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**PARLIAMENTARY INSTITUTE OF CAMBODIA**  
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## Briefing Note

Regional Fellowship Program

# Overview of Solid Waste Management in Myanmar

**Author:** Ms. Khaing Zar Yee, Fellow from Myanmar  
**Direct Supervisor:** Ms. Bandeth Ros, Senior Instructor  
**Editor:** Mr Jeffrey Cole

September, 2019

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## Acronyms

ADB	: Asia Development Bank
ASEAN	: Association of Southeast Asian Nations
CDC	: City Development Committee
EU	: European Union
IGES	: Institute of Global Environment Strategies
INGO	: International Non-Governmental Organization
ISWA	: International Solid Waste Association
JICA	: Japan International Cooperation Agency
KOICA	: Korea International Cooperation Agency
MSDP	: Myanmar Sustainable Development Plan
MCDC	: Mandalay City Development Committee
MSW	: Municipal Solid Waste
NEP	: National Environment Plan of Myanmar
NGO	: Non-Governmental Organization
3Rs	: Reduce, Reuse, Recycle
SDGs	: Sustainable Development Goals
TDC	: Township Development Committee
UN	: United Nations
UNEP	: United Nations Environment Program
WB	: World Bank
YCDC	: Yangon City Development Committee

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## **1. Introduction**

### ***1.1 Problem***

Solid waste includes municipal garbage, industrial and commercial waste, sewage sludge, waste resulting from agricultural and animal husbandry operations and other connected activities, demolition waste and mining residues[1]. Globally, it was estimated that 2.01 billion tons of municipal solid waste was generated annually according to the UNEP report in 2017, and waste generated per person per day averages 0.74 kilogram but ranges widely, from 0.11 to 4.54 kilograms[2]. These numbers differ in ASEAN, where municipal solid waste generates 1.14kg/capita/par day[3]. Solid waste management is mentioned in the Sustainable Development Goals (SDGs) “11”and “12”as a way of promoting sustainable cities and communities, along with sustainable consumption and production[4]. It was also emphasized in the ASEAN Joint Declaration on Hazardous Chemical and Waste Management in 2017[5].

Myanmar generates nearly the 9th lowest amount of municipal solid waste at 0.84 million tons per year in ASEAN[3]. Despite the low amount, the Government of Myanmar approved the National Waste Management Strategy and Action Plan for Myanmar 2017-2030 in 2018, which sets out the strategy based on principles of inclusiveness, zero waste, zero emissions to achieve a greener, cleaner and healthier environment in the country[6]. The government has implemented the action plan to contribute to the three pillars (environmental, economic and social matters) for sustainable development[6]. However, Myanmar still faces significant challenges with the management of solid waste. Therefore, the aim of this briefing note is to investigate the challenges facing current solid waste management in Myanmar and opportunities to improve the situation.

### ***1.2 Research Questions***

This briefing note seeks to address three specific research questions listed below:

- What is the current solid waste management system in Myanmar?
- What are the challenges and opportunities for current solid waste management in Myanmar?
- What is the existing legal framework and policies to support solid waste management in Myanmar?

### 1.3 Research Methodology

This briefing note reviewed secondary data and existing reports from the Ministry of Natural Resources and Environmental Conservation, the Environmental Conservation Department, Yangon City Development Committee, Mandalay City Development Committee, and Naypyitaw City Development Committee. As well, it reviewed data from the Asia Development Bank (ADB), United Nations Environment Program (UNEP), International Environmental Technology Center (IETC), Institute for Global Environmental Strategies (IGES), International Solid Waste Association (ISWA), Asian Institute of Technology (AIT) and other related academic articles.

