Developing Capacity for Post-typhoon Disaster Waste Management in Coastal Cities in Fiji and the Philippines

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TOWARDS A MORE RESILIENT NATION
نحو وطن أكثر جاهزية

Current affiliation:

Rabdan Academy, Abu Dhabi, UAE

Domains/Specialization

- Safety
- Security
- Defense
- Emergency Preparedness
- Crisis Management

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Rabdan Academy

Previous affiliation (2018-2022):

Institute for Disaster Management and Reconstruction (IDMR)

Sichuan University and Hong Kong Polytechnic University

China’s first research institute focusing on DRR

2008 Wenchuan Earthquake (Mw 7.9)

Source: Frederic J. Brown/AFP/Getty Images

Source: Baidu.com

2008 Wenchuan Earthquake

Source: China Earthquake Administration

- Killed: 69,000
- Missing: 18,222
- Made homeless: 4.8 million
- Disaster debris: **20 million tons**

- Led to the establishment of the **Institute for Disaster Management and Reconstruction (IDMR)**

Quantity of Disaster Wastes

Date	Name of the Disaster	Estimated amount of DWs
Earthquake/Tsunami		
Dec 2004	Sumatra-Andaman earthquake (Indonesia)	7 million-10 million m3
May 2008	Sichuan earthquake (China)	20 million tons
Jan 2010	Haiti Earthquake (Haiti)	23 million-60million tons
Mar 2011	The Great East Japan Earthquake (Japan)	31 million tons
Apr 2015	Nepal earthquake (Nepal)	14 million tons
Cyclone/Typhoon/Hurricane/Flooding		
Aug 2005	Hurricane Katrina (USA)	26.8 million tons
Oct 2011	Thailand floods (Thailand)	100,000 tons
Nov 2013	Super Typhoon Haiyan (Yolanda) (Philippines)	19 million tons
Feb 2016	Tropical Cyclone Winston (Fiji)	23,525 tons

Source: Japan MoE & JSMCWM (2018)

2013 Typhoon Haiyan

Source: Eoghan Rice (2013)

137% of the total wastes in 2013

- **19 million tons** = disaster wastes generated by Typhoon Haiyan (Japan MoE & JSMCWM, 2018)
- **13.9 million tons** = total waste generation in the Philippines in 2013 (SEPO, 2017)

Impact of Typhoon Haiyan

Source: nbcnews.com

Difference between Disaster Waste and Regular Waste

- Disaster waste: **very huge amount in a very short time** (can overwhelm the affected local governments)

- Disaster waste: can affect the living environment if not addressed properly and quickly (**hygiene and sanitation issues**; contamination of water sources; leakage of hazardous substances; fire risk)

- Disaster waste: can **hinder emergency response**, recovery from disasters, and reconstruction efforts

Date	Type of waste	Municipality	Amount (1000 ton)	Compared to annual MSW	Characteristics
Mar 2011	Earthquake and Tsunami (The Great East Japan Earthquake)	Iwate Prefecture	4,233*	56-79 years **	● Various types of communities, from small fishing villages to industrial areas ● Large damage from tsunami
		Miyagi Prefecture	11,530*	3.7-95 years**	● Same as Iwate prefecture
		Sendai city***	1,369*	3.7 years	● Ordinance-designated city ● Big damage at the sea side area by Tsunami and some at the hill side area by earthquake
		Ishinomaki ward***	5,265*	95 years	● Large part of the city was damaged ● Fishery and industry were damaged
Aug 2014	Flood and land slide	Hiroshima city	584	1.6 years	● Limited part of the city was damaged ● Large amount of waste mixed with soil and water
Sep 2015	Flood	Joso city	52	3 years	● Large part of the city was flooded and some houses were destroyed

*Not include Tsunami sediment, **Calculated in each city/area, ***Part of Miyagi Prefecture

Source: Japan MoE & JSMCWM (2018), p. 5

Why quantifying the amount of disaster wastes is important

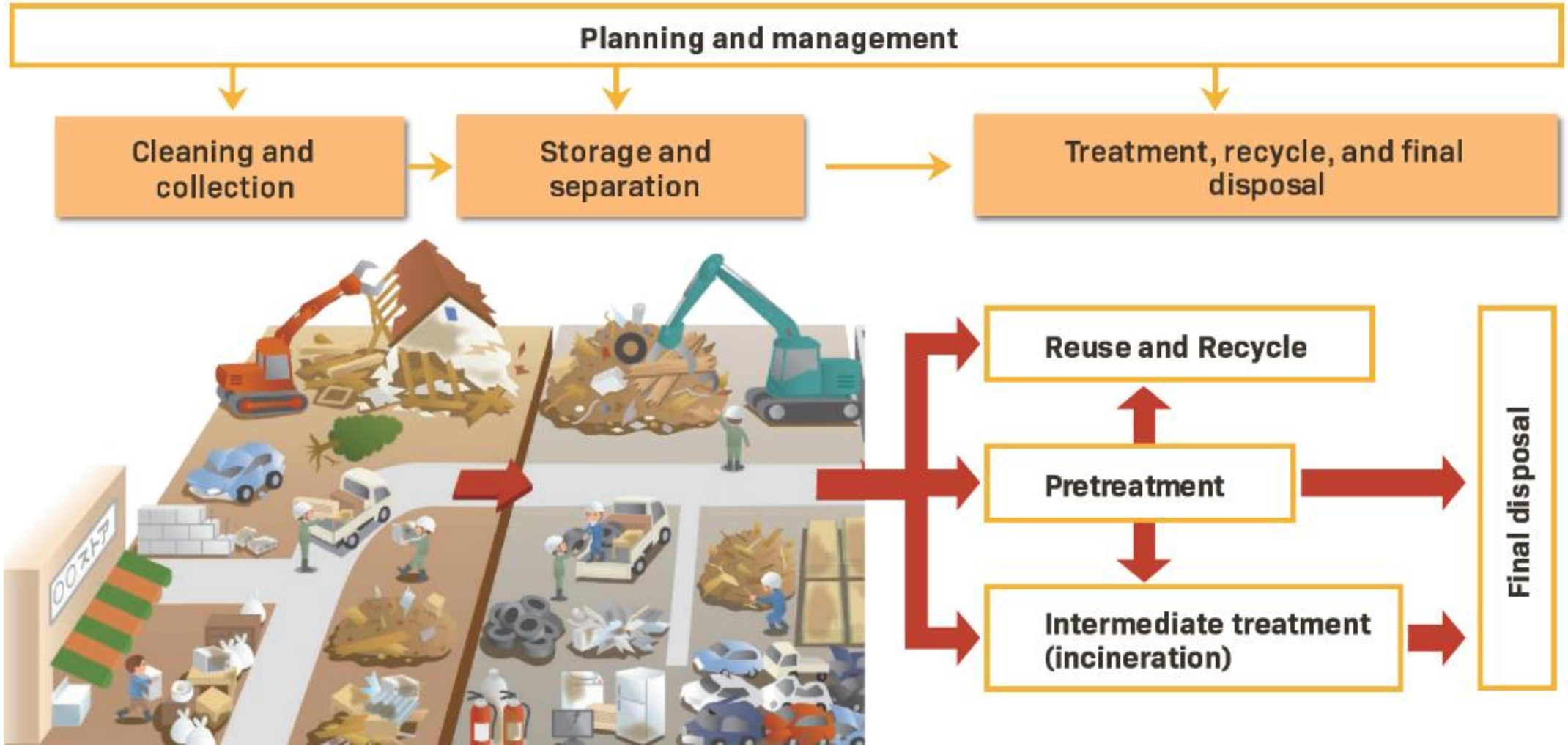
- **POST-DISASTER**: The amount of disaster wastes is an **important input in planning** for disaster reconstruction and waste management

