

JAPAN SOCIETY OF MATERIAL CYCLES AND WASTE MANAGEMENT

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Material Cycles and Waste Management Research as Environmental Studies and further integration towards sustainability

It is an honor to contribute this foreword as one of the Vice Presidents of the Japan Society of Material Cycles and Waste Management.



It is already more than 18 years since national policies for material cycles and waste management were integrated with environmental policy in Japan, through the reorganization of the government, as reported in Newsletters #36 & 37. Along with the governmental structural change, the Center for Material Cycles and Waste Management Research was newly established as one of the research centers within the National Institute for Environmental Studies (NIES). Following the inaugural director, Prof. Shin-ichi Sakai, 11th President of JSMCWM, I served as the second director of the Center from April 2005 to March 2011. Though my earlier career had not been focused on waste management issues, but rather broader environmental studies, my favorite research topic was ‘material cycles’, which was emerging as an essential keyword to link waste management research and broader environmental studies. This perspective has also been evolving internationally, e.g. as can be seen with the keyword expression, ‘industrial ecology’.

Eight years after my move from NIES to the University of Tokyo, as of April 1, 2019, I am being given new responsibility as a Vice President of NIES. This is an exceptional opportunity to re-recognize the positioning of material cycles and waste management research within the broader spectrum of environmental studies, and to explore the further possibility of integrating MCWM research into other areas of environmental studies.

Such integration is also being anticipated for its contribution to fundamental Japanese policies towards the creation of a society with a sound material-cycle. In connection with this theme, Ms. Junko Nishikawa from the Ministry of the Environment contributed an article to Newsletter #91, giving an overview of the Fourth Fundamental Plan for Establishing a Sound Material-Cycle Society (Fourth FPSMCS), which was approved by the Cabinet in June 2018.

One of the seven pillars of the Fourth FPSMCS is the “Regional Circular and Ecological Sphere (Regional CES)”. This keyword expression, Regional CES, is at the same time one of the key concepts in the Fifth Basic Environment Plan, also adopted in 2018. According to Nishikawa’s article, “Regional CES represents a self-reliant and decentralized society, making use of regional resources, and complementing and supporting one another according to unique characteristics of each region. With effective use of renewable, stock, and circulative resources, it will improve local resource efficiency and vitalize local economies in an integrated manner.” Recyclables from industrial products, both pre- and post-consumer, are of course one of these “regional resources”, as are non-tangible natural resources like so-called eco-system services. Moreover, the use of renewables such as biomass is attracting increasing attention for re-vitalizing local economies. Past experience in avoiding coastal landfill construction and reducing waste generation to protect eco-system services from estuaries may be re-interpreted as an example of an effort towards the realization of the circular and ecological sphere.

Further integration is mentioned in the first of the seven pillars of the Fourth FPSMCS, which is “Integrated Measures toward a Sustainable Society”, anticipating

the integrated improvements in the environment, economy, and society. These three improvements have repeatedly been mentioned in the context of sustainable development. Thanks to the adoption of SDGs, sustainability issues are evolving from concept to action, by setting measurable and accountable targets and by linking them to policy and measures.

Of course, we should not forget the challenging issues we face in waste management and environmental pollution, including waste and soils contaminated by radioactivity from nuclear accident, a problem which remains right in front of us. Ensuring environmental safety is a fundamental, necessary condition of sustainability.

(Yuichi MORIGUCHI)

The 18th Expert Meeting on Solid Waste Management in Asia and Pacific Islands (SWAPI)

The 18th Expert Meeting on Solid Waste Management in Asia and Pacific Islands (SWAPI) was held from January 16th to 18th, 2019 at Surugadai Memorial Hall, Chuo University. The organizers were SWAPI and the Japan Society of Material Cycles and Waste Management (JSMCMWM). The role of Secretariat was served by the International Cooperation and Business Department, Japan Environmental Sanitation Center. The purpose of this conference was 1) to further strengthen the network of experts in the waste management and 3R fields in Asia and the Pacific region; and 2) to study the establishment of a proper international resource cycle and waste management system.

The program consisted of three special sessions, two SWAPI expert meetings, and a presentation session of research projects promoted by the Environment Research and Technology Development Fund by the Ministry of Environment, Japan. The special session themes were “Moving on to the next stage for Disaster Waste Management in Asia and the Pacific”; “Management of Plastic Waste”; and “Waste to Energy (WtE) Bidding Process”. A total of 188 people participated — in SWAPI meetings 133 people and in research project presentations 55 people. Also, active discussions were held by participants from eight countries. The programs, presenters, and photos of the special sessions are shown below. The presentation session was a great opportunity to present the research projects, which are supported by the Fund by MOE, Japan to the general public. Three presentations were about research on disaster waste and final disposal.

