

# Chapter 1

## Regional Waste Management in Asia

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### **Abstract**

Most Southeast Asian countries are struggling to improve their waste management systems. They have enacted and refined laws on waste management, formulating action plans and roadmaps in the process. Although some improvements have been made, the progress is still nowhere near sufficient. The reason behind the insufficient management can be attributed to a lack of appropriate legislation, insufficient government funding, lack of appropriate infrastructure, and lack of technical capacity, amongst other factors.

With these efforts to improve municipal management in Southeast Asia, the importance of regional waste management is starting to be recognised. In Indonesia, some local governments have initiated a regional waste management scheme under financial support from the Clean Development Mechanism, which is a scheme under the United Nations Framework Convention for Climate Change. The Department of Local Administration in the Ministry of Interior of Thailand has also issued a waste management clustering policy. Some regional waste management schemes have been established in areas such as Phuket, Nonthaburi, Koen Kane, and others. But there is a gap between existing schemes in Southeast Asian countries and possible schemes for regional waste management. The benefits and challenges of a regional approach to municipal solid waste management in selected Asian countries are briefly discussed. In addition, in a few Southeast Asian countries, regional *de facto* waste management schemes initiated by private companies are also observed. Such private initiatives are also discussed.

**Keywords:** municipal solid waste management, regionalisation, inter-municipal cooperation, public–private partnerships (PPPs)

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## 1.1. Introduction

Most Southeast Asian countries are struggling to improve their waste management systems. The Philippines enacted the Ecological Solid Waste Management Act in 2001 after the collapse of the Payatas garbage dump in July 2000. This act required local governments to close open dumpsites within 3 years and controlled dumpsites by 2006 so that sanitary landfill sites can be used. However, the National Solid Waste Management Status Report (Department of Environment and Natural Resource, 2015) pointed out that 523 open dumpsites and 317 controlled sites still existed in 2014. On the other hand, only 86 sanitary landfill sites operated in the same year. Thailand put some effort into improving solid waste management, but the country needs to make a greater effort to improve its waste management schemes. According to Thailand's Pollution Control Department (2019), 27.8 million tons of municipal solid waste were generated in 2018. Amongst them, 10.9 million tons (39.1%) of waste were disposed of properly, 9.48 million tons (34.4%) of waste were utilised, whilst 7.4 million tons (26.5%) were disposed of improperly. This figure is a significant decrease in the volume of improper disposal from the 14.3-million-ton figure in 2009. Other Asian developing countries face similar challenges.

To improve waste management, governments should spend enough budget to collect, treat, and dispose of waste. But developing countries may have other priorities, such as infrastructure development in roads, water supply systems, and electricity supply systems. The United Nations Environment Programme (UNEP, 2015) regards the affordability limit for the total cost of solid waste management as 1% of the gross national income. It is also noted that some authors regard the limit of the affordability as 0.3%–0.6%. Based on the affordability and cost of waste management, it is also pointed out that low-income and lower-middle income countries have affordability issues for extending collection coverage and eliminating uncontrolled disposal. Upper-middle income countries may be able to afford proper waste management, but they need to use their budgets for waste management efficiently.

One way to budget for waste management efficiently is through regional waste management or inter-municipal cooperation. Some waste treatment and disposal facilities have characteristics of economies of scale (Kojima, 2019; Sasao, 2020). The larger the capacity of the waste treatment and disposal facility, the lower the unit costs associated with the construction of the facility. These include composting plants, waste-to-energy plants, and sanitary landfill sites.

Another way to manage government budgets efficiently is through public–private partnership (PPP) programmes, in which private sector entities develop and operate facilities, whilst the government pays the treatment costs of waste to the private sector. There are some examples of such PPPs and private finance initiatives in the region. Such programmes could be established if more waste was collected from a broader area as unit investment costs would be saved.

Apart from the financial aspect, scarcity of land might be another reason for regional waste management. It may be difficult for densely populated urban areas or small local governments to find land for waste treatment and landfill sites. A lack of human capacity might be another reason for regional waste management. Small local governments may not be able to hire experts on waste management.

This introductory chapter provides an example of regional waste management in Asia, discusses the types of regional waste management, and introduces the structure of this report. In Section 1.2, examples from India, a leading developing country in the field of regional waste management, are introduced. Another leading country in regional waste management is Japan, which is discussed in Chapters 2 and 3 of this report. Section 1.3 focuses on the types of regional waste management. Section 1.4 introduces the contents of Chapters 2 to 8.