- **PRE-DISASTER**: Forecasting can help us **anticipate the surge demand** for funds, workforce, technical capacity, transport equipment, waste treatment facilities, storage sites, disposal sites, etc.

- Over-estimation, under-estimation, or no estimation of waste quantity can highly increase the **costs of DWM**

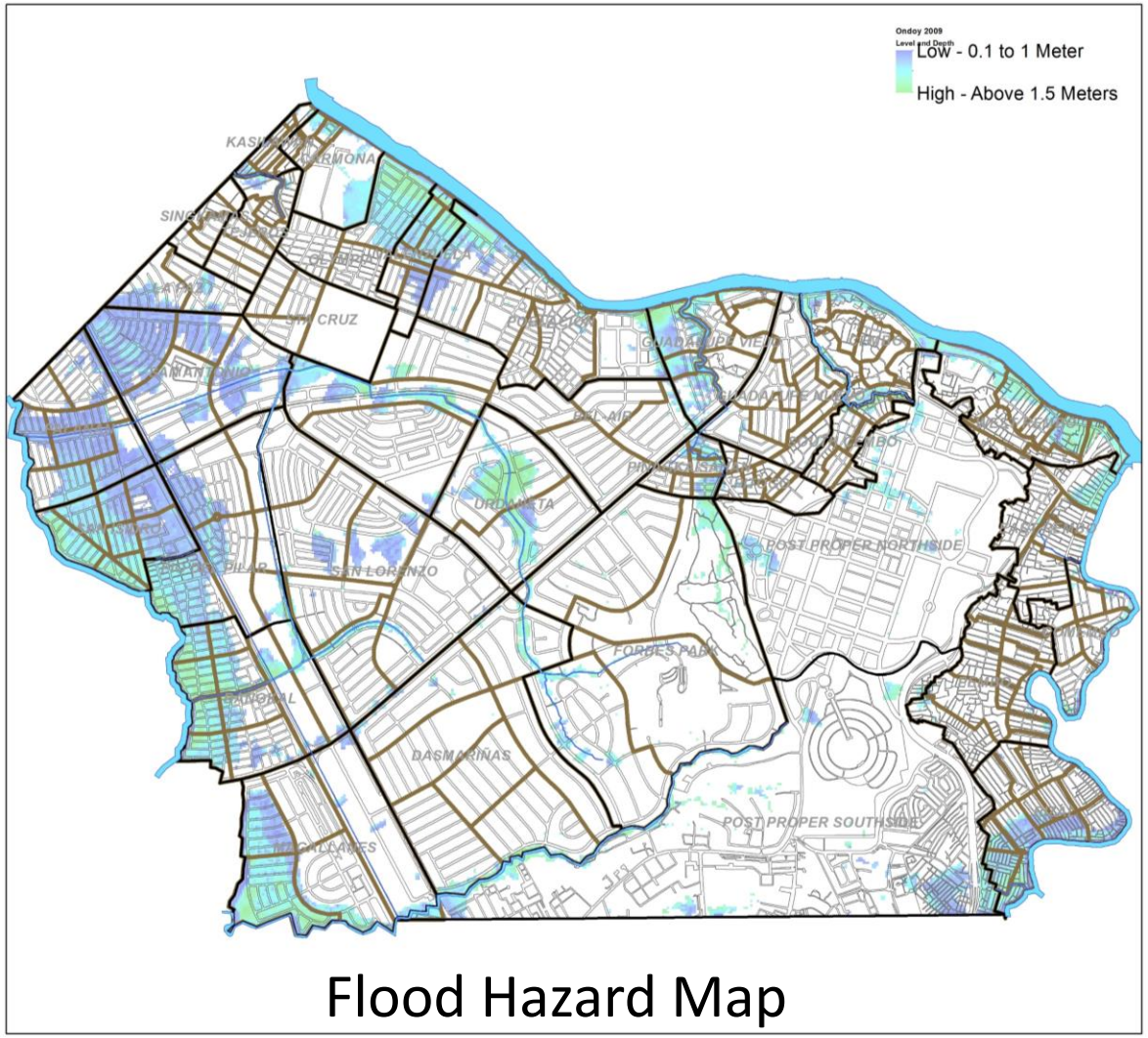
Reference: Marchesini et al. (2021)