## 2. Current Solid Waste Management System in Myanmar

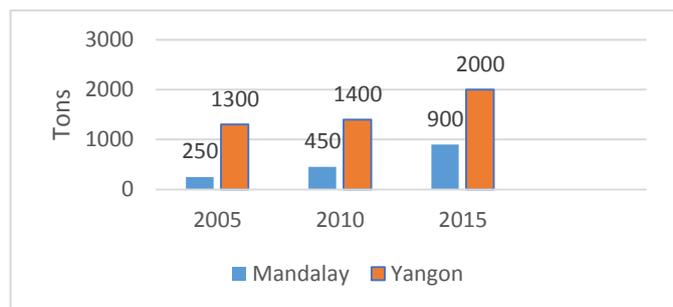
### 2.1. Types of Solid Waste

Different types of waste come from different sources such as residential, industrial, commercial, institutional, construction, demolition, municipal services and processing[7]. The types of waste consist of food waste, paper, cardboard, plastics, textiles, leather, yard waste, wood, glass, metal, ashes, special waste, batteries, oil, tires and household hazardous waste [7]. There

is a rapid increase in waste generation in some cities in Myanmar[8]. The three major cities of Yangon, Mandalay and Naypyitaw generated

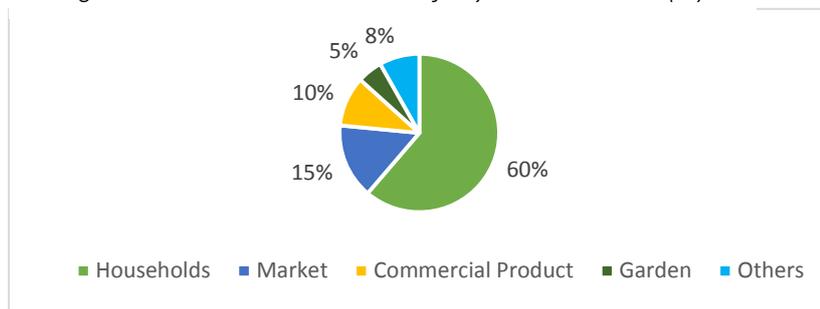
approximately 55 percent of total solid waste in the country in 2016 [9]. As referenced in Figure 1, solid waste generation in Mandalay increased from 250 tons in 2005 to 900 tons in 2015, whereas in Yangon, from 1,300 tons in 2005 to 2,000 tons in 2015[9] (See Figure 1). The increase in waste generation in the two cities was due to rapid industrialization, and urbanization, both products of economic growth, which led to increased consumption and a resulting increase in waste [6]. According to the World Bank's report in 2019, solid waste generation in Myanmar was 0.56 kg/capita/day, totaling 28.850tons/day and 10.5/Million/tons/year[10]. Solid waste was expected to reach about 21,012 tons/day with 0.85 kg/capita/day by 2025[11].

Figure1: Waste generation in Mandalay and Yangon in Myanmar in 2016 (tons)



Source: Premakumara, D, Hengesbaugh, M, Onogawa, K and Ohnmar, O, (2017)

Figure 2: Waste Characteristic of Myanmar in 2016 (%)



Source: Premakumara, D., Hengesbaugh, M., Onogawa, K. and Ohnmar, O (2017)

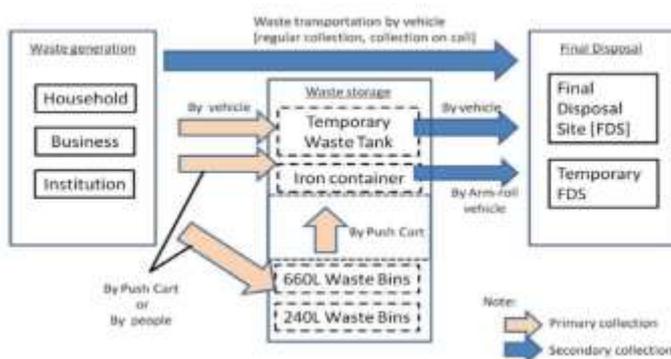
As shown in Figure 2, a study in 2017 found that the physical composition of Myanmar’s municipal solid waste primarily comes from households (60%), markets (15%), commercial products (10%), gardens (5%) and others (8%). The waste was composed mainly of organic materials (77%), while the remainder comprises plastic (13%), paper (7%) and others (3%)[9].

