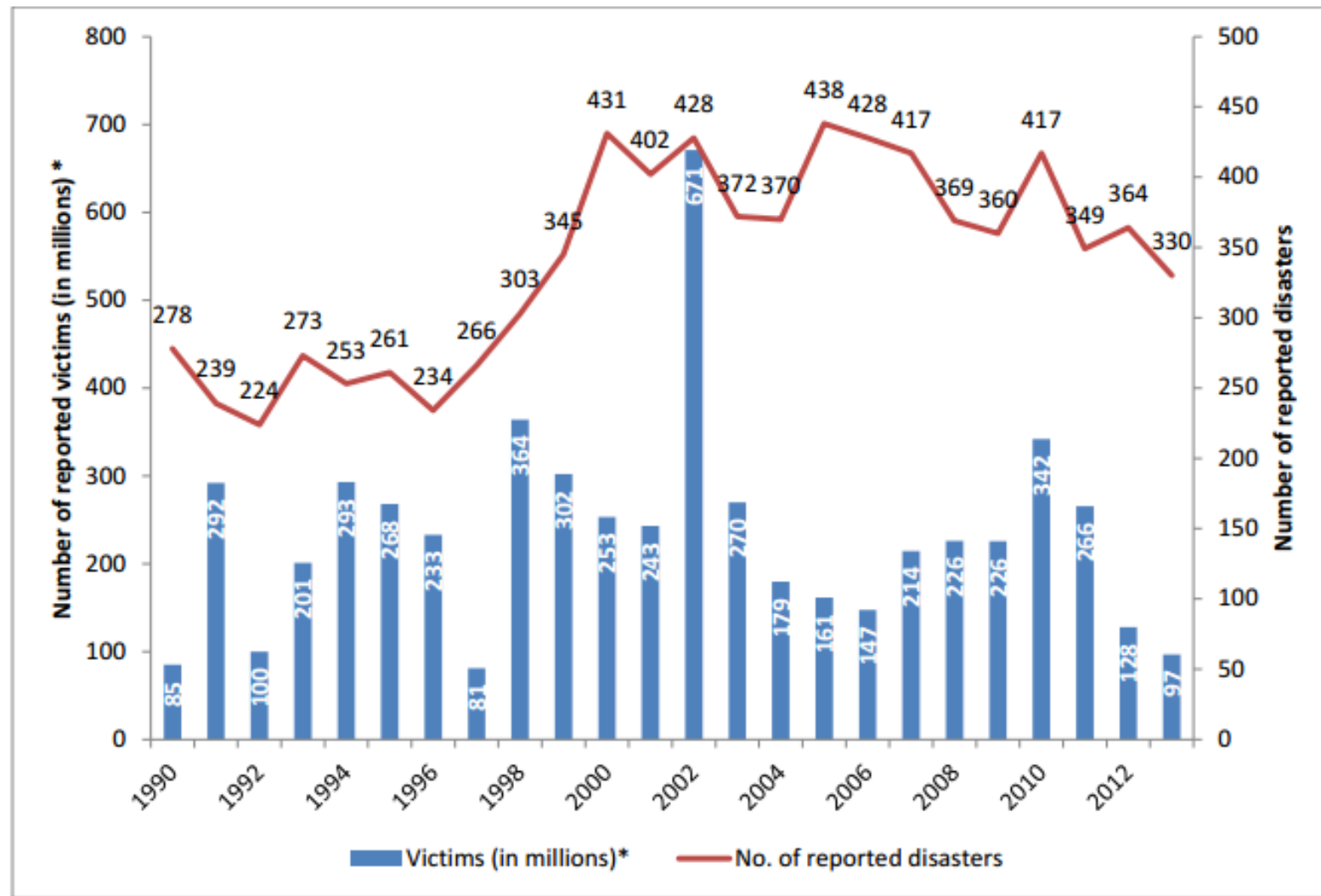
Source: Report on the Audit of Typhoon Yolanda Relief Operations (COA, Philippines 2014)

Table 1: Natural disaster subgroup definition and classification

Disaster Subgroup	Definition	Disaster Main Types
Geophysical	Events originating from solid earth	Earthquake, Volcano, Mass Movement (dry)
Meteorological	Events caused by short-lived/small to meso scale atmospheric processes (in the spectrum from minutes to days)	Storm
Hydrological	Events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up	Flood, Mass Movement (wet)
Climatological	Events caused by long-lived/meso to macro scale processes (in the spectrum from intra-seasonal to multi-decadal climate variability)	Extreme Temperature, Drought, Wildfire
Biological⁴	Disaster caused by the exposure of living organisms to germs and toxic substances	Epidemic, Insect Infestation, Animal Stampede

⁴Biological disasters are not included in this publication.

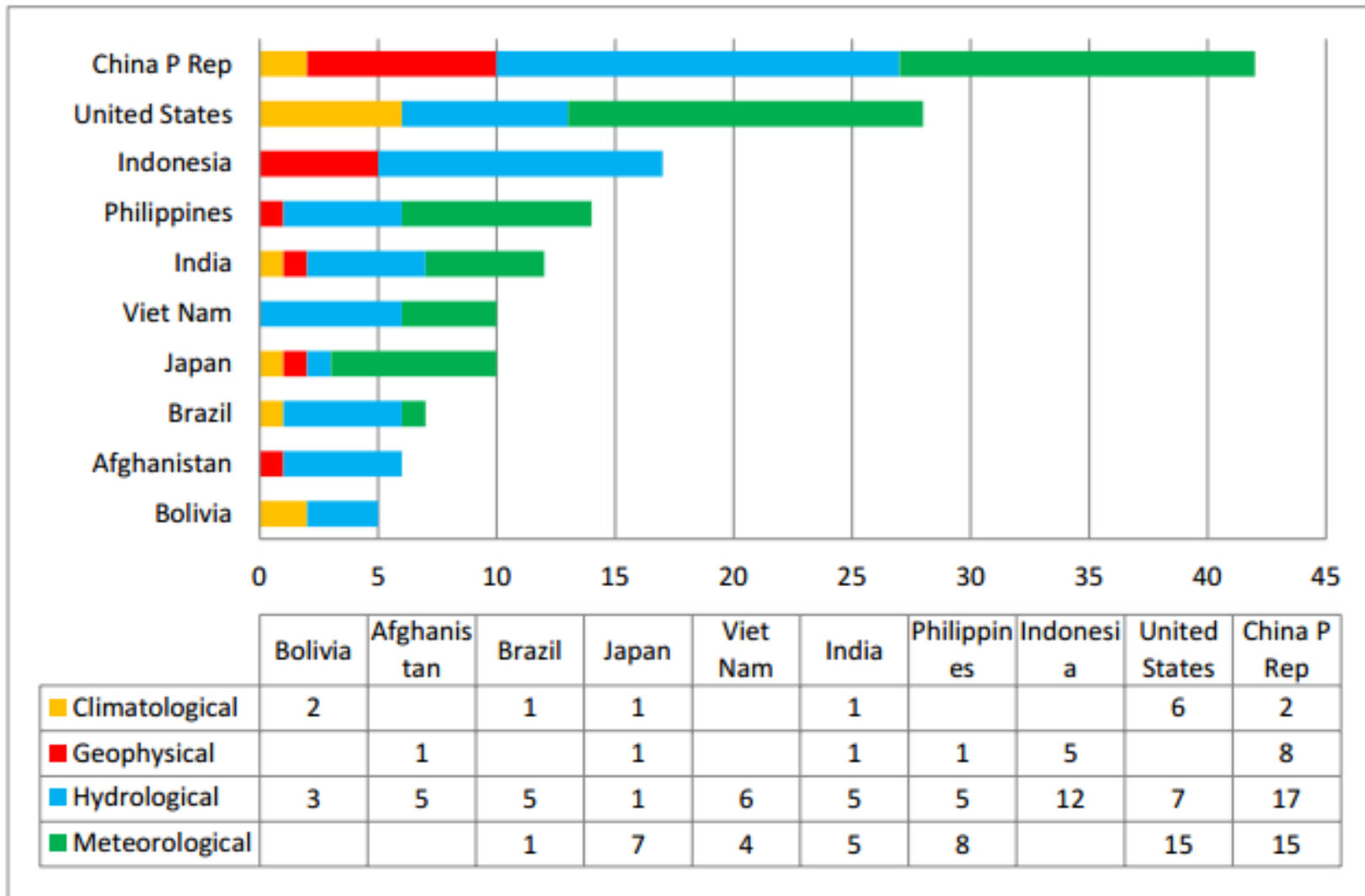
Source: Annual Disaster Statistical Review 2013 – The numbers and trends (CRED, 2014)