Flow of disaster waste treatment

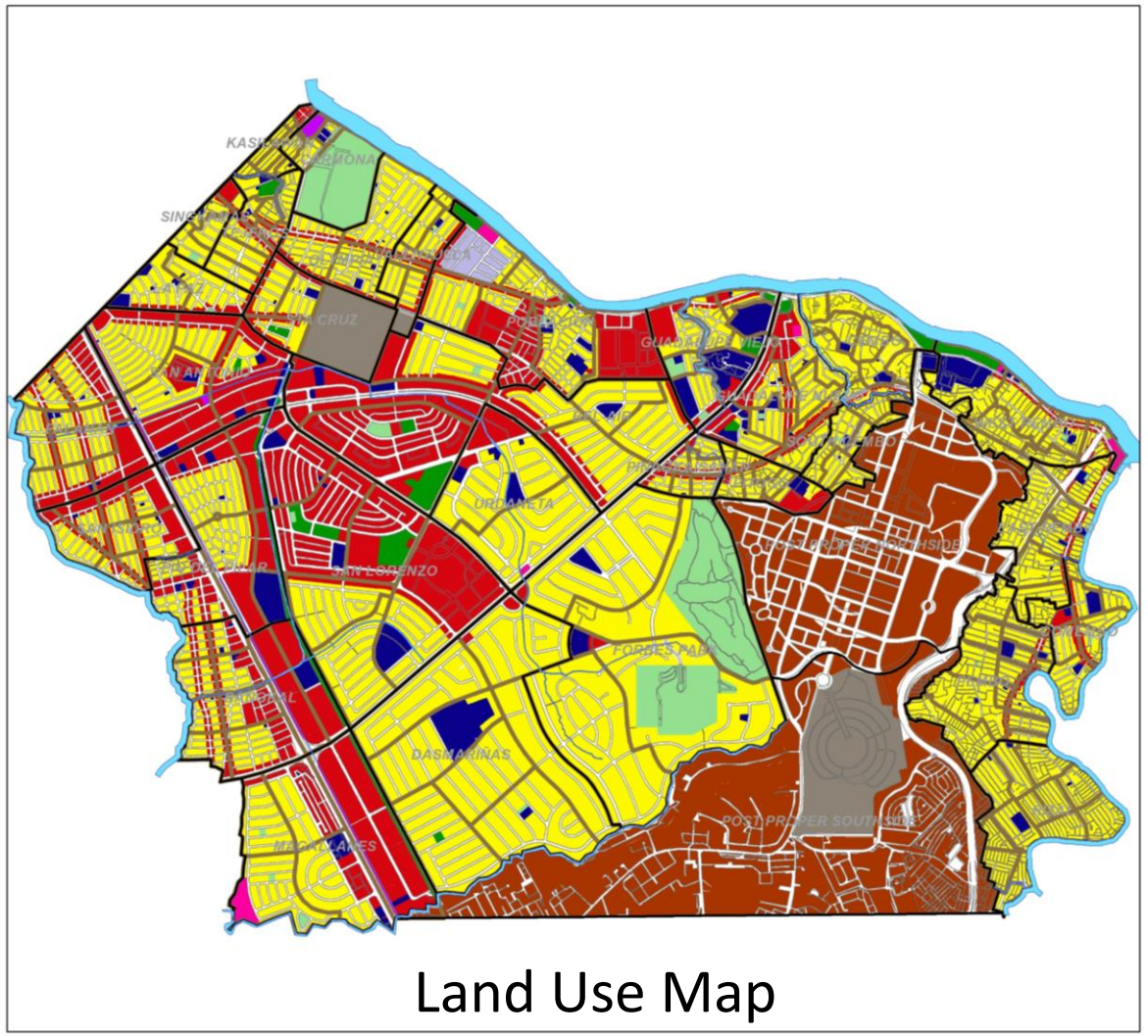


Source: Japan MoE & JSMCWM (2018), p. 10

Forecasting Types and Amount of Disaster Wastes



Flood Hazard Map



Land Use Map

Source: Makati City

2009 Typhoon Ketsana (*Ondoy*)

How much wastes?