## 2.2 Existing Solid Waste Management System and Key Stakeholders

The solid waste management system in Myanmar mainly includes waste collection and disposal, and recycling continues to play a minimal role at present [6]. 3Rs (reduction, reuse and recycle) policies were developed by the government in 2009, but there is no plan or project to implement them yet[3]. Collection and disposal work remains the main priority of the municipalities of Myanmar to manage solid waste in the country[6].

### 2.1.1 Waste Collection

Figure 3: Waste Collection and Transportation Flow



Source: Oo.S, Thein.M, Yin.N, Nu.T, Htun.H (n.d)

There are two types of waste collection: primary collection and secondary collection [6] (See Figure 3). Primary waste collection refers to the process of collecting waste from generation sources and moving it to waste storage sites, and it consists of door to door collection, curb side collection, bin container collection and communal waste collection points[8]. Under the primary waste collection system, there is another collection method: on call service[12]. Waste generators can make a

phone call for waste collection to a respective office[12]. A large number of waste generators, like industries and embassies, use these services[12].

On the other hand, secondary collection is mainly performed with tipper trucks that means a truck with a container part that can be moved to a sloping position so that its loads can slide off at the back[13, 14]. This type of collection has two steps. The first step is to collect waste from waste generation sources (household, business and institution) and transport it to the final disposal site directly. The second step is to collect waste from waste storage sites (temporary waste tanks and iron containers) after the primary delivery to the disposal site [12] (See Figure 3). Roadside space and street reservations are often used for secondary waste collection stations, where large containers are placed to store the waste from the primary collectors[8, 12].

### *2.1.2 Waste Disposal*

Waste disposal includes temporary disposal and final disposal. In Myanmar, the two disposal sites primarily refer to the open dumpsites. There is no measure to prevent the entrance of citizens to avoid nuisance and fire and or contain leachate, dust and landfill gas emissions[12]. According to the Myanmar waste scoping record in 2017, Yangon's dumpsites receive an average of 2,500 tons of solid waste per day, while in Mandalay it is 900 tons per day [12]. Before waste is dumped into the final disposal sites, waste is dumped into the temporary disposal sites, where packers sort waste by hand and manual tools[6]. Types of the sorted waste are paper, plastic, metal, and plastic bottles for reuse[8]. Mechanical equipment such as bulldozers are used for the unsorted waste [6]. Thereafter, sorted waste is packed, stored and transported back to the city for resale or recycling enterprises [6]. Approximately 400 small and medium size recycling enterprises operated in Yangon and Mandalay in 2017[8].

### *2.1.3 Costs and Fees*

The current cost of waste collection and treatment in Myanmar can only be roughly estimated[14]. Waste collection charges for household or domestic waste are based on the volume of waste disposal or the location[9]. The fee ranges from 300 to 900 kyats/month/household (USD0.2 to USD0.6) and the rate for one vehicle (3 tons capacity) is about 35,000 kyats (USD23.3) per trip[9]. However, commercial enterprises are required to pay a special collection fee from 20,000 to 150,000 kyats (USD13.3 to USD100), depending on the volume of waste produced. In Yangon and Mandalay, the collection fees are not enough to cover the total cost of the services, so the government needs to subsidize the remaining costs [14].

### *2.1.4 Key Stakeholders*

In Myanmar, the City Development Committee in each respective city and township is responsible for waste management in its own territory[9]. They also take responsibility for financing, planning and delivering urban services related to waste management[9]. Under the control of the City Development Committee and Township Development Committee, there are over twenty departments, of which the Pollution Control and Cleaning Department is the main department for waste management[15]. Its roles and responsibilities are to collect waste systematically, provide appropriate waste bins and collect payment [15]. There were a total of

4,220 workers employed in the Yangon City Development Committee, while there were 2,000 workers in the Mandalay City Development Committee for waste collection and disposal in 2015[6, 8].

The Ministry of Natural Resources and Environmental Conservation is also a focal ministry for overall environmental management in Myanmar, including solid waste management [6]. The Environmental Conservation Department plays a key role in promulgating laws, policies and a strategic action plan in cooperation with development committees related to solid waste management, and organize conferences, workshops, and training for raising public awareness on solid waste [16]. International agencies such as the Japan International Cooperation Agency (JICA), Korea International Cooperation Agency (KOICA), Asia Development Bank (ADB), European Union (EU) and Bremen Oversea Research and Development Association (BORDA) have provided technical and financial aid for Yangon, Mandalay and Naypyitaw for solid waste management[6].