Many participants were interested in these themes because they were closely related to the Special Sessions, and as a result the participants had very active discussions.

Summary of Special Session I

Special Session I

Moving on to the next stage for Disaster Waste Management in Asia and the Pacific

- Facilitators:
Shinichi Sakai (Kyoto University, Japan)
Mahesh Pradhan (UNEP-IETC)

- Presentations and presenters:

Recent Japan's Experiences to Tackle with Disaster Waste

Junko Nishikawa
(Ministry of the Environment, Japan)

Disaster Waste Management Experience

Malakai Lomu Sika
(Waste Authority Limited, Tonga)

Disaster Waste Management in Indonesia: Current Status and Future Challenge

Maryono
(Diponegoro University, Indonesia)

Development of Technical Tools

Makoto Tsukiji, Tomonori Ishigaki
(JSMCWM DWMGL Technical Team)



Summary of Special Session II

Special Session II

Management of Plastic Waste

- Facilitators:

Masaru Tanaka

(President of SWAPI / Research Institute of Solid Waste Management Engineering)

Enri Damanhuri

(Institute of Technology Bandung, Indonesia)

- Presentations and presenters:

Plastic Waste Management: Issues and Indian Initiatives

Kurian Joseph

(Anna University, Chennai, India)

Some Efforts of Indonesia to Reduce Plastic Waste Flowing into Environment

Enri Damanhuri

(Institute of Technology Bandung, Indonesia)

Plastic and Plastic Waste Management: Issues and Challenges

Agamuthu Pariatamby

(University of Malaya, Malaysia)

Plastic Waste Management in Vietnam: Current Status and Future Directions

Nguyen Thi Kim Thai (National University of Civil Engineering, Vietnam)

- Commentator

Orawan Siriratpiriya

(Chulalongkorn University, Thailand)



Makoto Yamamoto

(Japan Environmental Sanitation Center, Japan)

Waste-to-Energy Bid Process and Capacity Building of Local Governments

Justine E. Padiernos (PPP Center, Philippines)

Progress of Waste to Energy Facilities

Development in Indonesia

Enri Damanhuri

(Institute of Technology Bandung, Indonesia)

Quick Win Project of Waste to Energy (WtE) in Thailand

Orawan Siriratpiriya

(Chulalongkorn University, Thailand)



Summary of Presentation of research projects promoted by the Environment Research and Technology Development Fund by MOE

Summary of Special Session III

Special Session III

Waste to Energy (WtE) Bidding Process

- Facilitators:

Hideaki Fujiyoshi

(Japan Environmental Sanitation Center, Japan)

Agamuthu Pariatamby

(University of Malaya, Malaysia)

- Presentations and presenters:

Issues on promoting Waste to Energy Project in Asian Countries

Disaster Waste Management and Final Disposal

- Facilitators:

Hideaki Fujiyoshi

(Japan Environmental Sanitation Center, Japan)

Kurian Joseph

(Anna University, Chennai, India)

- Presentations and presenters:

Assessment of Sustainable Adaptation Measures to Manage Disaster Waste from Great Earthquake against Related Social Risks

Keiichi Kitazume (Kansai University)

Application of Super fluidized Treatment to Landfill of MSWIRs for Quick restoration from an Earthquake
Takayuki Shimaoka (Kyushu University)

Inert Waste Landfills - Test and Design Methods for Safe and Sustainable Management
Takeshi Katsumi (Kyoto University)



Expert meeting on Jan. 18



Group photo of the participants

(Satoshi Mizutani and Makoto Yamamoto)

Dissemination of Disaster Waste Management Guideline for Asia and the Pacific at SWAPI 2019 in Tokyo

An Expert Meeting on Solid Waste Management in Asia and Pacific Islands (SWAPI) has been held every year since 2005, with the support of the Ministry of the Environment, Japan (MOEJ), in order to facilitate networks among experts and to promote sound waste management and the 3Rs (Reduce, Reuse, and Recycle) in Asia and the Pacific region. The 18th meeting was held from January 16th to 18th, 2019 at Surugadai Memorial Hall, Chuo University in Tokyo.

During Special Session I, “Moving on to the next stage for Disaster Waste Management in Asia and the Pacific”, the editing team of the Disaster Waste Management Guideline for Asia and the Pacific (DWM Guideline) under JSMCWM presented the latest version of the DWM Guideline, as well as work being undertaken to compile technical practices on disaster waste management.