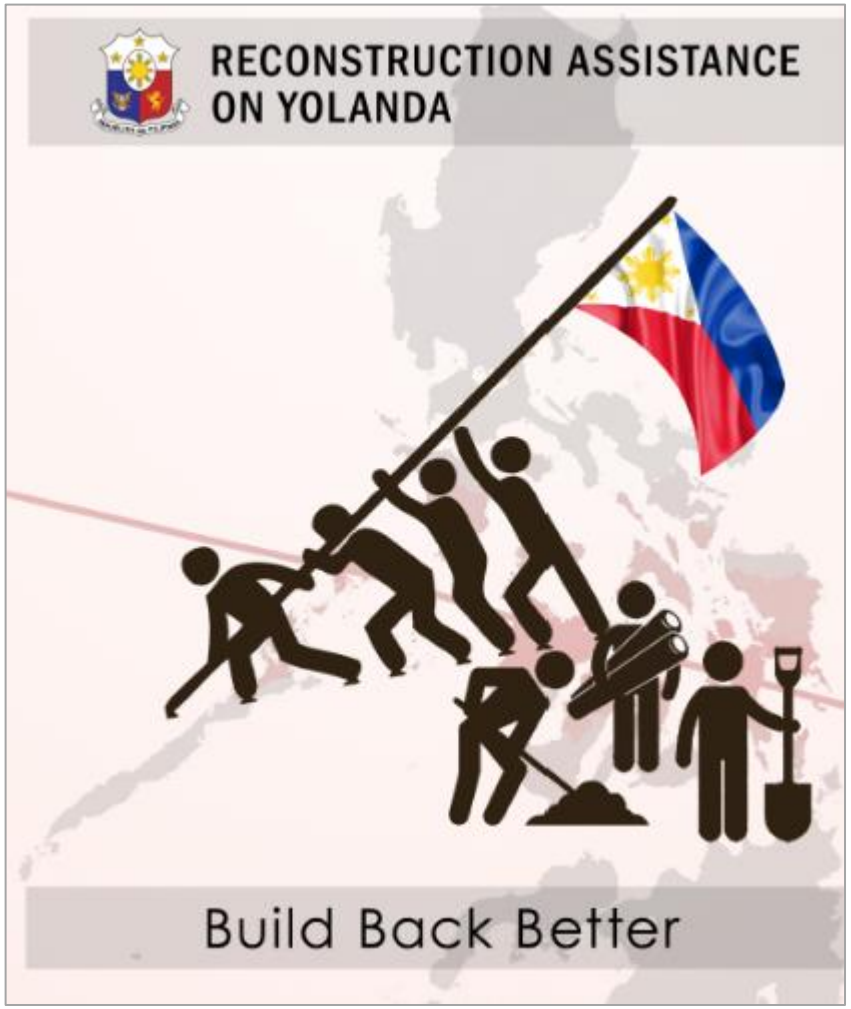
Photo: Noel Celis

2021 Typhoon Rai (Odette)

Photo: Ezra Acayan

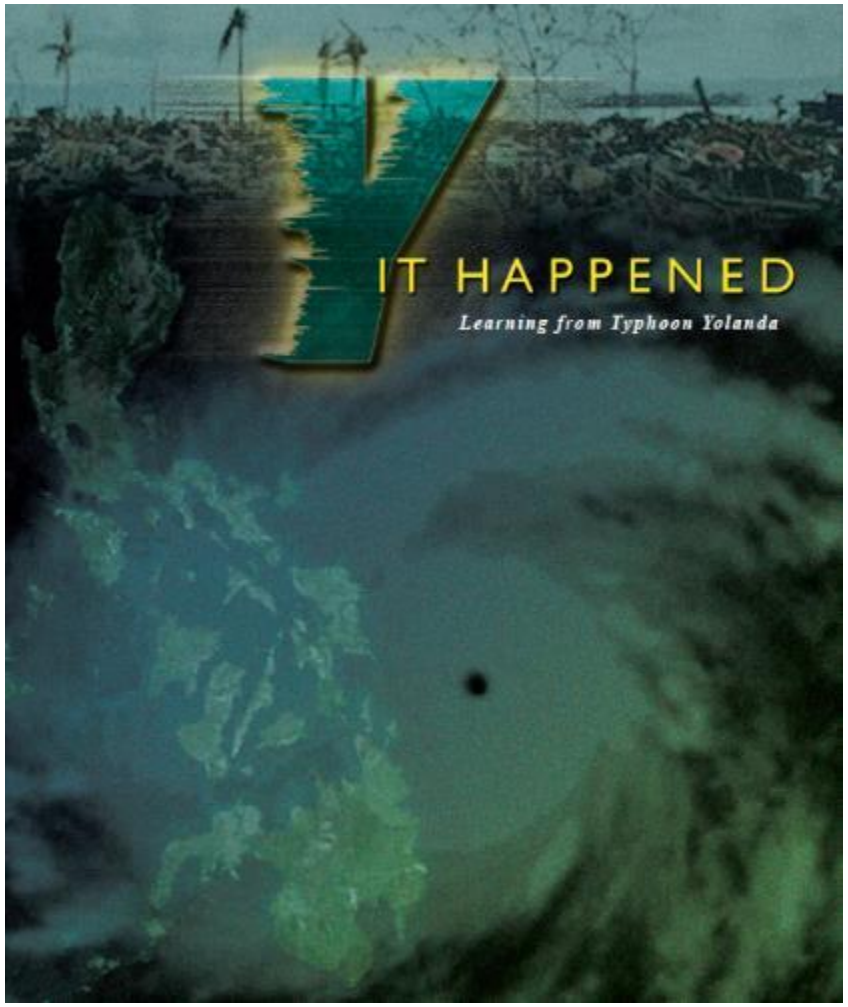
How much wastes?

No quantification of disaster wastes!



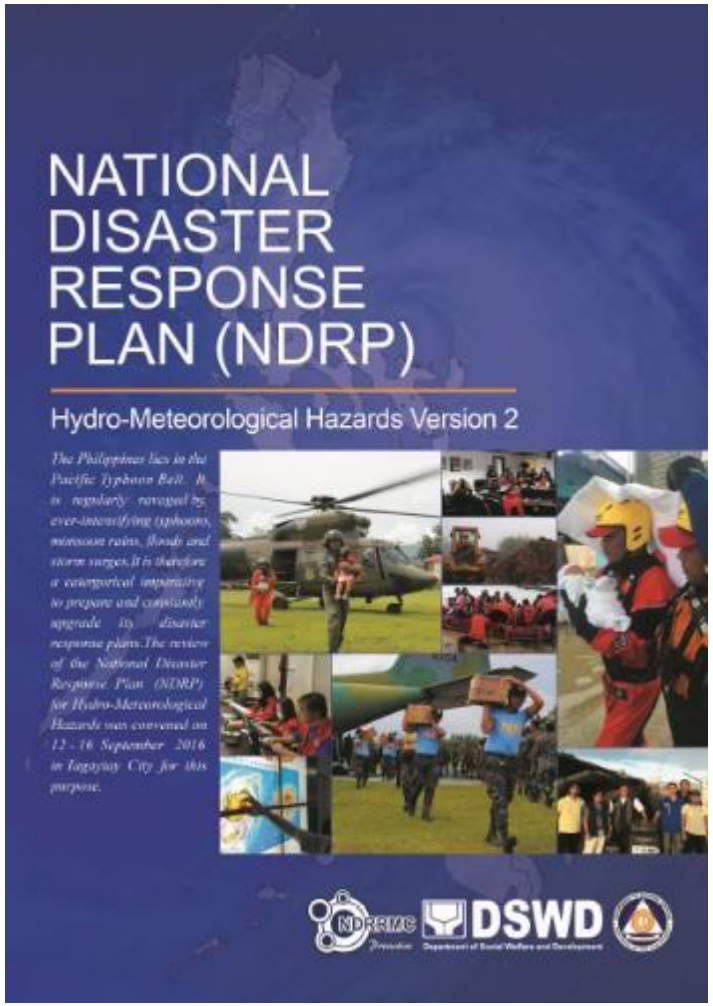
NEDA (2013)

NDRRMC (2014)