## **1.2. Regional Waste Management in India**

In 1994, pneumonic plague was spread in Surat in Gujarat, India, due to a lack of waste collection services, which worsened the local sanitary conditions. More than 50 people died as a result of these practices. India’s economy was also damaged by a decrease in exports and incoming tourists (Ministry of Urban Development, 2013; Furedy, 1995).

In 1995, the Indian Planning Commission released a report on urban solid waste management for the High Power Committee, in which the necessity of regional waste management was mentioned. For example, it mentioned that ‘Small and medium towns might have to share a trans-municipal land disposal facility.’ However, the first national regulation on waste management, the Municipal Solid Wastes (Management and Handling) Rules, issued by the Ministry of the Environment and Forests in 2000, did not mention regional waste management.

One of the leading cases of regional waste management in India was proposed in 2008 by the state of Gujarat. The project study in 2008 pointed out that if each urban local body (ULB) or municipality were to develop their own waste treatment facility or landfill site, they would need to spend US\$25 per ton. However, if ULBs worked together in clusters, they would only need to spend US\$9.40 per ton (UNEP, 2015).

Around 2010, the necessity of regional waste management was well recognised in India. The Ministry of Urban Development then made a guidance note on municipal solid waste management on a regional basis (Ministry of Urban Development, 2011). The report illustrated the economies of scale on landfill sites on the basis of a number of assumptions such as degree of slope, depth from ground level, and squareness of the site. In addition, the report classified the structure of regional waste into three types: (i) state government concession agreement structure, (ii) authority concession agreement structure, and (iii) structure when a private party provides land. In the state government concession agreement structure, the land for the facility is owned by the state government. In the authority concession agreement structure, the land for the facility is owned by a specific authority, such as a ULB. In the third case, as indicated by the name, the land is owned by a private party. Thus, the leading actors are different in each structure. The report also shows some cases of regional waste management in India and developed countries.

**Table 1.1. Some Cases of Regional Waste Management in India**

<b>Area</b>	<b>Population in Area</b>	<b>Contents</b>
Gujarat State	60 million (2011)	If all 159 urban local bodies operate their own facilities (composting and landfill), they would have to pay US\$25, whilst if they formulate clusters, the cost would be reduced to US\$9.40.
Kerala State	33 million (2011)	One regional landfill site saves US\$106 million in construction costs and US\$1.8 million in operations and maintenance costs compared to landfill sites in all five cities and 49 municipalities.
Ranganj, Jamuria, and Kulti	0.6 million (2011)	Three municipalities in West Bengal under the nodal Asansol Durgapur Development Authority have developed regional engineered landfill sites, by forming a public–private partnership for the project implementation.

Source: Compiled by the author, based on UNEP (2015) and Ministry of Urban Development (2016).

In 2016, the Municipal Solid Waste Management Rules were issued, whilst the Municipal Solid Wastes (Management and Handling) Rules (2000) were suspended. Revisions to the rules require the Ministry of Urban Development to ‘facilitate establishment of common regional sanitary land fill for a group of cities and towns falling within a distance of 50 km (or more) from the regional facility on a cost sharing basis and ensure professional management of such sanitary landfills.’

The Ministry of Urban Development also published a Municipal Solid Waste Management Manual in 2016. It emphasises that a state-level strategy should include facilitating regional facilities and promoting decentralised waste management as appropriate. It is pointed out that regional waste management is beneficial to both large and small local governments.

Some of these guiding documents mentioned cases of regional waste management, including the estimated savings generated by regional waste management. Table 1.1 shows some examples of regional waste management in India.

### **1.3. Types of Regional Waste Management**

There are a number of ways to classify regional waste management schemes. Hulst et al. (2009) classified inter-municipal service delivery from three perspectives: scope (single-purpose or multi-purpose), composition (horizontal or vertical), and organisational integration (standing organisations and contractual agreements). Kojima (2019) classified regional waste management into four types as shown in Table 1.2, focusing on the institutional setting, with specific attention paid to the main actors.

The Regional Government Scheme is a vertical cooperation scheme. Local government municipalities, such as state governments in India and provincial governments in Indonesia, accept waste from municipalities and operate regional treatment and disposal facilities, or contract private sector entities to operate such facilities. The Leading Municipality Scheme is led by a municipality hosting a waste treatment and disposal facility. The leading municipality contracts with neighbouring municipalities and receives waste from them. Facilities are operated by a leading municipality or by the private sector establishing a contract with the leading municipality. In other cases, municipality associations, which are formulated by local governments, serve as actors in waste management. An example of this are the Japanese partial affairs associations, which are explained in Sasaki and Kojima (2020) and Kimura (2020). These three types of organisations are classified under inter-municipal cooperation.