*Victims : Sum of deaths and total affected

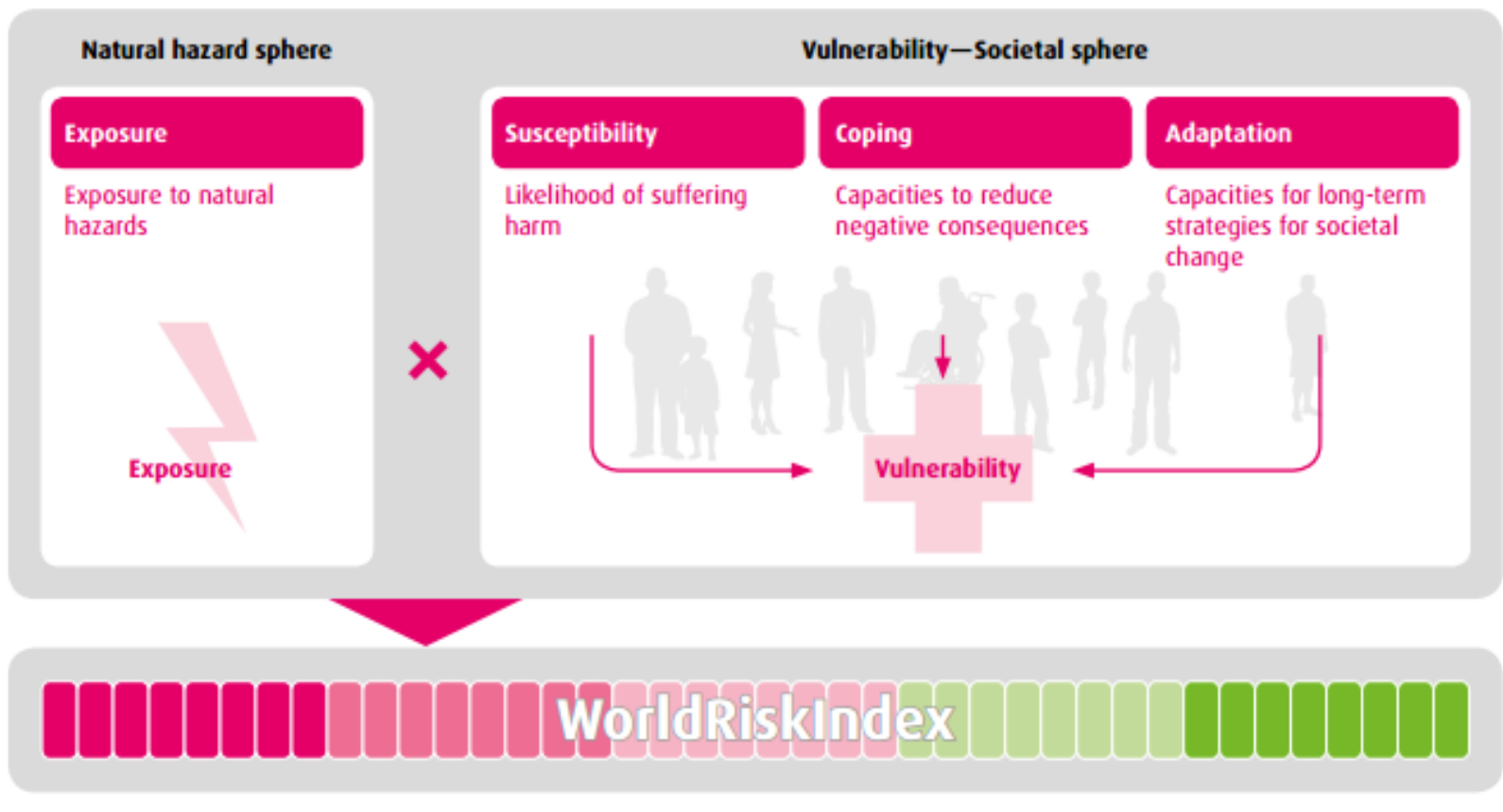
Source: Annual Disaster Statistical Review 2013 – The numbers and trends (CRED, 2014)

Figure 1. Trends in Occurrence and Victims



Source: Annual Disaster Statistical Review 2013 – The numbers and trends (CRED, 2014)

Figure 2. Top 10 countries by number of reported events in 2013



WorldRiskIndex		
Rank	Country	Risk (%)
1.	Vanuatu	36.43
2.	Tonga	28.23
3.	Philippines	27.52
4.	Guatemala	20.88
5.	Bangladesh	19.81
6.	Solomons	18.11
7.	Costa Rica	16.94
8.	Cambodia	16.90
9.	El Salvador	16.85
10.	Timor-Leste	16.37
11.	Papua-New Guinea	15.90
12.	Brunei Darussalam	15.80
13.	Mauritius	15.18
14.	Nicaragua	14.89
15.	Japan	14.10

very low	0.10 – 3.61
low	3.62 – 5.68
medium	5.69 – 7.43
high	7.44 – 10.37
very high	10.38 – 36.43
no data available	

Max. risk = 100%
Classification according to the quantile method

Source: World Risk Report 2013 (UNU-EHS)

Figure 3. World Risk Index and Its Components

Table 2a: Natural disasters in the Philippines (1990-2014)

Top 10 Natural Disasters in Philippines for the period 1900 to 2014 sorted by numbers of killed:		
Disaster	Date	No Killed
Storm	8-Nov-2013	7,986
Earthquake (seismic activity)	16-Aug-1976	6,000
Storm	5-Nov-1991	5,956
Earthquake (seismic activity)	16-Jul-1990	2,412
Storm	4-Dec-2012	1,901
Storm	29-Nov-2004	1,619
Storm	13-Oct-1970	1,551
Storm	15-Dec-2011	1,439
Storm	1-Sep-1984	1,399
Storm	30-Nov-2006	1,399

Source: "EM-DAT: The OFDA/CRED International Disaster Database

Table 2b: Natural disasters in the Philippines (1990-2014)

Top 10 Natural Disasters in Philippines for the period 1900 to 2014 sorted by numbers of total affected people:		
Disaster	Date	No Total Affected
Storm	8-Nov-2013	16,106,807
Storm	4-Dec-2012	6,246,664
Storm	12-Nov-1990	6,159,569
Storm	24-Sep-2009	4,901,763
Storm	21-Jun-2008	4,785,460
Storm	29-Sep-2009	4,478,491
Flood	6-Aug-2012	4,451,725
Storm	21-Oct-1998	3,902,424
Storm	27-Sep-2006	3,842,406

Source: "EM-DAT: The OFDA/CRED International Disaster Database

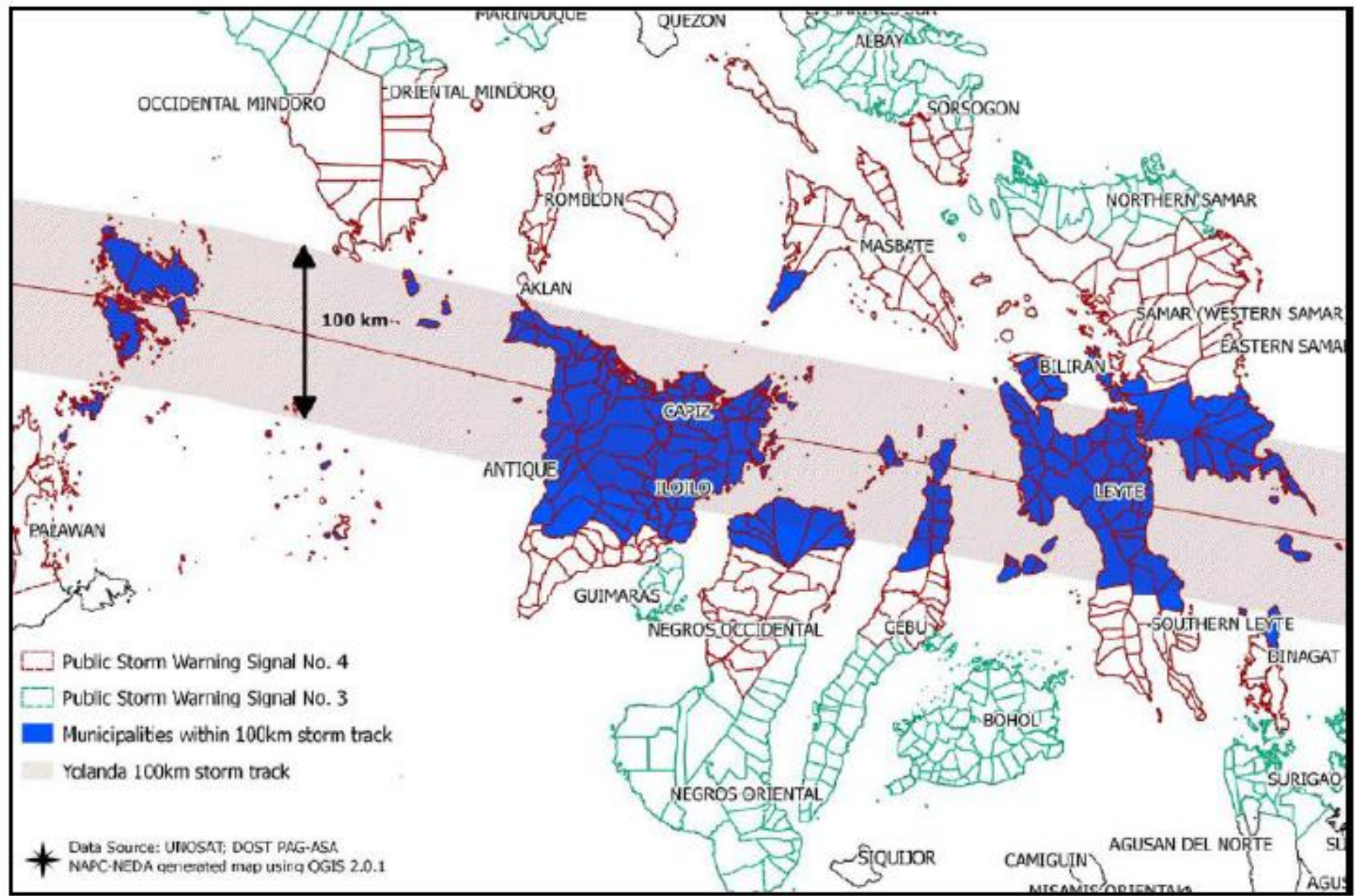
Table 2c: Natural disasters in the Philippines (1990-2014)

Top 10 Natural Disasters in Philippines for the period 1900 to 2014 sorted by economic damage costs:		
Disaster	Date	Damage (000 US\$)
Storm	8-Nov-2013	10,000,000
Flood	13-Aug-2013	2,190,000
Storm	4-Dec-2012	898,352
Flood	4-Sep-1995	700,300
Storm	29-Sep-2009	585,379
Storm	12-Nov-1990	388,500
Earthquake (seismic activity)	16-Jul-1990	369,600
Storm	24-Sep-2011	344,173
Storm	21-Jun-2008	284,694
Storm	18-Oct-2010	275,745

Source: "EM-DAT: The OFDA/CRED International Disaster Database

- The Philippines is one of the countries most vulnerable to the impacts of natural disasters
- Located within the Pacific Ring of Fire, it is prone to earthquakes and volcanic eruptions.
- An average of 20 tropical storms or typhoons impact the country each year.
- Since 2008, typhoons reaching the Philippines have become stronger and more devastating.
- Two of the most recent ones, Yolanda (Haiyan) and Pablo (Bopha), were considered category 5 storms with winds exceeding 251 km/h, which, according to the Saffir–Simpson hurricane scale, are the most powerful.