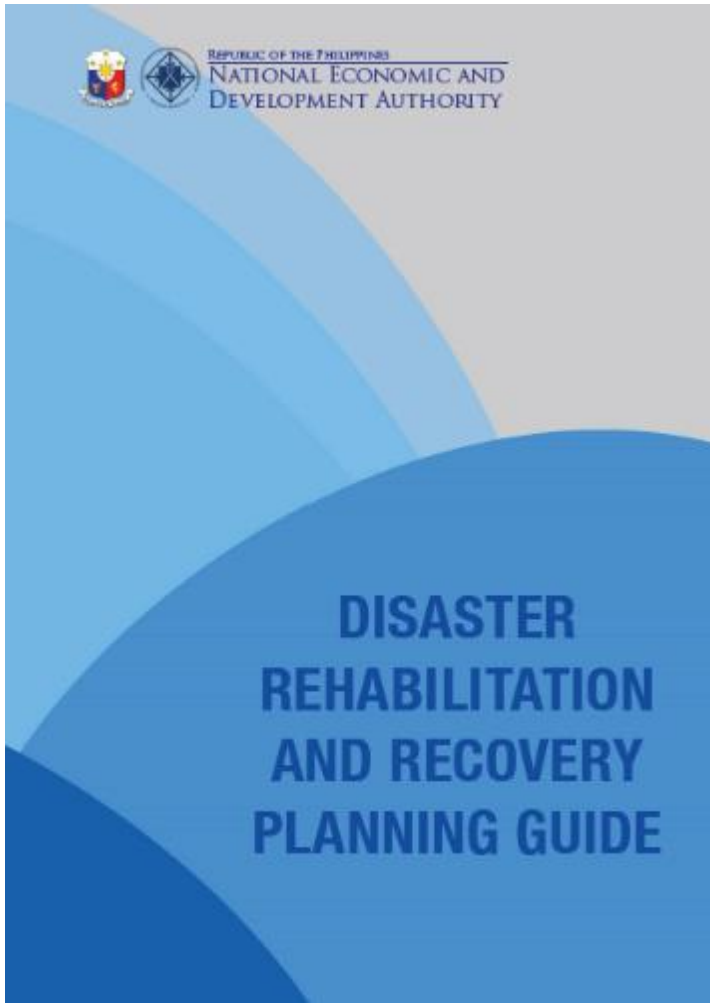


NDRRMC (2014)

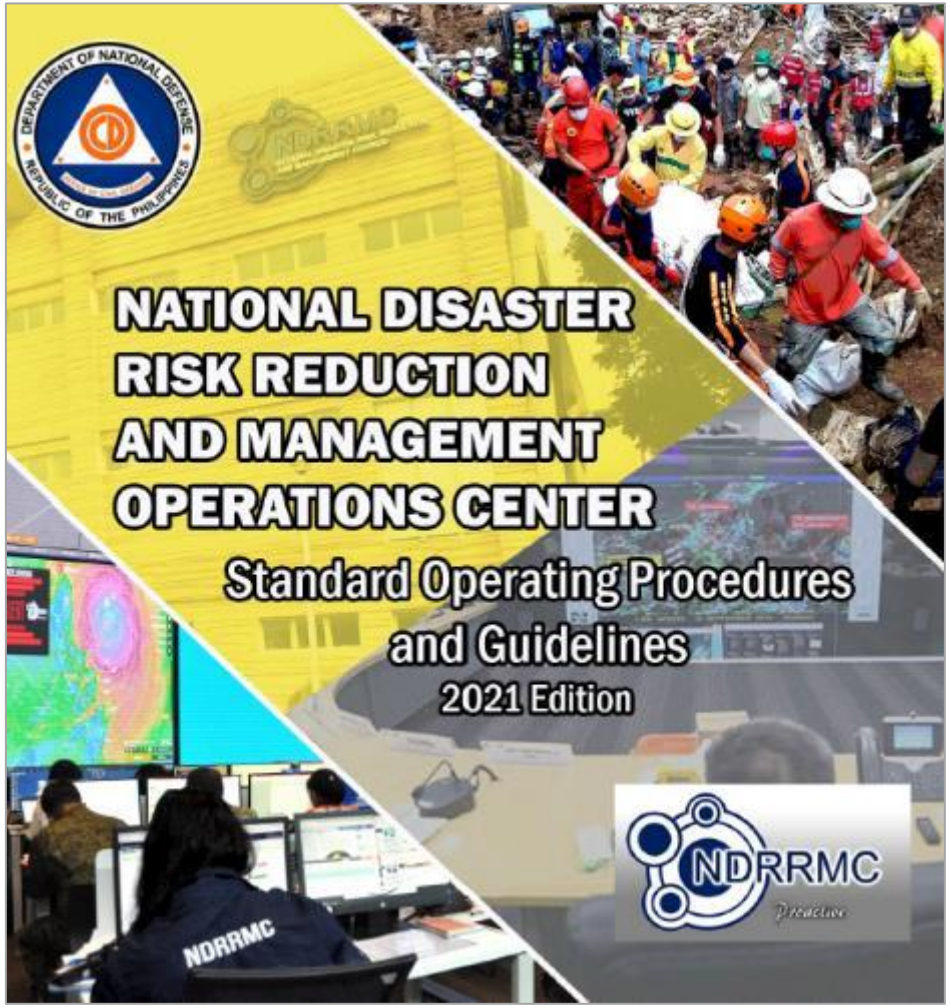
No quantification of disaster wastes!



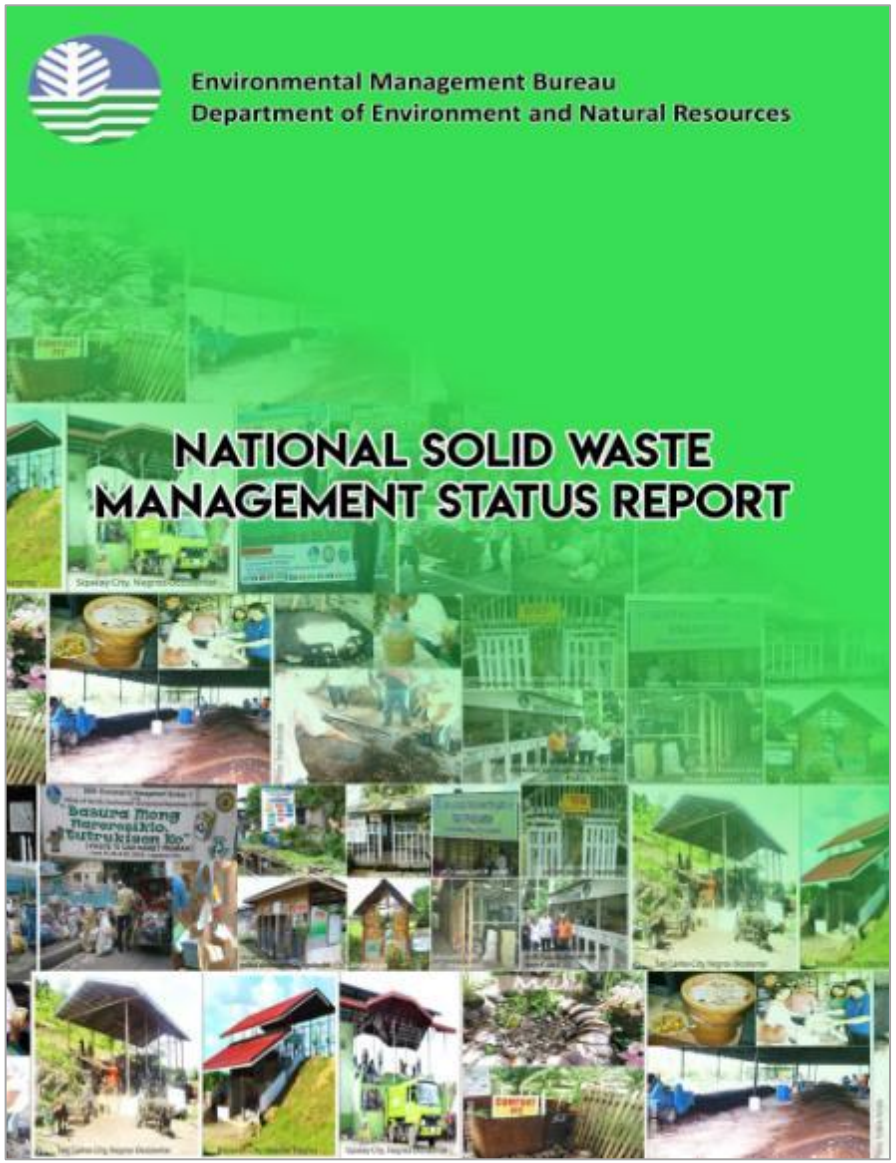
NDRRMC (2018)



