

3.2.23 Disaster Waste Management Contingency Planning in Coastal Cities in Fiji and the Philippines (Action 4.2.1)

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Context: The management of disaster waste is a necessary task in the early phase of disaster recovery (Asari et al., 2013). In catastrophic disasters, such as 2013 Typhoon Haiyan in the Philippines, the amount of waste generated can overwhelm local capacity to handle the waste, affecting other tasks such as rescue operations and delivery of humanitarian aid. It can take weeks or months to dispose of disaster waste, possibly due to underestimation or lack of estimation of the amount of waste that particular natural hazards such as earthquakes, flooding, and typhoons, can generate. As a consequence, disaster waste management can consume a significant portion of the disaster recovery cost. However, pre-disaster planning and capacity-building can result to cost effectiveness. Funding mechanisms, institutional arrangements, and assignment of roles to various stakeholders must be in place in advance to enable sound disaster waste management that can result to cost and time savings and recovery of resources for recycling.

Key Stakeholders:

- Lautoka City, Fiji
- Makati City, Philippines
- External higher education institutions
 - Institute for Disaster Management and Reconstruction, Sichuan University
 - Department of Environmental Science, Ateneo de Manila University, Philippines

- Graduate School of Global Environmental Studies, Kyoto University, Japan
- UNEP-Tongji Institute of Environment for Sustainable Development (IESD), Tongji University, China
- Funding agency
 - Asia-Pacific Network for Global Change Research, Japan

Process: Wastes can pose a serious threat to human health and safety. It is, therefore, necessary for coastal cities frequently affected by typhoons to have adequate capacity for post-disaster waste management. This ongoing project will contribute to this end via the provision of appropriate knowledge and training to government and non-government stakeholders. This ongoing one-year project will be implemented in Lautoka City, Fiji and Makati City, Philippines with the support of five prominent universities (Sichuan University, Hong Kong Polytechnic University, Kyoto University, Ateneo de Manila University, and Tongji University). In our capacity development intervention, we will utilize a blended learning approach, combining online distance education (i.e., requiring the participants to complete an introductory Disaster Waste Management course with the use of the Internet) and traditional face-to-face training facilitated by university professors, subject matter experts, and city officials. At the end of the project, we target to produce at least 100 individuals (50 in each participating city) trained in post-typhoon disaster waste management. The two cities are also expected to produce a typhoon-specific disaster waste management contingency plan.

Role of Science and Technology: Evidence suggests that communities with pre-disaster waste management arrangements tend to have more effective waste management processes than communities without such arrangements. Science can be used to justify

Figure 49: Participants during Disaster Waste Management Course



to the local government and other stakeholders need for the contingency planning exercise. Pradhan & Xu (2018) mentioned possible methods to manage disaster waste, including those generated by typhoons. Brown & Milke (2016) studied five disaster events, including Hurricane Katrina, to investigate the feasibility and effectiveness of recycling disaster waste.

Lessons from previous studies can be applied in the ongoing project.

Possible Replication and Challenges: Training materials and other knowledge products of this ongoing project will be shared freely on the dedicated project website to benefit more cities: <http://disaster-waste.org/> (under construction).

3.2.24 Social Care for the Elderly in Disaster Situation (Action 4.2.2)

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and up to around 20% in 2040 (BPS: 2018).

The elderly in Indonesia who live in the area prone to natural hazard-induced disasters, requires the efforts of all parties to provide protection and handling from the impact of the disaster.

Context: The Elderly in Disaster Situation; Key stakeholders: Ministry of Social Affairs

Process: The number of elderly population in Indonesia in 2018 was 24.49 million or around 9.27% of the total national population (BPS: 2018). In 2020 it is estimated that around 10% of Indonesia's population will be 60 years old up

Law no.24 of 2007 concerning Disaster Management, especially Article 48 and 55 mentioned that in the organization disaster management is needed protection towards vulnerable groups such as children, people with disabilities, and elderly. Protection of elderly in situations disaster relief includes: 1) rescue and evacuation to temporary shelters, 2) recovery of physical