Source: Typhoon Yolanda Ongoing Recovery: Recovery Framework Case Study/August 2014 (WB, UNDP, EU)



Source: Reconstruction Assistance on Yolanda (NEDA, 2013)

Figure 4. Map of 100km Storm Track of Typhoon Yolanda

Table 3a: Typhoon Haiyan (Yolanda) disaster profile impact

Number of severely affected province	14 provinces¹
Population affected	16 million²
Number of fatalities	6,268 reported casualties³
Number of injuries	28,626⁴
Most affected sectors (based on needs)	Housing, Industry and Services
Estimated overall damage (USD)	US\$12.9B
Estimated overall impact (% of GDP)	.90%⁶

Sources: ¹ Office of the Presidential Assistant for Recovery and Reconstruction (OPARR). (2014). *Yolanda Rehabilitation and Recovery Efforts*. ² National Disaster Risk Reduction and Management Council (NDRRMC). (2014). *SitRep No. 107 re Effects of Typhoon Yolanda (Haiyan)*. ³ NDRRMC, 2014. ⁴ NDRRMC, 2014. ⁵ National Economic Development Council. (2013). *Reconstruction Assistance on Yolanda*

Source: Typhoon Yolanda Ongoing Recovery: Recovery Framework Case Study/August 2014 (WB, UNDP, EU)

Disaster Related Laws and Regulations

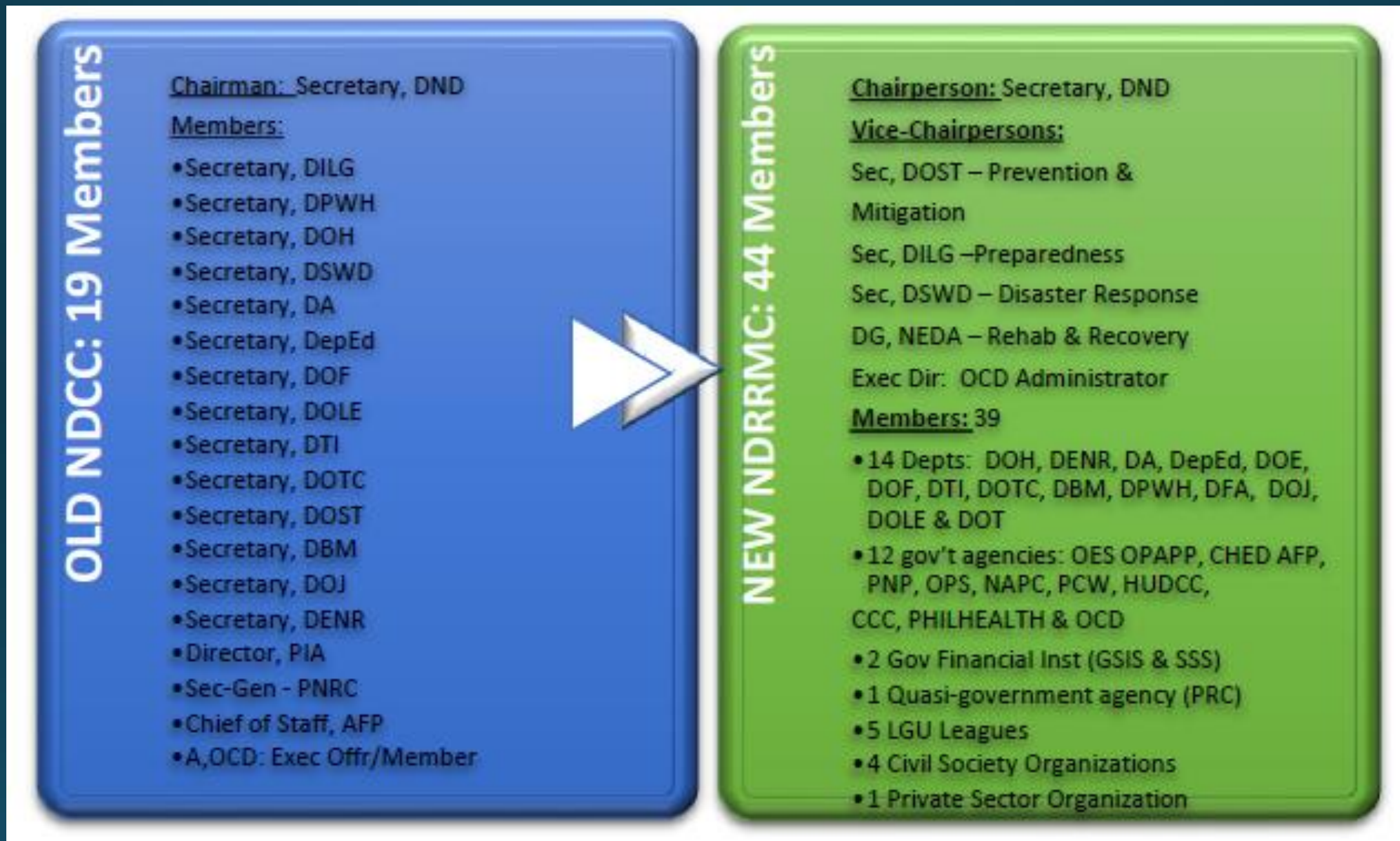
- Presidential Decree (PD) 1566 entitled "Strengthening the Philippine Disaster Control, Capability and Establishing the National Program on Community Disaster Preparedness," issued on June 11, 1978, is the country's basic law on disaster management. It lays down the policy, institutional and operational framework for the disaster risk management system in the country.
- National Calamities and Preparedness Plan approved in 1983 was revised and issued in August 1988 together with the Implementing Rules and Regulations of PD 1566.

- Climate Change Act of 2009 and Republic Act (RA) 10121 or the Philippine Disaster Risk Reduction and Management Act of 2010 (PDRRM-2010)

common goals and objectives:

to increase resilience of communities and the country against natural disasters and reduce damage and losses due to disasters

- The institutional framework for disaster risk management is provided in the Philippine Disaster Risk Reduction and Management (DRRM) Act of 2010.
- The Act establishes a National DRRM Council (NDRRMC) composed of the heads of 36 government agencies, as well as private sector and civil society representatives. The NDRRMC is responsible for setting policy, coordinating and supervising DRRM activities, and conducting monitoring and evaluation.
- The National Council is chaired by the Secretary of National Defense, together with 4 vice chairs, each overseeing a thematic area: the Secretary of the Department of Interior and Local Government (DILG) for Disaster Preparedness; the Secretary of the Department of Social Welfare and Development (DSWD) for Disaster Response; the Secretary of the Department of Science and Technology (DOST) for Disaster Prevention and Mitigation; and the Director General of the National Economic and Development Authority (NEDA) for Disaster Rehabilitation and Recovery. The Office of Civil Defense (OCD) acts as the Secretariat of the NDRRMC.



Source: Report on the Audit of Typhoon Yolanda Relief Operations (COA, Philippines 2014)

Figure 6. Expanded Membership of the NDRRMC Under RA 10121



Source: Report on the Audit of Typhoon Yolanda Relief Operations (COA, Philippines 2014)