NEDA (2020)

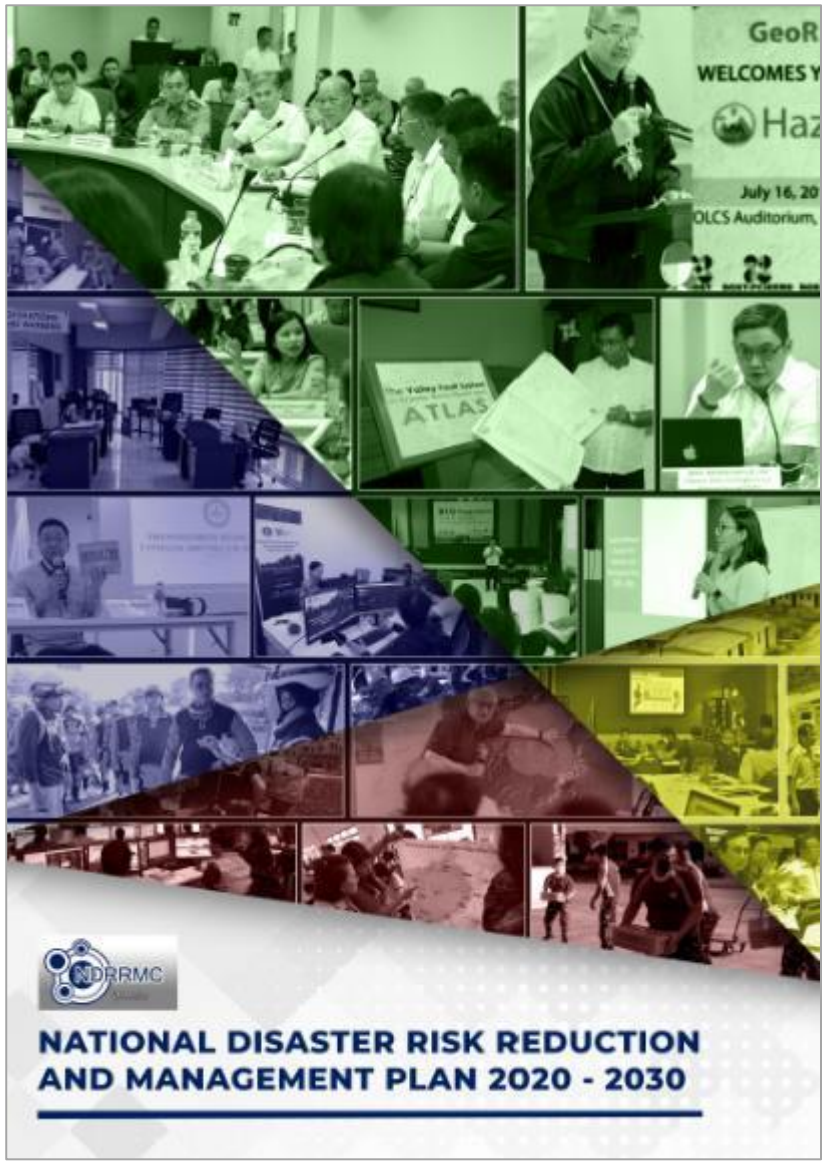


NDRRMC (2021)



National Solid Waste Management Status Report (2008-2018)

- **Waste management infrastructure** may be prone to disasters
- Uncollected wastes may lead to **clogged waterways** that can result in massive flooding during extreme rainfall events
- **Does not mention disaster wastes from 2009 Typhoon Ketsana and 2013 Typhoon Haiyan**



National Disaster Risk Reduction and Management Plan (2020-2030)

- **First plan to explicitly mention "disaster waste management"** but only in passing, as one of the emerging issues that are gaining traction in discussions in the DRRM community

Qualitative content analysis of 60 laws and policies (1938-2020)

- **The Philippines does not have a law on DWM per se**
- Policies from **four streams** guide DWM implementation
  - Most directives **focus on road-clearing** operations
  - As regular SWM is inadequate, DWM is expected to be also inadequate
  - **Poor or no records** of how disaster wastes were treated and/or disposed of
  - Largely a **missed opportunity** to recover useful materials from disaster wastes

Qualitative content analysis of 60 laws and policies (1938-2020)