The session was facilitated by Prof. Shinichi SAKAI of Kyoto University. The program included:

- Recent Japan’s Experiences to Tackle with Disaster Waste: Junko NISHIKAWA (MOEJ);
- Disaster Waste Management Experience: Malakai Lomu SIKA (Waste Authority Limited, Tonga);
- Disaster Waste Management in Indonesia: Current Status and Future Challenge: MARYONO (Diponegoro University, Indonesia);
- Development of Technical Tools: JSMCWM Disaster Waste Management Guideline for Asia and the Pacific Technical Team.

Ms. Junko NISHIKAWA, Deputy Director, Office of Disaster Waste Management, MOEJ highlighted the fact that safety, speed, and cost effectiveness are the guiding principles for disaster waste management in Japan. Japan has learned many lessons from the Great East Japan Earthquake, particularly that it was a challenge to develop policies and an institutional structure that allows effective and rapid response, as well as ensures sound waste treatment through adequate guidelines and mechanisms. Making the most of these lessons, MOEJ currently provides human, technical, and financial support through the disaster waste treatment network, or D.Waste-Net. It also provides assistance for those coping with disasters overseas, such as the earthquake and tsunami that hit Central Sulawesi Province in Indonesia in 2018.

Next, Mr. Malakai Lomu SIKA, Chief Executive

Officer, Tonga Waste Authority Limited, presented an overview of the Tonga national legislative framework on disaster management, and their experiences with disaster waste management. As Tonga is often hit by tropical cyclones, he introduced their experience in having dealt with the damage caused by Tropical Cyclone Gita — estimating disaster waste amount and collecting disaster waste flow and green waste. He also pointed out that the lack of resources, coordination and guidance, and conflicting interests among stakeholders are the next challenges to be tackled.

Dr. MARYONO of Diponegoro University introduced his current work on disaster waste management in Indonesia. Using the data from nine Indonesian earthquakes, he presented an evaluation based on a SWOT model on planning for management and implementation of treatment. He also introduced a model for disaster waste estimation and a disaster waste resilience index model, both for Indonesia. In addition, he reported on a model of the factors that affect stakeholders' willingness to promote preparedness on disaster waste management.

Lastly, the editing team of the DWM Guideline reported on the work being undertaken this fiscal year on compiling technical practices on disaster waste management as a step toward updating the current DWM Guideline. The team consists of four working groups (WG), and a representative of each group presented an overview of their work. Dr. Tomonori ISHIGAKI of the National Institute of Environmental Studies (NIES) reported that WG1 is addressing the classification of disaster waste for quick recovery. Dr. Atsushi TAKAI of Kyoto University presented on the work of WG2, which is to elaborate how to estimate generation of disaster waste. Dr. Ryo TAJIMA of NIES spoke about the work of WG3 in compiling practices to maximize risk reduction. Lastly, Mr. Makoto TSUKIJI of JSMCWM reported on the work of WG4, which is to support the development of preparation plans in Asia and the Pacific regions using the template proposed by the DWM Guideline. WG4 conducted a workshop in Samoa from October 16th to 18th, 2018, hosted by SPREP and J-PRISM, to develop a preparation plan on disaster waste management. The participants were central and local governmental officers in charge of disaster management and waste management. Using the template developed in the DWM Guideline, the participants were able to create drafts of their own preparation plans and waste treatment flows.



The pictures above are from the presentation of Mr. Makoto Tsukiji of Working Group 4

One of the participants from the floor asked about the recycling rate of disaster waste in Japan. The presenter responded that all tsunami sediments are recycled because of limitations on final disposal sites, and that separation at an early stage is the key in doing so. Another participant pointed out from his experience that bringing bio-degradable waste to a temporary storage site is likely to be resisted by residents of an affected area. The presenter agreed and stressed the importance of consulting with municipalities in advance to set storage sites apart from important facilities, and to start coordination with related stakeholders during normal times.

The work on the DWM Guideline that was reported at SWAPI 2019 has yet to be finalized; new proposals may yet be made. The comments and experiences shared from the floor were gratefully received, as they were constructive and very helpful for refining the compilation of technical practices on disaster waste management.

(Mayumi TAMIYA)

Disaster Waste Management in Indonesia - From the case of the Sulawesi earthquake -

1. Preface

A magnitude 7.5 earthquake occurred in Central Sulawesi, Indonesia on 28th September 2018 (hereinafter the “Sulawesi earthquake”). In addition to direct damage from the earthquake itself, a tsunami and liquefaction occurred. The number of victims surpassed 2,000, 87,560 people were injured, and 173,552 people lost their homes.