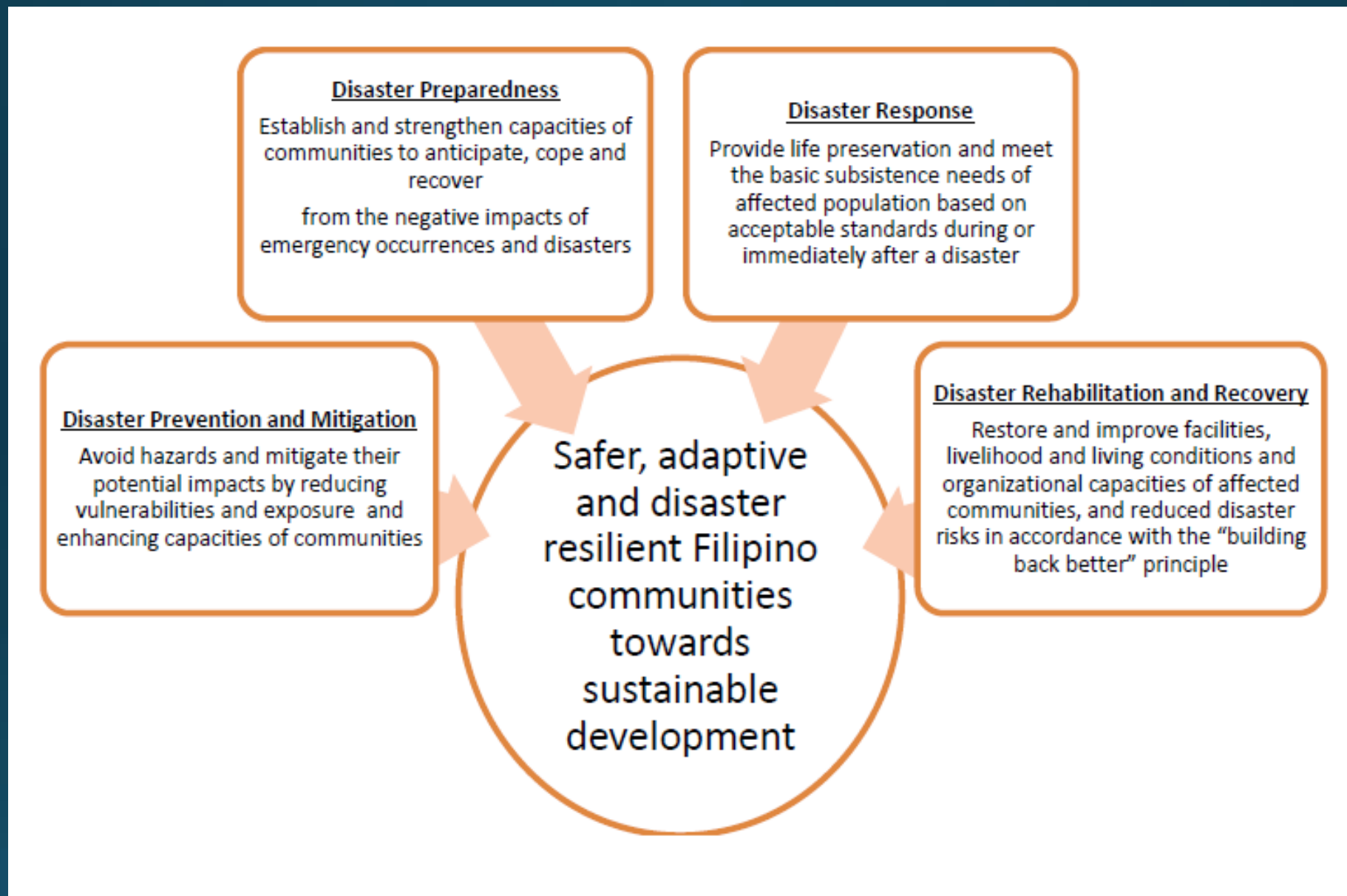
Figure 7. DRRM Council Networks

The National Disaster Risk Reduction and Management Plan (NDRRMP)

- The NDRRMP for 2011-2028, approved on February 7, 2012, is the road map on how DRRM shall contribute to sustainable development



Figure 8. NDRRMP



Source. NDRRMC

Figure 9. DRRM Priority Areas and Long-Term Goals

Thematic Area 1: Disaster Prevention and Mitigation

Overall responsible agency: Department of Science and Technology (DOST)

Outcome	Lead agency(ies)
1. DRRM and CCA mainstreamed and integrated in national, sectoral, regional and local development policies, plans and budget	Office of Civil Defense (OCD)
2. DRRM and CCA-sensitive environmental management	Department of Environment and Natural Resources (DENR)
3. Increased resiliency of infrastructure systems	Department of Public Works and Highways (DPWH)
4. Enhanced and effective community-based scientific DRRM and CCA assessment, mapping, analysis and monitoring	OCD
5. Communities access to effective and applicable disaster risk financing and insurance	Department of Finance (DOF)
6. End-to-end monitoring (monitoring and response), forecasting and early warning systems are established and/or improved	Department of Science and Technology (DOST)

Thematic Area 2: Disaster Preparedness

Overall responsible agency: Department of Interior and Local Government (DILG)

Outcome	Lead agency(ies)
7. Increased level of awareness and enhanced capacity of the community to the threats and impacts of all hazards	Philippine Information Agency (PIA)
8. Communities are equipped with necessary skills and capability to cope with the impacts of disasters	Department of Interior and Local Government (to coordinate) and OCD (to implement)
9. Increased DRRM and CCA capacity of Local DRRM Councils, Offices and Operation Centers at all levels	DILG
10. Developed and implemented comprehensive national and local preparedness and response policies, plans, and systems	DILG and OCD
11. Strengthened partnership and coordination among all key players and stakeholders	DILG

Source. NDRRMC

Thematic Area 3: Disaster Response

Overall responsible agency: Department of Social Welfare and Development (DSWD)

Outcome	Lead agency(ies)
12. Well-established disaster response operations	Department of Social Welfare and Development (DSWD)
13. Adequate and prompt assessment of needs and damages at all levels	Disaster Risk Reduction and Management Councils (DRRMCs), OCD and DSWD
14. Integrated and coordinated Search, Rescue and Retrieval (SRR) capacity	Department of National Defense (DND), DILG, Department of Health (DOH)
15. Safe and timely evacuation of affected communities	Local government units (LGUs)
16. Temporary shelter needs adequately addressed	DSWD
17. Basic social services provided to affected population (whether inside or outside evacuation centers)	DOH
18. Psychosocial needs of directly and indirectly affected population addressed	DOH
19. Coordinated, integrated system for early recovery implemented	DSWD

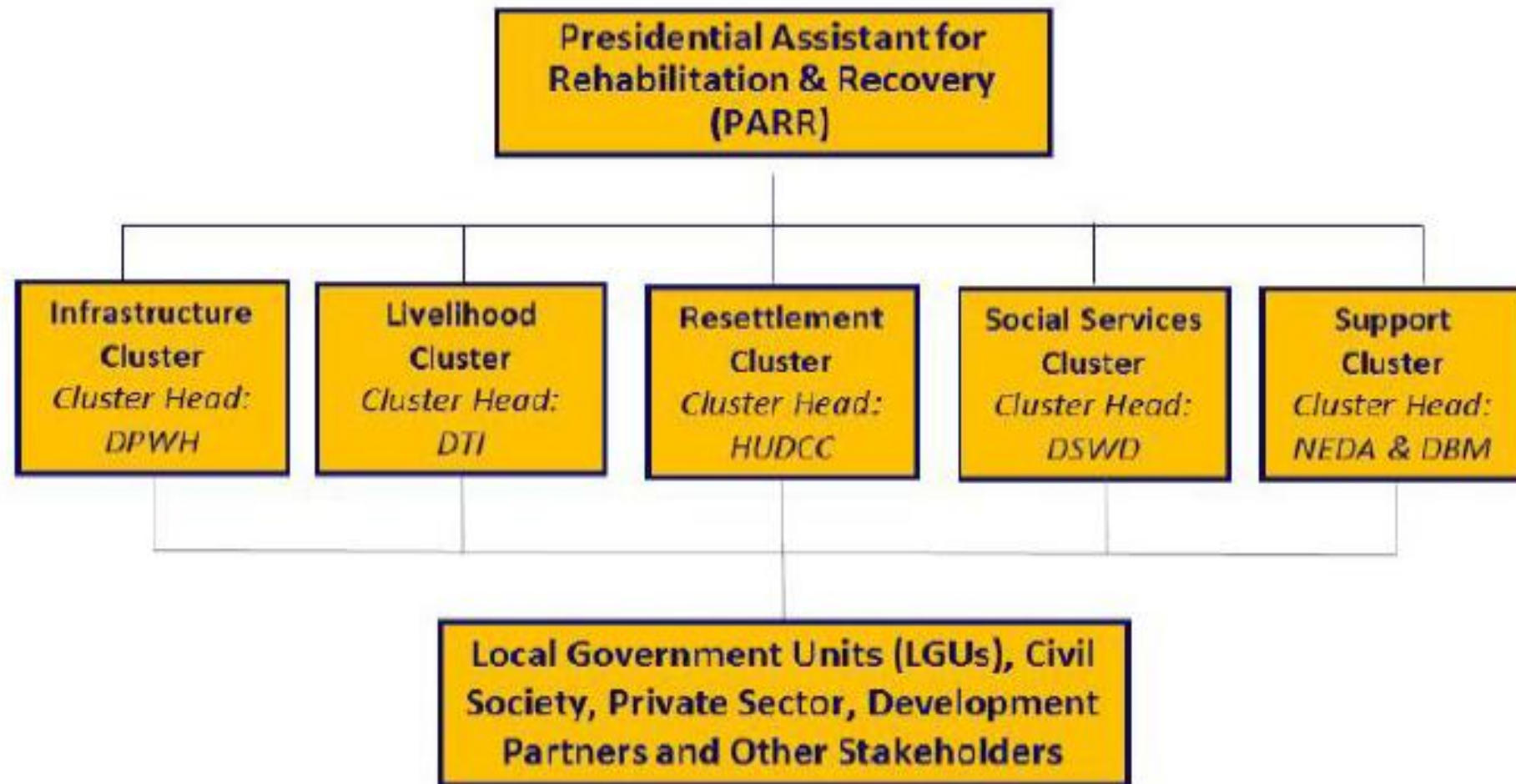
Thematic Area 4: Disaster Rehabilitation and Recovery

Overall responsible agency: National Economic and Development Authority (NEDA)

Outcome	Lead agency(ies)
20. Damages, losses and needs assessed	OCD
21. Economic activities restored, and if possible strengthened or expanded	Agency to be determined based on the affected sectors
22. Houses rebuilt or repaired to be more resilient to hazard events; safer sites for housing	National Housing Authority (NHA)
23. Disaster and climate change-resilient infrastructure constructed/reconstructed	DPWH
24. A psychologically sound, safe and secure citizenry that is protected from the effects of disasters is able to restore to normal functioning after each disaster	DOH and DSWD

Source. NDRRMC

- To address the large scale recovery needs of Typhoon Yolanda, the Philippine Government created the Office of the Presidential Assistant for Rehabilitation and Recovery (OPARR) to unify the efforts of the government and other institutions involved in the rehabilitation and recovery efforts.
- With a mandate of two years, OPARR is tasked with developing an overall strategy and corresponding integrated short-, medium-, and long-term recovery plans and programs.