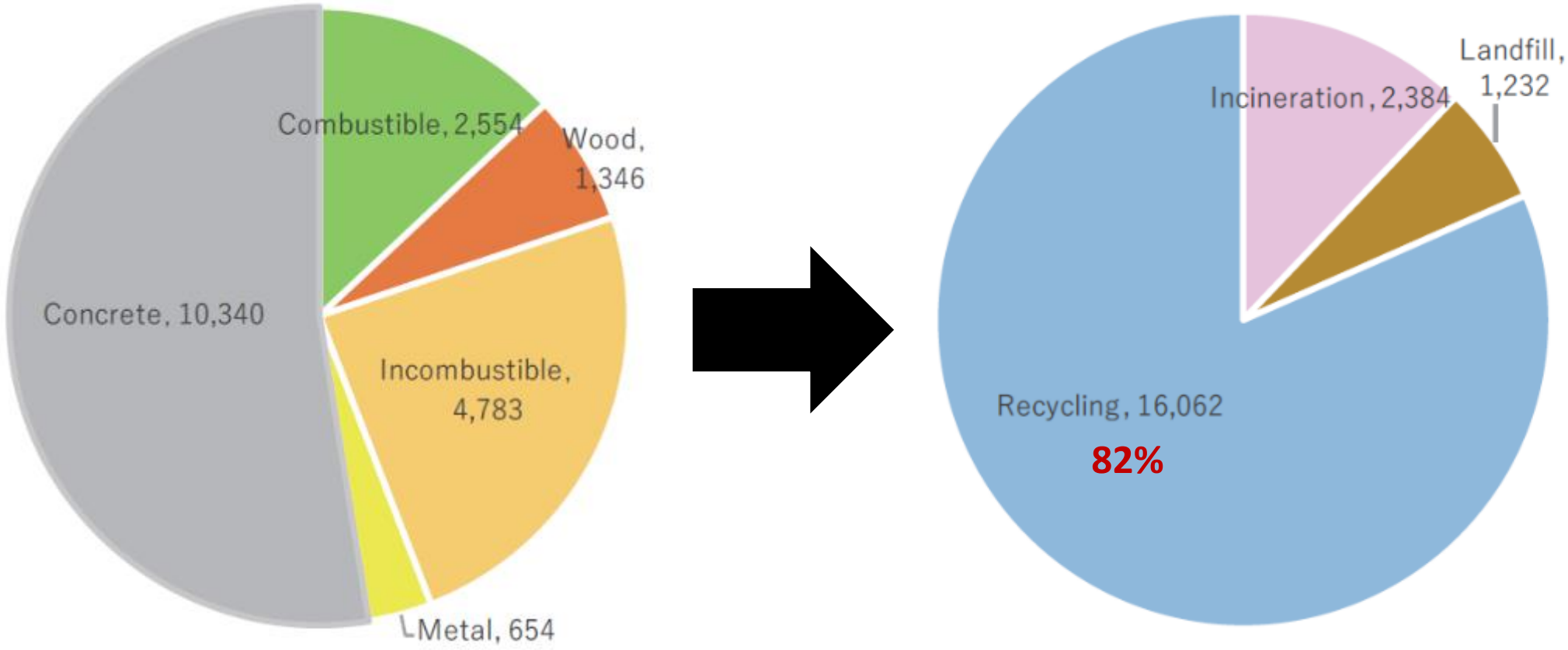
Only Republic Act 7160 (and succeeding laws creating new provinces and cities) explicitly mentions disaster waste management:

- The appointment of a **general services officer** is mandatory for the provincial and city governments
- One of the duties of the general services officer:
  - Be in the frontline of the **orderly and sanitary clearing up of waste materials or debris, particularly during and in the aftermath of man-made and natural calamities and disasters**

Going beyond road-clearing operations

- The **20-year old solid waste management law (RA 9003) should be updated** to include DWM in the National Solid Waste Management Framework and in long-term plans.
- The **guidelines** for the preparation of local DRRM plans, SWM plans, and climate change action plans **should be modified to include DWM**, with the following contents suggested by international guidelines:
  - Assigning roles to various stakeholders
  - **Increasing waste reduction, recycling, and reuse** and **minimizing the residual wastes going to landfills**
  - Setting up incentive schemes for and addressing barriers to the implementation of DWM
  - Promoting **resource conservation** through education

Composition of disaster waste and recycling rate: 2011 Great East Japan Earthquake and Tsunami



Source: Japan MoE & JSMCWM (2018), p. 7

Philippine National Greenhouse Gas Inventory (in million metric tons of CO2 equivalent)

Sector	1994	2000	2010
Energy	34.15	43.733	55.742
Agriculture	33.137	37.001	43.152
Transport	15.888	25.937	24.184
Waste	**7.094**	**11.6**	**15.561**
Industrial Processes and Products Use (IPPU)	10.603	8.61	11.874
Land Use Change and Forestry (LUCF)	-0.127	-105.111	-36.998

Reference: Recabar et al. (2019)

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DONOR

APN
ASIA-PACIFIC NETWORK FOR GLOBAL CHANGE RESEARCH

PARTICIPATING RESEARCH INSTITUTIONS

IDMR
Sichuan University – Hong Kong Polytechnic University
Institute for Disaster Management and Reconstruction

GSGES
Kyoto University
Graduate School of Global Environmental Studies

PARTICIPATING CITIES

LUNGSOD NG MAKATI PILIPINAS 1995

CITY OF LAUTOKA

LUNGSOD QUEZON PILIPINAS

ATENEO DE MANILA

UNEP

1907 TONGJI UNIVERSITY

IESD

Objectives of our APN project on DWM

1. To promote **resource conservation** and **resource efficiency** through **waste prevention** and by **recovering valuable materials** from typhoon-related disaster waste
2. To **determine training needs** related to capacity-building for effective post-typhoon disaster waste management
3. To **produce training materials** and to **deliver training** on post-typhoon disaster waste management that can address the needs of the participating cities
4. To assist participating cities to **develop a typhoon-specific disaster waste management contingency plan**

