

## Chapter 3

# Inter-Municipal Cooperation on Solid Waste Management in Japan: Its Challenges and Implications for ASEAN Countries

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### Abstract

As municipal solid waste (MSW) management is globally recognised as an imperative issue towards the decarbonised future, inter-municipal cooperation gains momentum. It can expect mutual benefits such as improvement of cost efficiency and introduce environmentally sound technologies amongst member cities (and sometimes via public–private partnerships). This chapter clarifies the status quo of inter-municipal cooperation on MSW management in Japan and analyses the incentives and challenges by showing several case studies. It also drew some implications for cities in the Association of Southeast Asian Nations (ASEAN) countries. Inter-municipal cooperation varies depending on the needs and capabilities of municipalities so that each municipality needs to investigate the most suitable approach and cooperation type. In the context of ASEAN countries, issues in finance, legal systems, and governance need to be tackled to introduce a system for inter-municipal cooperation.

**Keywords:** Municipal solid waste management, inter-municipal cooperation

### 3.1. Introduction

The importance of municipal solid waste (MSW) management is increasingly recognised in the discourse of urban sustainability as populations in cities explosively rise globally. Although many cities struggle with severe economic conditions, they try to reduce the costs and maintain sufficient public services by exploring different approaches such as

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amalgamation and cooperation with neighbouring cities. Inter-municipal or regional cooperation is one way that several municipalities (and the private sector) work together for the efficient delivery of public services and mutual benefits. The cooperative arrangements amongst municipalities have been widely implemented in many countries, and it is not a new attempt in Japan either. Because of depopulation, financial distress, and response to climate mitigation, however, the Japanese government has encouraged municipal governments to cooperate regionally and concentrate on waste treatment facilities in recent years.

In this chapter, we aim to clarify the status quo of inter-municipal cooperation on MSW management in Japan and analyse the incentives and challenges. We also attempt to draw the implications for the cities and regions in the Association of Southeast Asian Nations (ASEAN), confronting the severe problems of MSW, such as insufficient collection, open burning, and open dumping. For instance, the Indonesian government has recognised an emergency of MSW, enacting regulations for building waste-to-energy (WTE) plants for waste incineration and energy generation (Damanhuri, 2019; Diela, 2019). One of the leading cities, Bandung, the capital city of West Java has limited land for waste treatment and disposal facilities. Some of the WTE-related facilities are constructed near Bandung and can receive waste from several municipalities. In Thailand, the national government promotes a policy for clustering municipal governments on waste management in wider regions. The issues of waste reduction and renewable energy for climate change mitigation are considered urgent in many ASEAN countries. Although there already exist international cooperation programmes by different agencies, including the Japan International Cooperation Agency, the demands for learning from the Japanese experiences of regional waste cooperation would increase further.<sup>12</sup> This chapter is composed of three parts. First, section 3.2 gives a brief overview of the historical development of MSW management in Japan. By looking at the shifts of policy interests over the years, it focuses on incineration, the dominant treatment method in Japan, and regional waste management. Second, this chapter explains inter-municipal cooperation in Japanese MSW management by introducing various types of cooperation as well as challenges. The last section discusses the analysis and gives a short implication