Source: Typhoon Yolanda Ongoing Recovery: Recovery Framework Case Stud/August 2014 (WB, UNDP, EU)

Figure 10. Cluster Framework of OPARR

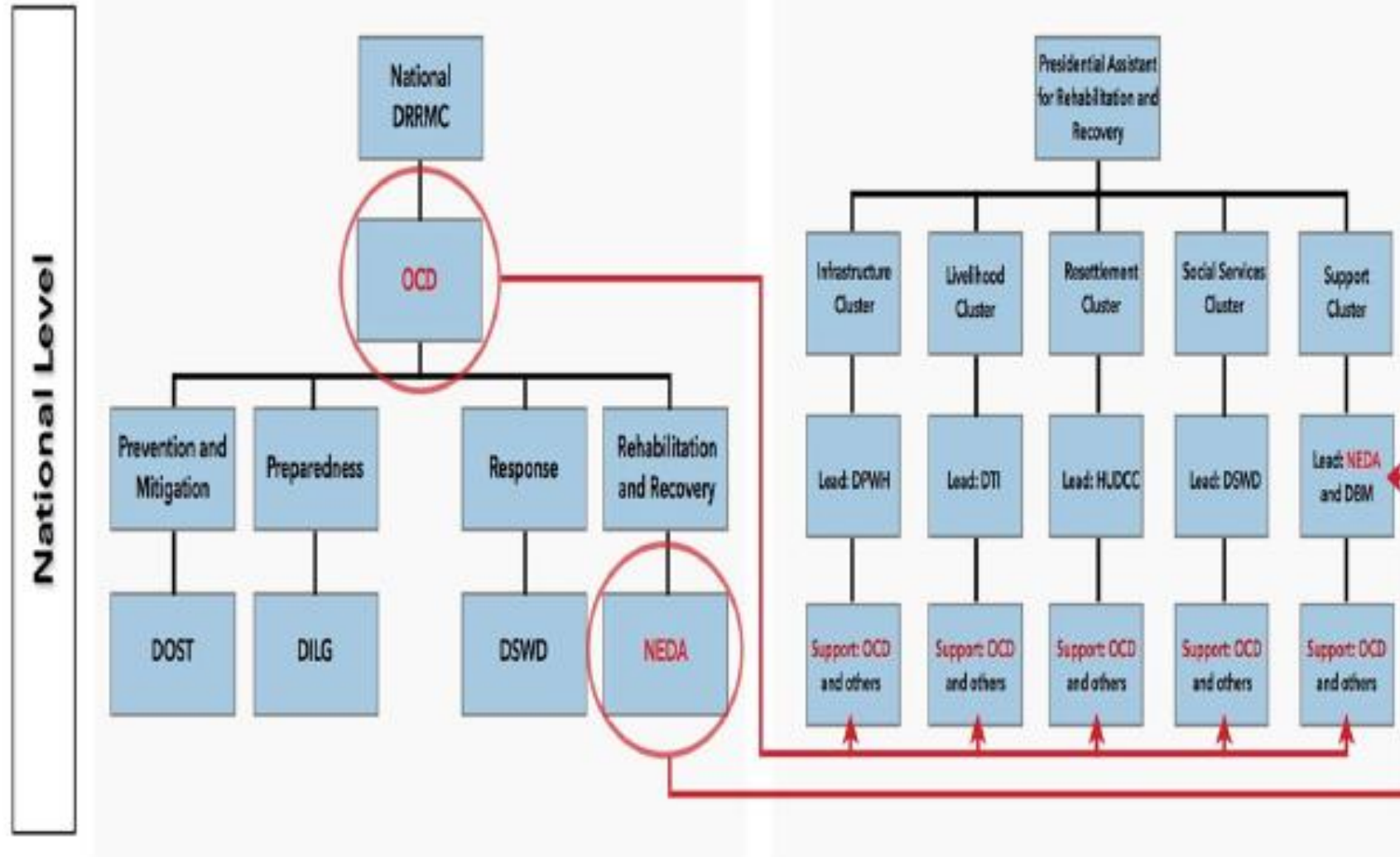
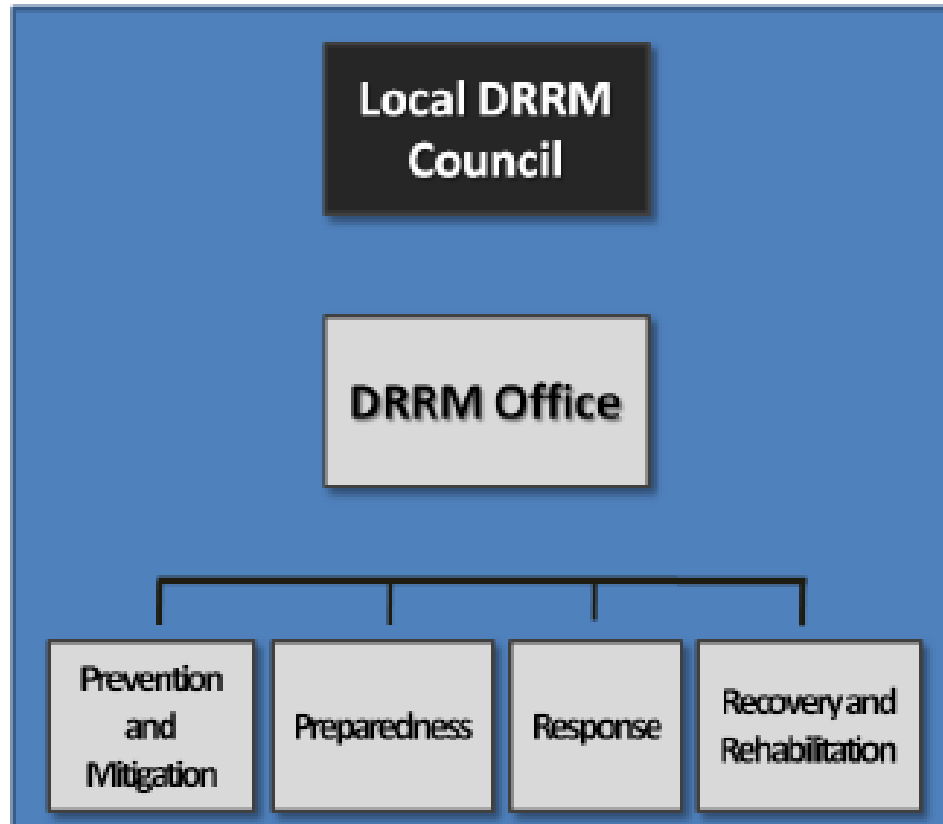


Fig. 11. Comparative institutional arrangement pre- and post-Yolanda where government reorganized recovery, rehabilitation and reconstruction under sectors rather than conventional disaster cycle themes

**Pre-Yolanda
RA 10121**



**Post-Yolanda
Memorandum Order No. 62**

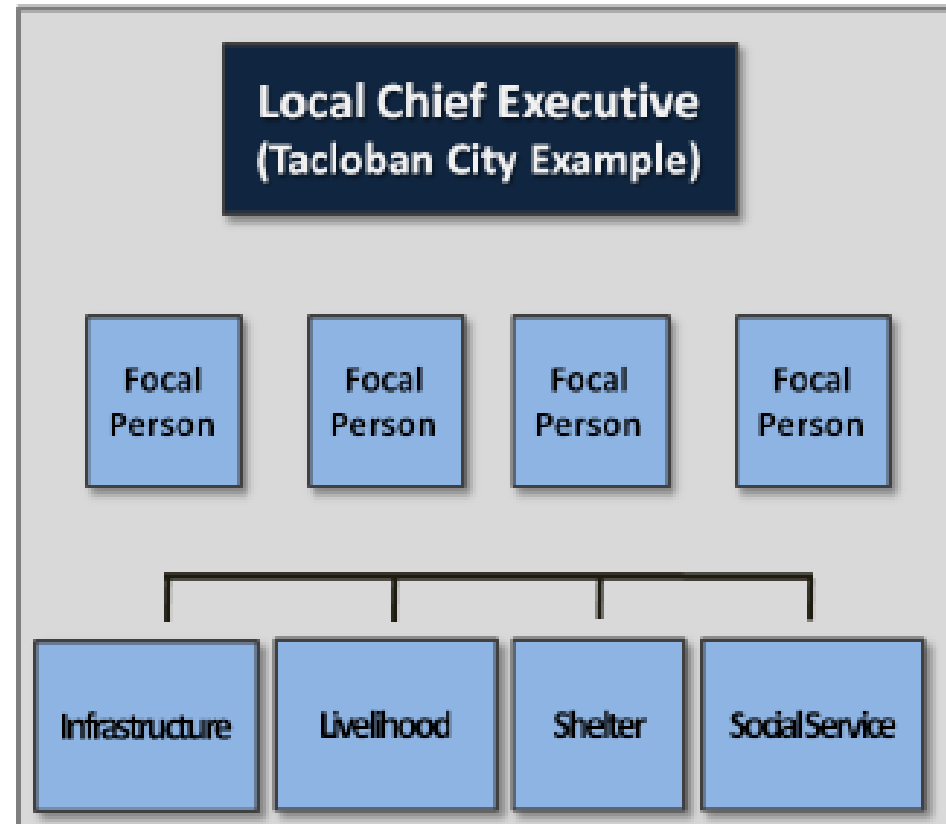


Figure 12. Re-alignment of institutional arrangement of LGUs to the sectoral one prescribed by OPARR

Recovery Framework

Core Recovery Principles Outlined in RAY

- Local governments will be responsible for implementation, to ensure that recovery is tailored to local conditions and promotes community participation, ownership and sustainability.
- The national government will take charge of oversight and coordination but will make sure that there is flexibility in local implementation.
- Recovery programs will promote inclusiveness and sustainable livelihoods in order to address pre-existing poverty issues that drive disaster risk in the affected areas.
- Gender considerations will be incorporated into the design and implementation of recovery and reconstruction activities to address gender inequality and promote women's empowerment.
- There will be an emphasis on fast tracking the implementation of programs and activities, but at the same time systems will also be put in place to track and assess performance, to ensure transparency and accountability.
- RAY is guided by the "build back better" principle, which focuses on sustainable efforts to reduce vulnerabilities and strengthen capacities to cope with future hazard events.