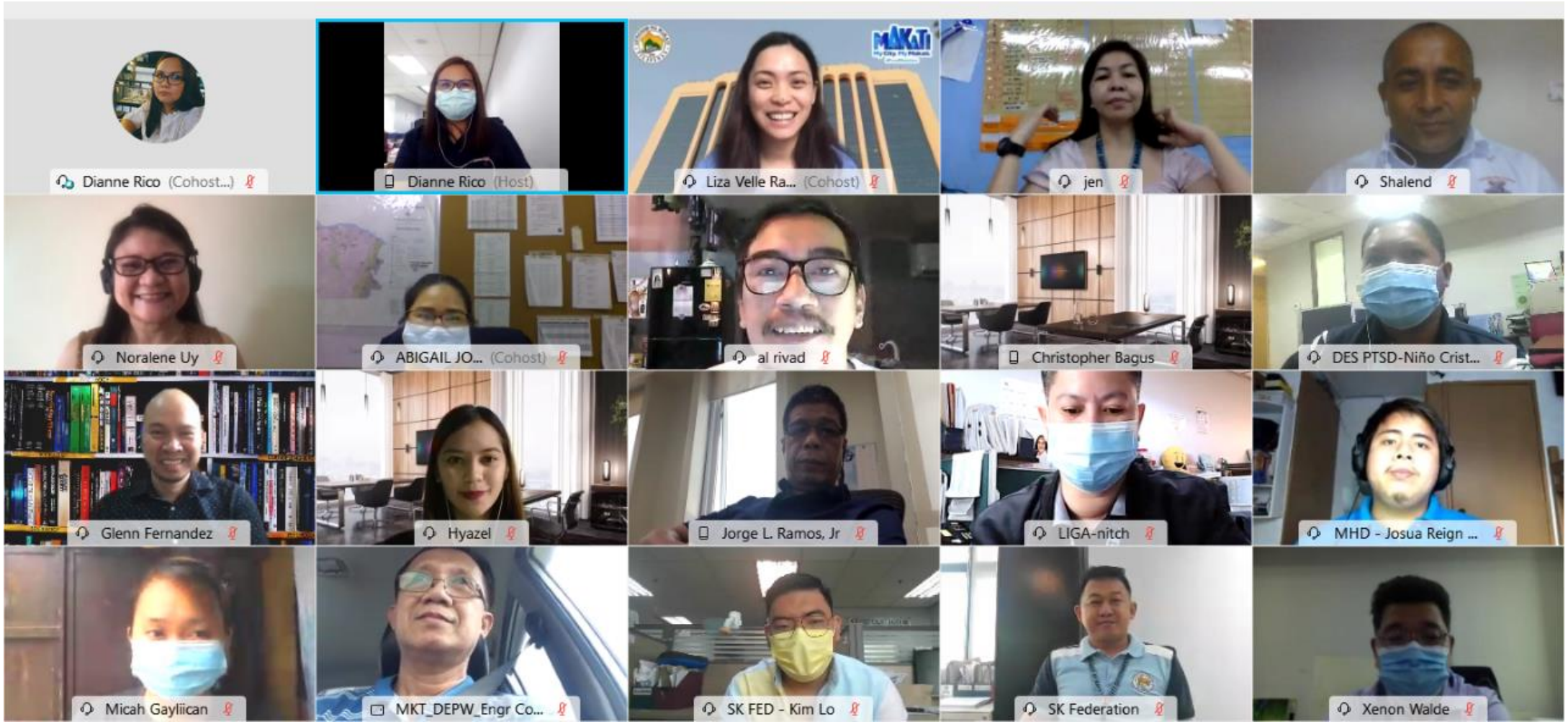
Project Launching in Makati, Philippines on October 2, 2019

Project Launching in Lautoka, Fiji on October 24, 2019

Training of Trainers in Ateneo on January 15-16, 2020

Face-to-Face Training in Makati on January 17, 2020

Virtual Training for Makati on March 24, 2021



International DWM Webinar on April 28, 2021

Mentoring Seminar for Makati on June 18, 2021

Hybrid training workshop in Lautoka on March 23, 2022

NATIONAL NEWS www.fijitimes.com

Disaster waste control

'Allocations, arrangements should be done in advance to enable sound management'

By SHIRAZ KASIM

DISASTER waste management consumed a significant portion of the recovery costs, Lautoka City Council chief executive officer Mohammed Anees Khan said.

He said it was critically important for pre-disaster planning and capacity building that would result in cost-effectiveness during the LCC's disaster waste management contingency planning workshop at Lautoka's Tanoa Waterfront Hotel on Wednesday.

He said budgetary allocations, organisational arrangements and assignments of roles to various departments should be placed in advance to enable sound disaster waste management.

"It will result in cost and time savings," he said.

"The 'Developing Capacity for Post Typhoon Disaster Waste Management' project will contribute to the provision of appropriate knowledge and learning to the various stakeholders, especially the LCC staff.

"It's necessary to prepare in advance by addressing policy gaps in disaster waste management, including the deficiencies in the existing financial, technical, and institutional capacities."

Mr Khan said the objectives of the projects were to raise awareness and develop a capacity to promote resources conservation, including resource efficiency through waste prevention and the recovery of valuable materials from cyclone-related disaster waste.

"The training materials will be produced from the project to deliver adequate training on post-typhoon disaster waste management that will address the training needs of the participating cities.

"The workshop further promotes international co-operation among the project partners by facilitating knowledge sharing based on the experiences and lessons learnt from the project."

The workshop finished in the afternoon and included some international project members and guest speakers, who had joined online via the zoom platform.

Participants at the Lautoka City Council's contingency planning workshop on disaster waste management at the Tanoa Waterfront Hotel's conference room in Lautoka on Wednesday. Picture: SHIRAZ KASIM

Project Outputs

1. **Training needs assessment** for the participating cities
2. **Training materials** according to the needs of the participating cities
3. At least **100 city officials and local stakeholders trained**
4. Two typhoon-specific **disaster waste management contingency plans**
5. **Presentations** at local and international conferences and forums
6. **Dedicated website** for sharing information about the project
7. **Partnerships with different organizations** for continuing our capacity development activities beyond the APN-funded project
8. Establishment of the **Philippine Association for Disaster Waste Management**

Philippine Association of Disaster Waste Management
https://disaster-waste.org/

- **Main aim**: to promote and support disaster waste management by local governments in the Philippines

Grassroots Science Advice Promotion Awards 2022

- **Science Advice on Disaster Waste Management**: Enabling Local Governments to Practice and Promote Building Back Better, Circular Economy, and Climate Change Mitigation

INGSA: International Network for Government Science Advice

Sendai Framework Voluntary Commitment

- **Commitment**: Disaster Waste Management Capacity Development for Local Governments

NEXT STEPS to Continue DWM Capacity Development

- Continuity partnership with the **Development Academy of the Philippines** in delivering DWM training for local government staff

- **Start working with other interested cities** in developing their DWM contingency plans, such as Puerto Princesa City in Palawan

- Promotion of **Business Continuity Management** for service providers and contractors to minimize disruption to MSWM during disasters

MSWM is a public service

- For some public service, such as garbage collection, there might be **no alternative service provider**

- **Continuity of operations** therefore needs to be assured

Source: ADCB

THANK YOU

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