In this article, I will summarize the Sulawesi earthquake from the perspective of Disaster Waste Management (DWM). I will also consider the possibility of a contribution from Japan to Indonesia through the formulation and implementation of DWM in Sulawesi applying the Japanese ‘infrastructure strategy’ for disaster reduction.

Indonesian earthquake



Source: AFP

2. Characteristics of the Sulawesi earthquake

Number of Victims

City/Regency	Deaths	Injured	Evacuated
Palu	1,722		
Donggala	171		
Sigi	188		
Parigi Moutong	15		
Total	2,096	87,560	173,552

Source: BPBD Central Sulawesi, Dr. Maryono

Damage to Housing

City/Regency	Totally Damaged	Moderately Damaged	Lightly Damaged
Palu	3,069	4,969	47,643
Donggala	1,106	5,238	8,946
Sigi	5,085	5,536	6,752
Parigi Moutong	1,869	1,763	3,113
Total	31,086	17,551	66,463

Source: BPBD Central Sulawesi, Dr. Maryono

Damage from the Sulawesi earthquake was caused by three natural phenomena: earthquake, tsunami, and liquefaction. Among these liquefaction had not occurred in previous earthquakes in Indonesia. We visited Palu City in February 2019 and found that the basic functions of the city had mostly recovered. We also noticed the most damage was concentrated in areas where liquefaction occurred, and damage was relatively small in the other areas.

Regarding damage caused by the earthquake itself, some shopping malls and hotels collapsed. However, the damage to houses was limited. Most of the waste resulting from the earthquake had been cleared.

The tsunami devastated the coastal areas of Palu City, reaching 200m inland from the coastline and flooding and destroying buildings and houses.



Coastal areas in Palu City where it was devastated by a tsunami (Photo: Author)

The picture above was taken at the coastal area of Palu, at a location that news broadcasts had reported the tsunami reaching. As of February 2019, the collapsed shopping mall and some hotels had not yet been restored. On the other hand, most of the disaster waste had been cleared.

Liquefaction can be said to be a characteristic of the Sulawesi earthquake; it occurred in several areas in Palu City. As a result of this, landslides occurred and destroyed affected areas. After the earthquake occurred, the national government mobilized the National Armed Forces (TNI) and police in order to save victims. Most of damage from the Sulawesi earthquake arose from liquefaction and landslides in Palu City; likewise, most of the victims were from those areas.

In those areas affected by these two phenomena, it is difficult to develop a restoration plan because of the possibility that liquefaction and landslides may occur in

future earthquakes. As for disaster waste caused in these areas, it had not yet been cleared.

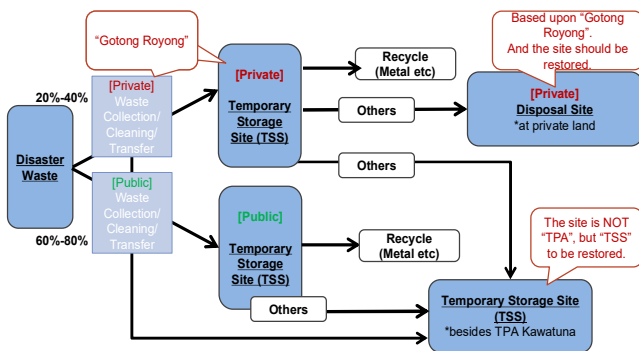


Damage from liquefaction and landslides in Palu City (Photo: Author)



The TSS beside the TPA (Photo: Author)

3. Treatment flow of Disaster Waste in Palu City



The figure above describes the treatment of disaster waste in Palu City. Basically, the collected disaster waste was transferred to a large temporary storage site (TSS) via several small TSSs. Intermediate treatment facilities were not prepared. From the view of DWM, I would like to point out some aspects.

Firstly, the Ministry of Public Works and Public Housing (PUPR) and TNI played roles in debris cleaning. PUPR and TNI collected and transferred the disaster waste to the TSS. The Department of Environment, Palu City (DLH) allocated land for the large TSS beside the final disposal site, a sanitary landfill (TPA). The land was owned by the DLH for the further expansion of the TPA. We should note that this TSS next to the TPA is not a site for final disposal, and that the TSS should be restored appropriately.

Secondly, private sector actors, including waste pickers, collected and sold valuables such as metals. The public sector did not seem to do any intermediate processing, collect or sort valuables from the disaster waste.

Thirdly, in addition to what the public sector offered, the private sector entities also voluntarily provided TSSs and land for waste. From interviews in Palu City, some stakeholders pointed out that they noticed ‘illegal dumping’. However, based upon traditional “Gotong Royong” (mutual aid), some landowners may provide their land as TSSs or disposal sites.