### **3. Challenges and Opportunities for Current Solid Waste Management in Myanmar**

#### *3.1 Challenges*

Waste management is a cross cutting issue that is linked to other sectors such as health, poverty, food security and sustainable consumption and production[6]. There are five main challenges related to solid waste management in Myanmar [9].

##### *3.1.1 Landfill Relocation and Lack of Data*

According to the report of the Mandalay City Development Committee in 2017, the landfill sites in the city will reach the end of their lifecycle in the next two to four years (from 2017 to 2020) and the administration is having trouble relocating to suitable spaces within the city[8]. Another challenge is the lack of accurate and reliable data on recycling volume, ratios and the number of recycling factories in Myanmar[9].

##### *3.1.2 Law Enforcement*

The Myanmar government has enacted environmental laws, rules and regulations, but the enforcement of these existing legal frameworks is still weak[9]. Even though the Mandalay City Development Committee has established its own law for solid waste management, environmental conservation and bylaws for cleaning in 14 May 2015[8], the actual implementation and enforcement of these environmental regulations lag behind.[9].

##### *3.1.3 Public Participation*

Each City Development Committee introduces a number of programs in cooperation with Local Non-Governmental Organizations and other volunteer groups to raise the awareness of reducing waste and

promoting 3Rs (Reduce, Reuse, Recycle)[8]. However, due to the lack of a road map and infrastructure for proper waste separation management, public participation and 3Rs activities are still limited and ad-hoc[8].

#### *3.1.4 Economic Aspects*

Revenue for waste management is generated from the collection of user charges[8]. This revenue is low and cannot keep pace with the total waste management expenditures[9]. There is also a lack of financial support from the national government because it is considered the responsibility of municipalities (City Development Committees and Township Development Committees)[8]. Financing a solid waste management system is a challenge in Myanmar.

#### *3.1.5 Technological Aspects*

The solid waste management sector in Myanmar needs to upgrade existing infrastructure such as technologies for waste collection, transport, recycling and waste to energy technology [8]. Barriers to progress include limited know-how and capacity to adapt suitable technologies to local conditions, limited resources, which include underdeveloped financial and technical capabilities to identify and invest in new technologies[9].

### **3.2 Opportunities**

Myanmar still has opportunities to improve its own solid waste management despite challenges. Firstly, Myanmar has seen local initiatives in improving solid waste management. For example, Mandalay city is actively working to address wage gaps by increasing the number of waste collection workers and vehicles[6]. Similarly, the Yangon City Development Committee stated that the rate of waste collection nearly doubled between 2007 and 2016[6].

Secondly, treatment facilities to turn waste into energy is improving in Myanmar [14]. Japan has helped to not only promote waste to energy in strategic studies, but also to co-invest in Myanmar's first pilot plant project in Yangon[14]. The pilot plant project exceeded USD1.6 million and half of the amount was provided by the Yangon City Development Committee, and the rest by Japan[14]. This project can produce 700 kilowatts of electricity[14]. Of that, 400 kW is used for feeding into the grid, and the remaining is used for the internal consumption of the plant[14].

Thirdly, the private sector is also playing an important role in developing Myanmar's waste management sector[14]. Some are working in the waste management field and others are working in adjacent fields[14]. For example, Environmental Control Myanmar worked with the Ministry of Natural Resources and

Environmental Conservation on the/a waste management strategy for main cities[14]. Zeya & Associates also works on waste to energy in Myanmar[14].

Finally, Myanmar has international support for waste management issues[14]. The Japanese government provided USD5.5 million for waste management project to implement a semi-aerobic landfill in 2019[17]. Further, the Asia Development Bank (ADB) has cooperated on waste management activities in Myanmar under the Mandalay urban services improvement project[14]. This project will focus on residents without access to waste collection and wastewater collection. Under the Dutch Embassy of Myanmar's supervision, Dutch companies wish to become active in Myanmar[14]. The embassy aims to support a development plan and business that promotes ties between the Dutch and Myanmar solid waste private sectors[14].