Figure 13. Planning System for Yolanda Rehabilitation and Recovery

Recovery Planning

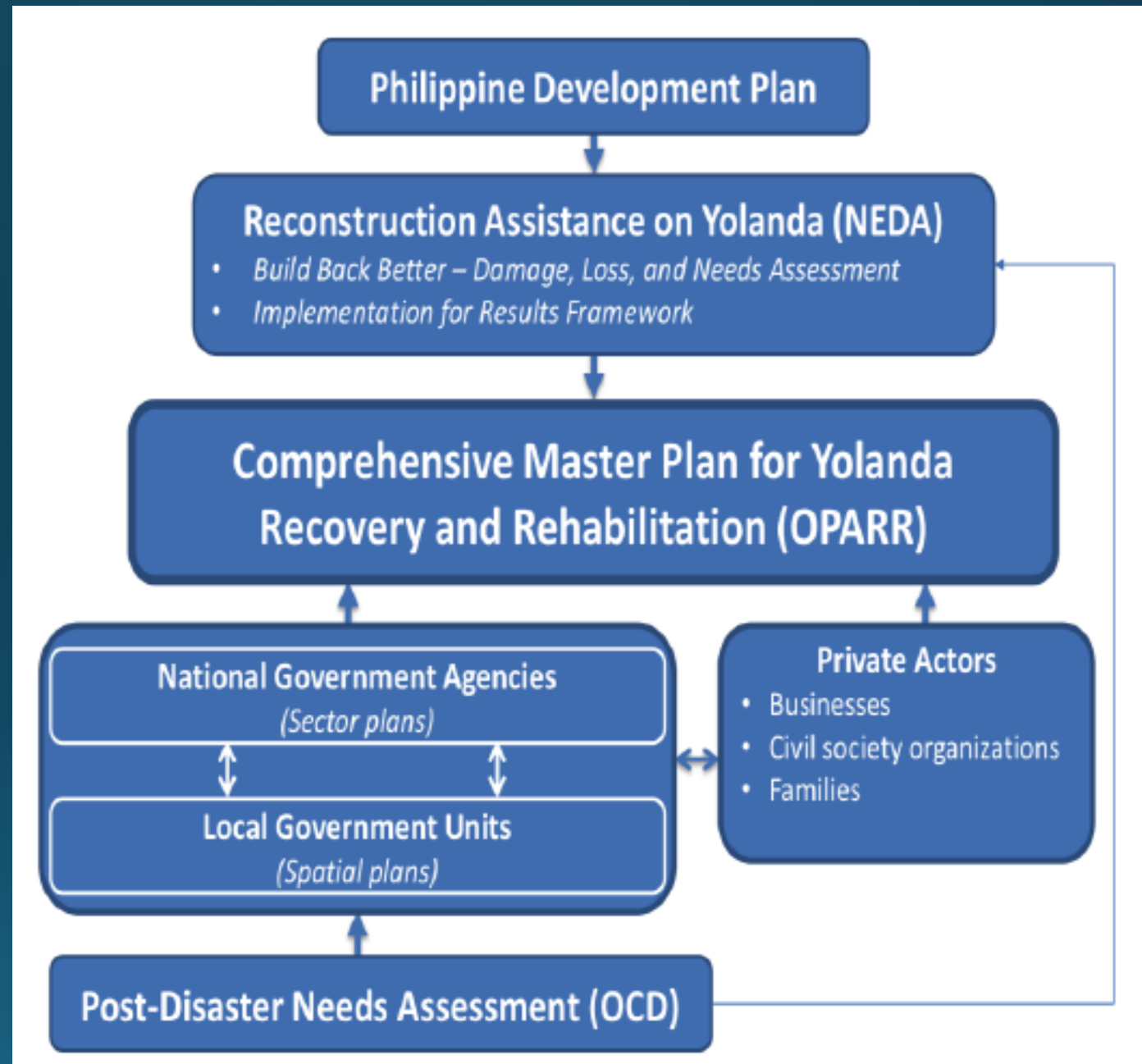


Figure 14. Planning System for Yolanda Rehabilitation and Recovery

Implementation, Monitoring and Evaluation

Public Private Partnership in Yolanda Recovery

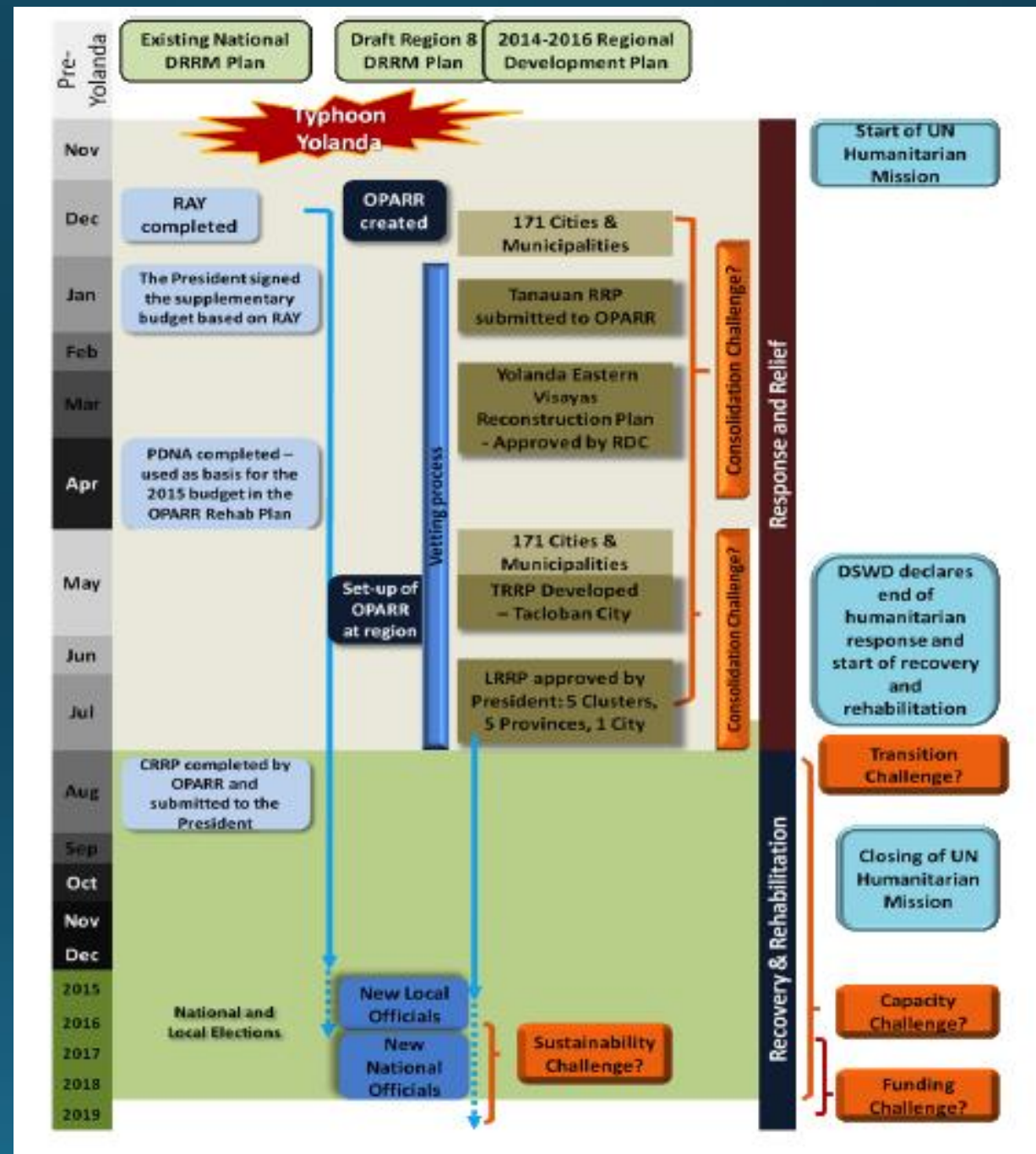
An example of effective public private partnerships can be seen with the mass housing project in the northern part of Tacloban City. The land (covering 12 hectares) where the new houses are being built is owned by the city government and the construction of the houses are being supported by a private foundation, the GMA Kapuso Foundation and the International NGO Habitat for Humanity. The development of the site, which includes the provision of water and power, will be covered by the National Housing Authority, which is a national government agency.

Implementing Programs through Existing Network of Civil Society Organizations

The Inter-Church Organization for Development Cooperation (ICCO) office has allocated donated funds of about €3.6 million for projects in areas not covered by other organizations. Projects focus on community-identified needs, which include enterprise development, psycho-social support, and initiatives addressing land rights issues. The network works closely with LGUs and the Department of Agriculture in selected projects. Effective implementation is ensured through regular monitoring, conducted through field visits and project reports.