4. Characteristics of Disaster Waste

I had an opportunity to accompany the sampling inspection of disaster waste in Palu City, conducted by Dr. Maryono of Diponegoro University.

We assumed that a large part of the disaster waste in Palu City was rubble. For example, we noticed concrete blocks, concrete debris, and bricks at the TSS and liquefaction and landslide sites. We also found ceramic, broken glass, and tin roofs. As of February 2019, five months after the earthquake, we rarely saw valuables or wood. These seemed to have been collected and sold or reused by private sector actors.



Sampling inspection by Dr. Maryono (Photo: Author)

5. Supporting Sulawesi's Reconstruction Plan by Japanese Government and DWM

The Japanese Government is considering a contribution to disaster reduction as part of its 'Management Council for Infrastructure Strategy'. In line with this strategy, the Japan International Cooperation Agency (JICA) has been implementing the "Project for Development of Regional Disaster Risk Resilience Plan in Central Sulawesi" to support the formulation and implementation of 'Sulawesi's Reconstruction Plan'.

JICA will share Japan's experience with disaster recovery and support the Indonesian government in formulating a reconstruction plan. In addition to this, JICA is planning to support the development and implementation of an Action Plan and the reconstruction of the regional infrastructure, which will be based upon the reconstruction plan.

The Indonesian reconstruction plan may incorporate the construction of a "Green Sea Dyke" in order to enhance resilience against future tsunamis. There is also the possibility of utilizing the rubble generated by the Sulawesi earthquake as construction material for this dyke.

As we pointed out, most of the disaster waste was rubble, which was collected and brought without treatment to the TSS beside the TPA. By utilizing the experience of Japan, we can reuse and recycle this debris to construct the "Green Sea Dyke". In doing so, we will also be able to demonstrate best practices for DWM. The reuse and recycling of rubble will also contribute to the DWM and reconstruction of areas devastated by the Lombok earthquake and Banten Tsunami, which occurred in 2018.

6. Support from Japan for DWM in Indonesia

At the G7 Toyama Environment Ministers Meeting and the Tripartite Environment Ministers Meeting among Japan, China and Korea (TEMM) 18, member states agreed to assist countries or regions in Asia and the Pacific, where frequent earthquakes and other disasters have occurred.

Moreover, the Ministry of Environment Japan (MOEJ) published the "Disaster Waste Management Guideline for Asia and the Pacific" in 2018, compiling issues to be considered for proper, smooth, and speedy treatment of disaster waste, based on Japanese experience with disasters.

In Indonesia, the Ministry of Environment and Forestry (KLHK) will soon publish the government regulation for specific solid waste management, which will address

the treatment of disaster waste. KLHK will also consider developing ministerial regulations which function as a guideline for DWM.

MOEJ has been supporting DWM in Indonesia, and as part of its activities, we held a workshop with stakeholders on 12th March 2019 in Jakarta. Not only did central Indonesian ministries such as KLHK, PUPR and the National Agency for Disaster Countermeasure (BNPB) take part, but so did regional stakeholders, including local Departments of Environment and local PUPR from Banten, Lombok, and Palu. Participants exchanged information and discussed the way forward of DWM in Indonesia.



DWM workshop on 12th March 2019 in Jakarta
(Photo: Author)

7. Conclusion

Japan can use its knowledge and experience in DWM policy to make an international contribution to the reconstruction of Sulawesi through two policies: 1) Support the formulation and implementation of Sulawesi's Reconstruction Plan, Action Plan and the reconstruction of infrastructure; and 2) Support for DWM in Indonesia.

Specifically, we can utilize and localize the experience of Japan in order to support recovery from the Sulawesi earthquake, and provide feedback about DWM in Indonesia. These actions will support the development of a proper DWM in Indonesia as well as building and enhancing resilience to disasters.

Acknowledgements

In writing this article, I referred to the results of DWM surveys in overseas countries or areas conducted by MOEJ.

In addition, Dr. Maryono of Diponegoro University has contributed to this article. He kindly provided data and information about disaster waste in Indonesia, and

coordinated the site visit to Palu City.

(Shintaro Higashi)

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(*: Corresponding author)

Current Members of JSMCWM

Current Members of JSMCWM as of January 31 st , 2019	
Regular Members	2,008
Fellows	45
Seniors	53
Honorary Members	8
Students	181
Public Institutions	89
Supporting Companies	118
Supporting Individuals	1
Regular Association Citizens	4
Individual Citizens	15
Total	2,522

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