#### **4. Existing Legal Framework and Policies to Support Solid Waste Management in Myanmar**

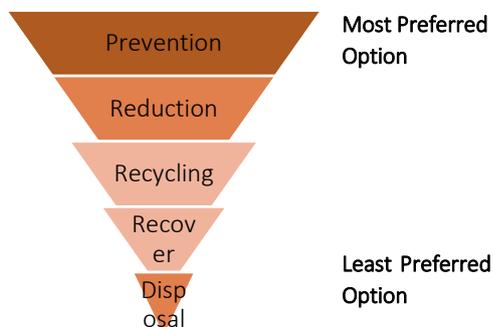
The Myanmar government has signed international environmental treaties and conventions to address waste management issues [18]. These include: Stockholm Convention on Persistent Organic Pollutants in 2004, The Ha Noi 3R Declaration 2013, and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal in 2015.

The Government of Myanmar has also approved the following laws/acts regarding waste management [18, 19, 20]. They are the Yangon Water-Work Act in 1885, Water Power Act in 1927, Underground Water Act in 1930, City of Yangon Development Law in 1990, City of Mandalay Development Law in 2002, Naypyitaw Development Law in 2009, Environmental Conservation Law 2012, Mandalay City Development Committee Law 2015, Mandalay Environmental Conservation and Cleaning Bylaws in 2015, and the Yangon City Development Committee Law in 2018.

Myanmar also developed several policies related to solid waste management. For instance, the National Environmental Policy of Myanmar (NEP) has been recently launched by the Ministry of Natural Resources and Environmental Conservation in June 2019 to provide environmental services for waste planning and infrastructure for urban and rural areas [21]. The NEP highlights waste management and encourages the enterprises to adopt clean production principles and practices. In addition, the Ministry of Planning and Finance launched the Myanmar Sustainable Development Plan (MSDP) (2018-2030) in August 2018[22].

The MSDP sets out a detailed action plan under strategy 5.3 to practice effective and environmentally safe waste management and disposal[22].

Figure 4: Waste Management Hierarchy (2018)



Source: Thein, Maw, Thin and Latt, (2018)

Myanmar has also implemented the National Waste Management Strategy and Action Plan which targets short term (2017-2020), midterm targets (2021-2025) and long term targets (2025-2030) to be achieved[6]. The National Waste Management Strategy and Action Plan for Myanmar (2017-2030) aims to make a transformation away from conventional waste management, towards a goal of achieving a zero waste, resource efficient and sustainable society[6]. It also aims to set up a waste management hierarchy which consists of 3Rs (reduce municipal solid waste

volume which goes to the landfill; recycle; and recover valuable waste for re-processing) (See Figure 4) and identifies six strategic goals to deal with waste disposal, financial aspects, public participation and law enforcement. The six strategic goals are: (i) extending sound waste collection and eliminating uncontrolled disposal; (ii) extending sustainable and environmental management of waste; (iii) reducing waste through 3Rs; (iv) ensuring sustainable finance mechanisms; (v) awareness raising; and (vi) monitoring and enforcement [6].

## 5. Conclusion

Myanmar solid waste management system is progressing, but still faces challenges in achieving sustainable waste management in the face of industrialization and urbanization in the country. The main challenges hindering the current solid waste management system in Myanmar include landfill relocation and limited data, inadequate enforcement of laws, weak public participation, and economic and technological aspects. Along with the challenges, the private sector is participating significantly, which helps encourage life style changes towards more sustainable practices. Furthermore, international agencies and organizations are keen on to invest in solid waste management, a positive sign for Myanmar solid waste management improvement in the future. With the existing international and national legal frameworks and policies put in place, improving solid waste management in Myanmar still requires the Government of Myanmar to address existing challenges. The government could also focus on having adequate staffing for solid waste management and implement fees or other penalties with legislative goals and effective coordination among different stakeholders to promote a positive change in waste management.

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