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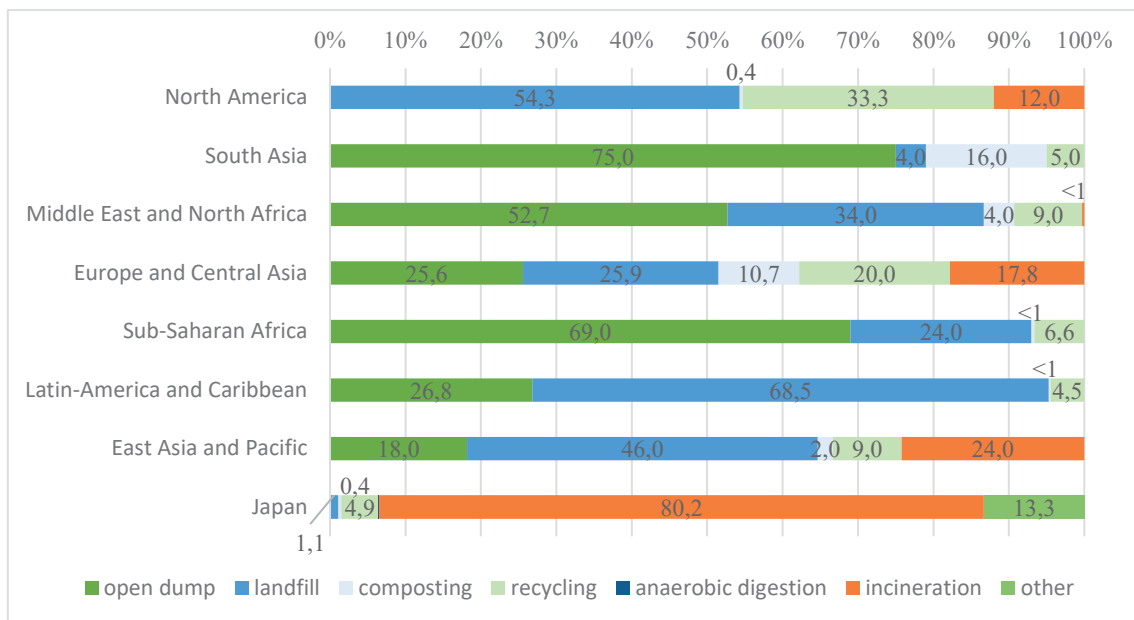
<sup>12</sup> The activities by inter-municipal organisations for international cooperation are still limited in Japan. One of the most active players of international cooperation for knowledge transfer of MSW management is the Clean Authority of Tokyo, an inter-municipal body of 23 wards in Tokyo. See Sasaki and Kojima (2019) for detailed information.

for ASEAN countries.

## 2.2. Overview of Municipal Solid Waste Management in Japan

The high ratio of incineration in treatment methods is one of the major characteristics of MSW in Japan. As shown in Figure 3.1, compared with other countries in the world, Japan relies heavily on incineration. Since land is constrained by a dense population, incineration has, at times, seemed to be the only appropriate solution. It was initially encouraged with the aim of combatting epidemics. Nevertheless, as the incineration technology has been developed, it has gradually become a major disposal method for reducing the amount of wastes and generating energy.

**Figure 3.1. Waste Disposal Methods by Region**



Notes: The percentages are based on a graph from Kaza, et al. (2018) and the dataset of World Bank (2018). Some numbers are shown as '<1' as stated in the original graph. The number in East Asia and Pacific does not meet 100%, but it is also based on the original data. Source: Compiled by the authors based on Kaza et al. (2018) and World Bank (2018).

Waste management has been treated as a part of a larger set of hygiene policies since the 19th century. These policies were aimed at tackling epidemics by patients and to disinfecting their living areas (Yatsuki, 2004). Following the Waterworks Ordinance in 1890, the laws for waste management (Waste Cleaning Act) and sewerage (Sewerage Law) were enacted in 1900.

Since then, Japanese municipalities have played an active role in waste management. The Waste Cleaning Act determined that the collection and disposal of waste are under the responsibility of municipalities. It also placed 'waste treatment operators under the

supervision of government organisations to establish a waste administration system' (MoE, 2014, p.3). At the same time, it is stated within the act that the waste needs to be desirably incinerated (MoE, 2014, p.3). The Act on Emergency Measures concerning the Development of Living Environment Facilities, enacted in 1963, also pushed forward the promotion of incineration facilities in municipalities (MoE, 2014, p.4). Under rapid economic growth, Japan urgently needed to treat urban waste by introducing incineration plants. The construction of landfill sites was not an easy task in a country with scarce land. Later, the purpose of waste management gradually shifted from sanitation to environmental protection. Dioxin emissions from incineration became problematic in Japan in the latter half of the 1990s. The national government began to implement measurements and enacted a law against dioxin emissions. As larger incineration plants were enabled to have a stable combustion condition for dioxin reduction, the national government encouraged the local governments to install such high-performance facilities by cooperating with neighbouring municipalities to concentrate on the plants (Ministry of Health and Welfare, 1999).