Source: Typhoon Yolanda Ongoing Recovery: Recovery Framework Case Stud/August 2014 (WB, UNDP, EU)

Figure 15. Summary of Recovery Milestones and Challenges



Source: Typhoon Yolanda Ongoing Recovery: Recovery Framework Case Stud/August 2014 (WB, UNDP, EU)

Research conducted in relation to Typhoon Haiyan

Collaboration of Philippine (De La Salle University) and
Japanese Universities (Tokyo Institute of Technology, Waseda University,
Toyo University and The University of Tokyo)

Philippine and Japanese universities collaboration in the Joint Survey Group of Typhoon Haiyan Storm Surge

- The Joint Survey Group on 2013 Typhoon Haiyan was organized by the Department of International Development Engineering of Tokyo Institute of Technology with Waseda University, University of Tokyo and Toho University in Japan.
- The purpose of the survey is to conduct actual investigation on the extent of storm surge that hit the areas of Leyte and Samar specifically Tacloban, Palo, Tanauan, Abuyog, Dulag, Tolosa, Basey, Balangiga, Guiporlos, and Quinapondan. The field survey was conducted to document evidences of storm surge such as water marks, traces of damaged buildings and vegetation and to assess the extent of actual storm surge height.
- Interviews from the local community and government agencies were also done to gather and validate data and information.
- The field survey also supports and confirms the numerical simulation of storm surge on November 8 in Leyte and Samar earlier investigated by the Japanese researchers.



Photo 1: Members of Joint Survey Group on 2013 Typhoon Haiyan



Photo 2: Members of Joint Survey Group on 2013 Typhoon Haiyan together with DPWH Assistant Secretary Dimas S. Soguilon.



Photo 3: Members of Joint Survey Group on 2013 Typhoon Haiyan together with ARD Edgar B. Tabacon, DPWH Region VIII.



Photo 4. Cargo ship dragged ashore in Anibong, Tacloban City



Photo 5. Damaged structures and vegetation in Tanauan

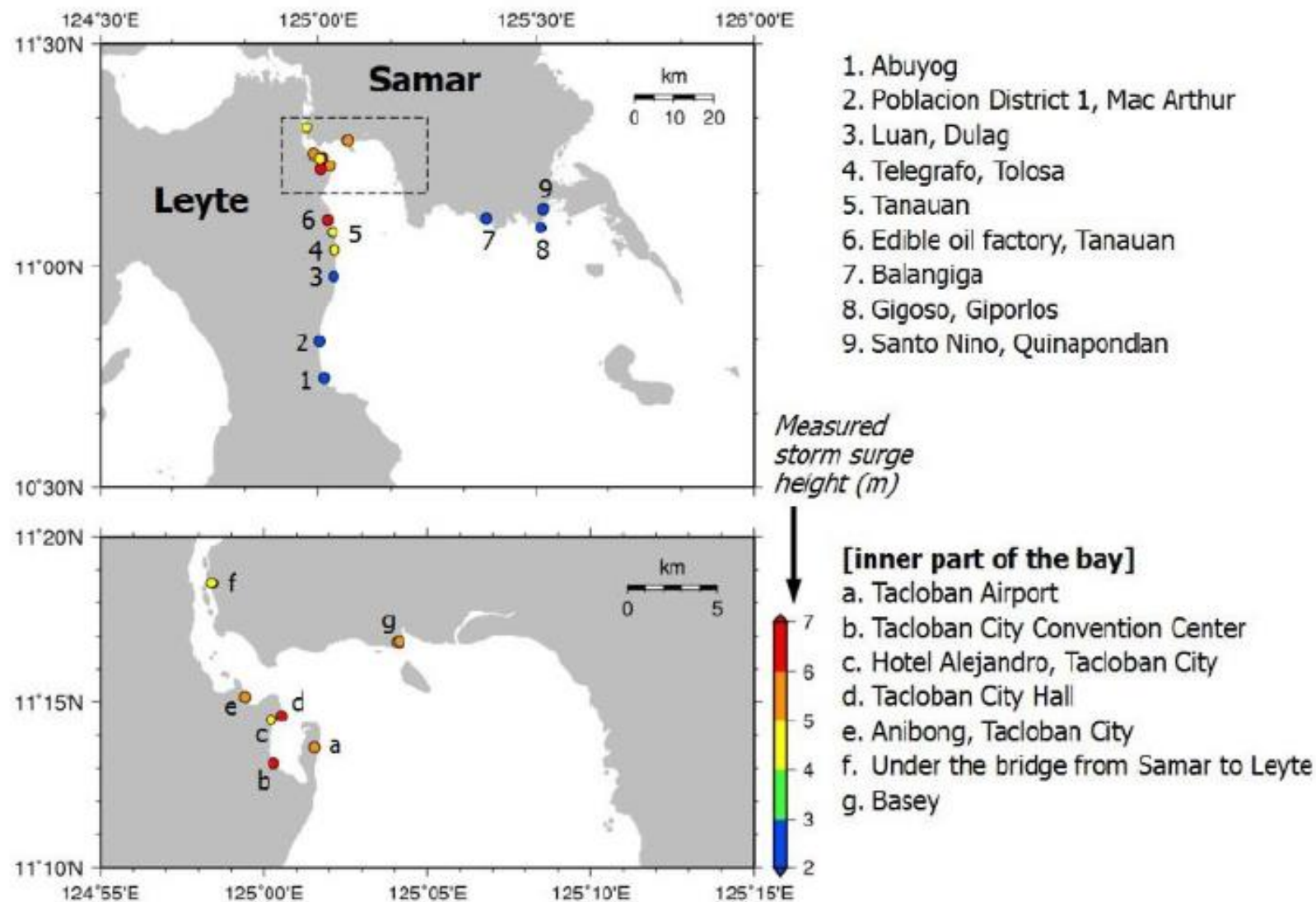


Fig. 1. Field survey sites in Leyte and Samar



Photo 6a. Surveyed Site near Tacloban City Convention Center



Photo 6b. Surveyed Site near Tacloban City Convention Center



Photo 7a. Surveyed site near Tacloban City Hall



Photo 7b. Maximum height of water reached near Tacloban City Hall



Photo 8a. Surveyed Site at the Oil Factory in Tanauan



Photo 8b. Surveyed Site at the Oil Factory in Tanauan

Research themes

- Analysis and Numerical Simulation for the 2013 Typhoon Yolanda and Storm Surge
- Storm Surge Field Surveys in the Philippines after the 2013 Typhoon Yolanda
- Change of Living Conditions and Assistance of Yolanda Victims
- Storm Surge Awareness and Disaster Preparedness for Typhoon Yolanda

Research theme 1:

Analysis and Numerical Simulation for the 2013 Typhoon Yolanda and Storm Surge

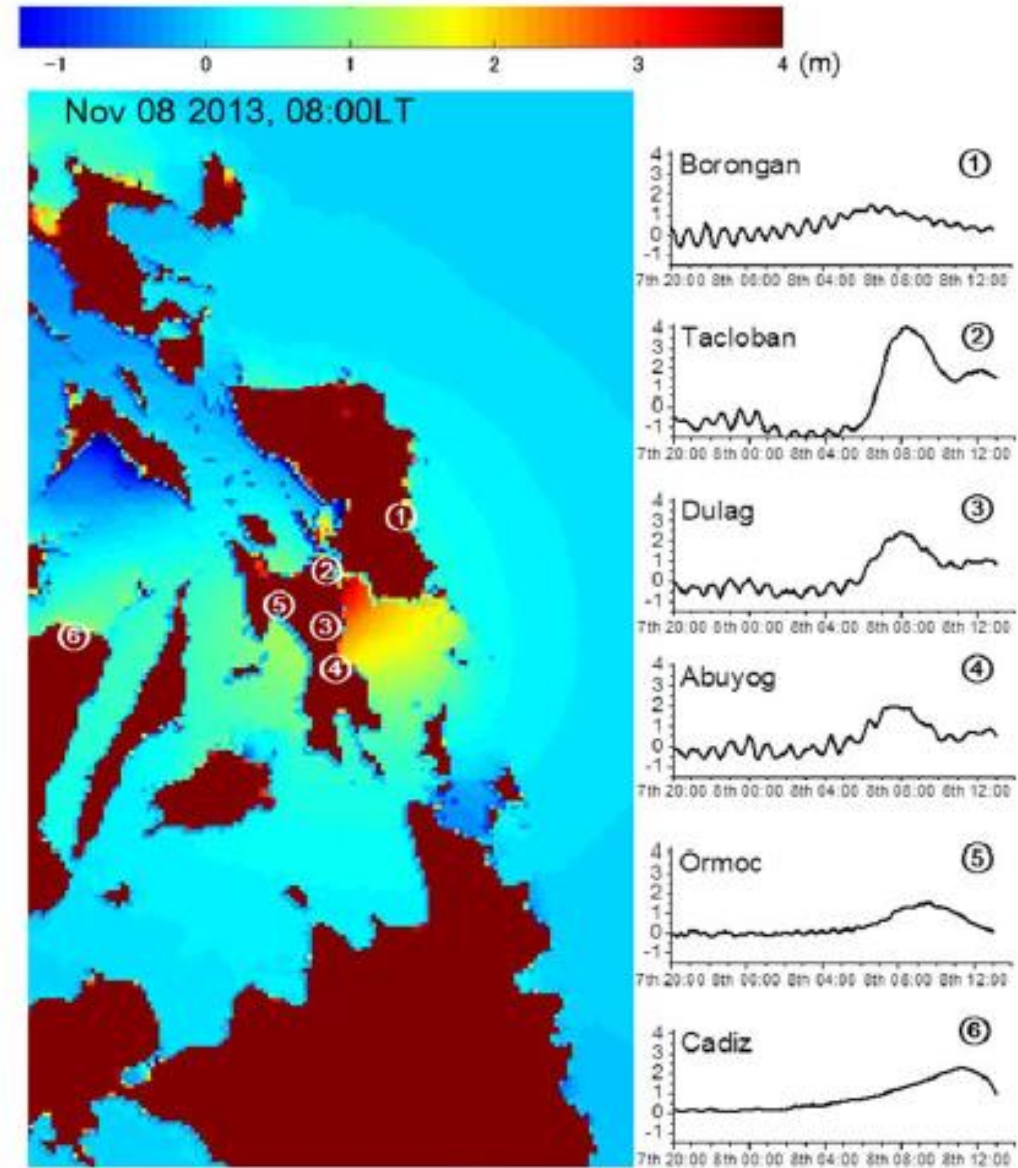


Figure 1. Maximum storm surge levels of the passage of Typhoon Yolanda through the Philippines. The graphs above show the time-history of the storm surge at its passage through Tacloban City (Leyte Island), Medellin (Cebu Island) and Iloilo (Panay Island). Figure used Philippines Local Time (LT)