There are some cases in which the private sector invests in waste treatment and disposal facilities and accepts waste from various municipalities. Each local government separately contracts with a private company. For example, the TPI Polene Power Public Company in Thailand receives municipal waste from various municipalities and produces and uses refuse derived fuel as raw material in power plants. The company has 12 sorting plants, five refuse derived fuel plants, and one power plant. In Thailand and the Philippines,

private landfill sites receive municipal solid waste from local governments. Such schemes are not regarded as inter-municipal cooperation, but the schemes can be regarded as regional waste management.

**Table 1.2. Types of Regional Municipal Solid Waste Management**

	<b>Types</b>	<b>Examples</b>	<b>Explanation</b>
Inter-municipal cooperation	Regional Government Scheme	Waste-to-energy plant planned in West Java, Indonesia	The regional government makes agreements with local governments in the region and accepts waste from them.
	Leading Municipality Scheme	Waste-to-energy plant in Phuket in Thailand, Kitakyushu City in Japan, and neighbouring municipalities	A municipality hosting waste treatment or disposal facilities makes an agreement with and receives waste from other municipalities.
	Municipalities' Association Scheme	Partial affairs associations in Japan	Local governments formulate associations to treat and/or dispose of waste jointly.
	Private Sector Leading Scheme	Private landfill sites in Japan accepting ashes from waste to energy plants located in other areas. RDF plants in Thailand accept waste generated in other areas.	The private sector operates waste treatment and disposal facilities, which accept waste from multiple local governments.

RDF = refuse derived fuel.

Source: Compiled by the author.

#### **1.4. Structure of the Report**

The following chapters of this report focus on inter-municipal cooperation or regional waste management in specific countries. Chapter 2, 'Inter-Municipal Cooperation and Regional Waste Management in Japan,' discusses the history of inter-municipal cooperation in Japan, including types of inter-municipal cooperation and waste-related activities. Chapter 3, 'Inter-Municipal Cooperation in Solid Waste Management in Japan: Its Challenges and Implications for ASEAN Countries,' describes inter-municipal cooperation on municipal solid waste management in Japan. It discusses local government-formulated associations or unions jointly treating and disposing of municipal solid waste. It also points out that Japan has a legal basis to formulate associations of local government, whilst Southeast Asian countries have a limited legal basis to formulate such associations. Chapter 4, 'Cost Efficiency of Regional Waste Management and Contracting out to Private Companies,' estimates economies of scale in waste management in Japan

and the Philippines. Previous studies show the economies of scale by using data from developed countries. The data of the Philippines show that a 1% increase in the amount of waste raises the costs by 0.64%. Economies of scale are also observed in developing countries. Chapter 5, 'Promoting Local Collaboration on Waste Management: Lessons from Selected Cases in the Philippines,' reviews the legal basis for promoting local collaboration in waste management, the status and types of local collaboration, and the challenges and opportunities associated with waste management. In addition, it focuses on some emerging trends in public service delivery such as the promotion of PPP and its relation to waste management. Chapter 6, 'Internal and External Factors in the Development of Regional Waste Cooperation in the Greater Bandung Region,' applies a SWOT analysis to the regional waste management schemes in West Java, a province of Indonesia. West Java established the Regional Waste Management Agency (BPSR) in 2006 as the regional waste management coordinator. A SWOT analysis is applied to the role and function of the BPSR and the newly-developed waste treatment and disposal facilities in Legok Nangka. Chapter 7, 'The Effect of Local Government Separation of Public Service Provision in Indonesia: A Case of Garbage Pickup Services in Urban Areas', analyses the impact of district splitting on waste management. It addresses the increase in the number of local governments from 290 to 514 over the course of 20 years. The chapter finds that urban residents living in a district that has been split have experienced a lower probability of having a public waste collection service. Chapter 8, 'Clustering and Public-Private Partnerships: The Tools of Municipal Solid Waste Management Reformation in Thailand', points out how clustering and PPP have recently been regarded as major tools to improve waste management, with some regional waste management schemes enjoying great success. Despite this, small local governments face difficulties in finding private companies to treat and dispose of waste.

## **1.5. Conclusion**

Most Southeast Asian countries are trying to improve waste management. But some local governments may not have sufficient budgets or the technical capacity to manage waste. In such circumstances, the necessity and concern as it relates to regional waste management is gradually being recognised in Southeast Asian countries. Compared with India and Japan, guidelines or legal foundations to formulate inter-municipal cooperation are limited in Southeast Asian countries. Using shared experiences in Asian countries, regional waste management schemes should be carefully designed and implemented throughout Southeast Asia.

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