Research theme 2:

Storm Surge Field Surveys in the Philippines after the 2013 Typhoon Yolanda

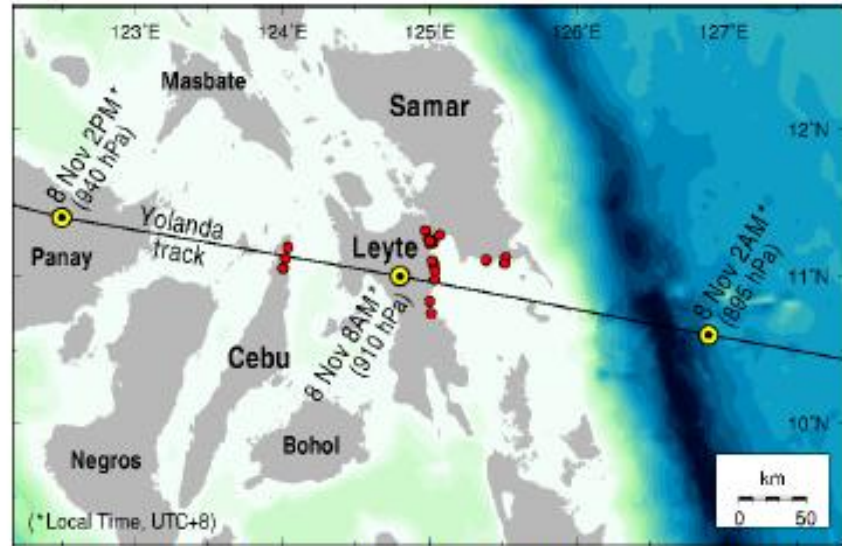


Figure 1. Path of Typhoon Yolanda and the surveyed locations (red circles)

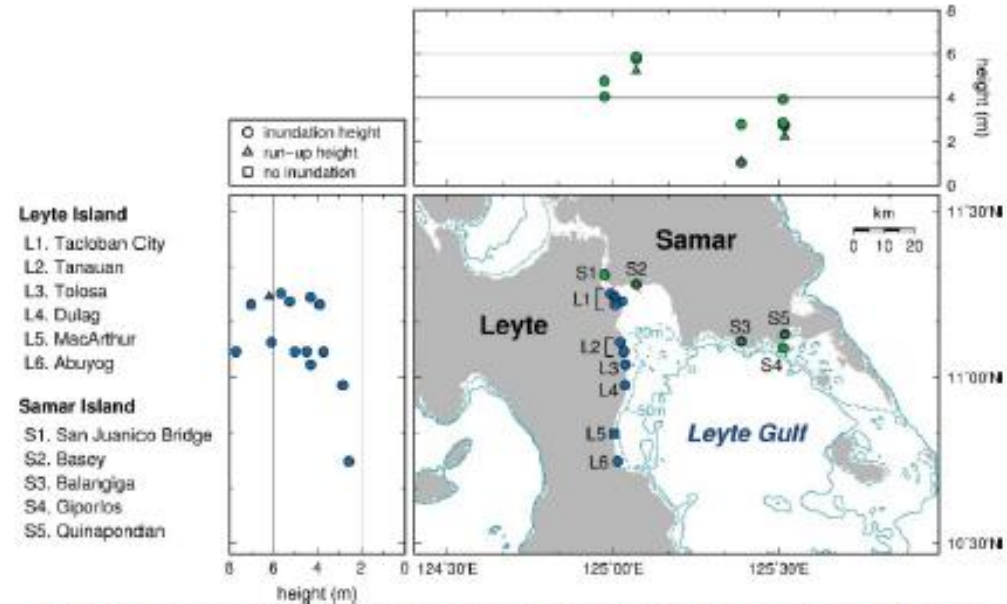


Figure 2. Distribution of the measured storm surge heights along the Leyte Gulf coast

Research theme 3:

Storm Surge Awareness and Disaster Preparedness for Typhoon Yolanda

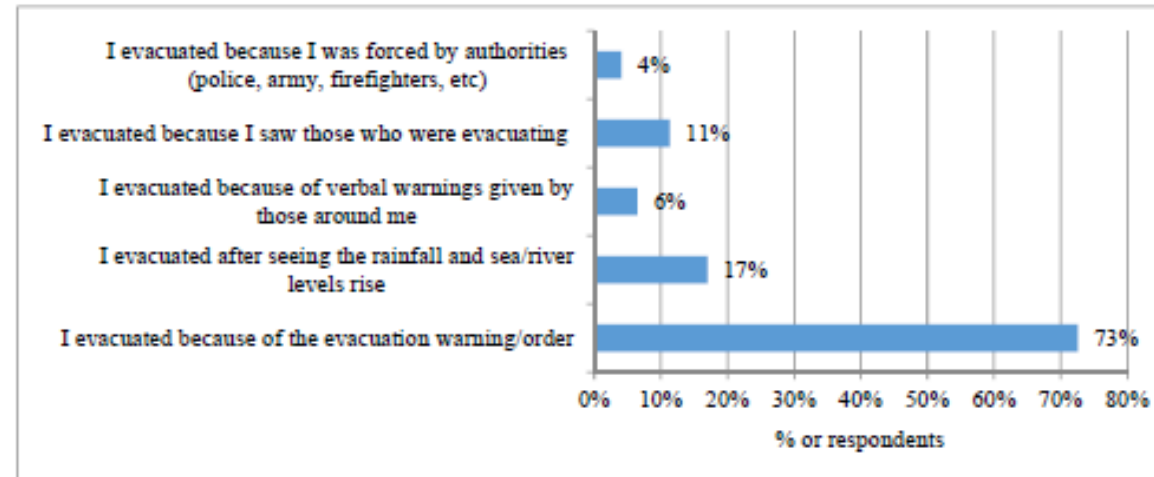


Figure 1. Reasons cited by respondents for evacuating (note that multiple answers were allowed in this question)

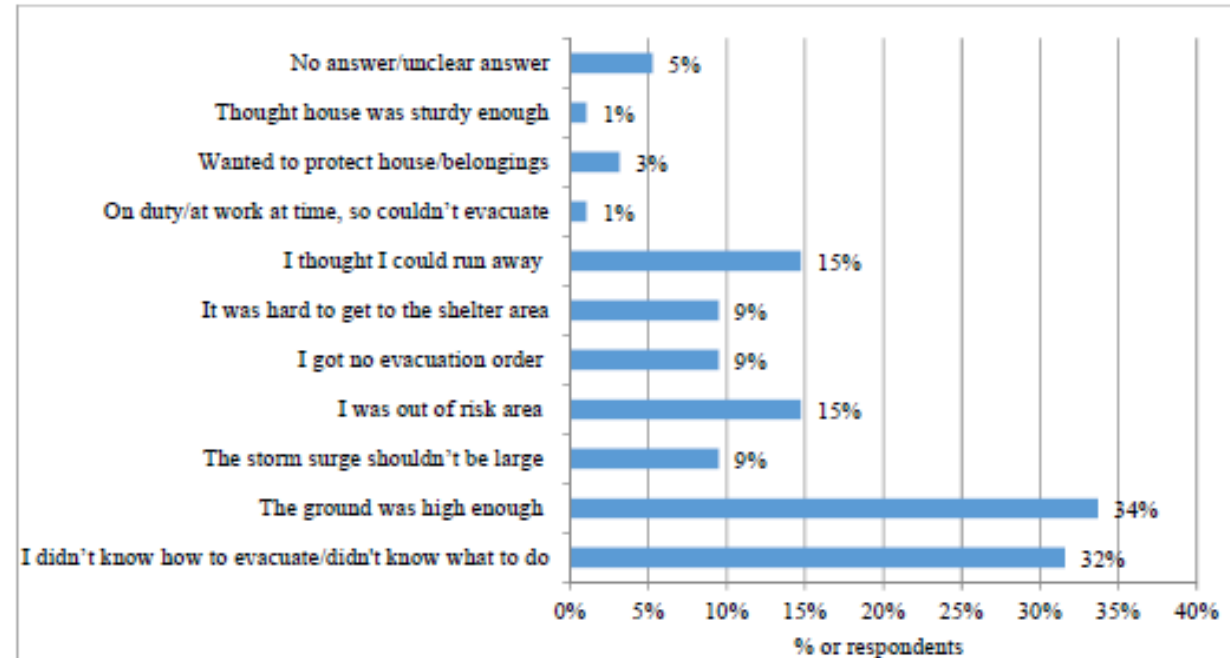


Figure 2. Reasons cited by respondents for not evacuating (note that multiple answers were allowed in this question)

Future Perspectives

- The occurrences of disasters open a spectrum of opportunities to review and revise policies to ensure risks reduction, protection of lives, properties and environment, rehabilitation and recovery measures through reliable and scientific data
- Collaborative research for scientific technologies, economic policies and empowerment of stakeholders must be sustainable in order to achieve the goals of sound disaster risk planning and management.

Future perspectives

- Stakeholders engaged in risk reduction, planning and management should have clear mandate and defined roles and responsibilities
- Capacity development of stakeholders
- Community participation and involvement in risk reduction, planning and management
- Support for research and development

End of the presentation.

Thank you very much for your attention.