To promote those measurements, the government prepared the subsidies for MSW, especially incineration plants with special facilities. For instance, incineration plants with the WTE technology are subsidised up to half of the total cost (Kaza, et al., 2018, p149). Also, the prefectural governments were encouraged to make a plan for regional cooperation and concentration, and they were subsidised by the central government based on such plans. Such measurements have proceeded since the mid-1990s resulting in reductions in the number of incineration plants by 40% all over the country: from 1,769 in 1998 to 1,120 in 2016 (MoE, 2019a). At the same time, the incineration facilities have scaled up and almost half of the plants had a capacity of over 100 tons/day in 2016, contributing to dramatic reductions in the emission of dioxin and achieving the goal, 33 g TEQ/year (MoE, 2019a).

The Ministry of Environment continuously encourages the municipalities to set larger-scale goals for their incineration facilities. These goals include over 100 tons/day for all facilities and a scaling up to over 300 tons/day for areas with 100 to 300 tons/day. If the scaling up seems difficult, a measurement for utilising the applicable efficient technologies to collect the energy (e.g. gasification of biomass) should be considered (MoE, 2019a).

## 2.3. Inter-Municipal Cooperation in Waste Management

### 2.3.1. Cooperation Types

Cooperation amongst neighbouring municipalities is commonly implemented officially and unofficially in many countries. Particularly, inter-municipal cooperation is widespread throughout western Europe in various forms and is adapted to the historical, geographical, legal, or political background of each country. (Hulst, et al. 2009; Kamo, 2010).

According to Hulst, et al. (2009), arrangements of cooperation can be classified into three perspectives: (i) composition (only municipalities or mixed of different actors, i.e., public and/or private ones), (ii) scope (single-purpose or multi-purpose), and (iii) degree of organisational integration (public services are delivered by separately established organisations or through agreements of partnering cities).

With respect to the regional cooperation in MSW management in Japan, various kinds of cooperation could be classified based on the perspectives of Hulst et al. (2009) (Table 3.1).

**Table 3.1. Inter-municipal Cooperation for MSW in Three Perspectives**

		Examples in Japan
<b>(i) Composition</b>	Inter-municipal: organisations consisting of municipalities	partial affairs association, wide area cooperative
	Public-private: municipality and private sector	PFI/PPP (e.g. DBO, BOT), outsourcing
	Mix: several municipalities (or regional governmental body), other public entities, private sector	PFI by a partial affairs association, BOT concession by several municipalities
<b>(ii) Scope</b>	Single-purpose: setting up an organisation or agreement a single purpose	Inter-municipal organisation aimed only for MSW management
	Multi-purpose: setting up an organisation or agreements for multiple purposes	agreement for comprehensive regional collaboration
<b>(iii) Degree of organisational integration</b>	Setting up a separate governmental body	a partial affairs association, wide area cooperative
	Agreements	agreements of several municipalities, concession agreement

BOT = build-operate-transfer, DBO = design-build-operate, MSW = municipal waste management, PFI = private finance initiative, PPP = public-private partnership.

Source: Compiled by the authors, based on the three perspectives on inter-municipal cooperation by Hulst, et al. (2009).

The composition of inter-municipal cooperation could be inter-municipal, public–private, or mixed. The most common type for MSW management in Japan is inter-municipal, establishing associations in several municipalities under the Local Autonomy Law (horizontal cooperation in many cases). Amongst such associations, a partial affairs association (*ichibu jimmu kumiai*) and a wide-area cooperative (*koiki rengo*) are the most numerous (MIC, 2018).<sup>13</sup> Both are established for municipalities to cooperate and implement certain tasks together. Wide-area cooperatives were created in 1995 as a new type of regional cooperation, enabling local governments to collaborate more flexibly with national/prefectural governments compared with partial affairs associations. In 2017, there existed over 9,000 cases of inter-municipal cooperation in Japan. Amongst them, 567 organisations were established for waste treatment (MIC, 2018)<sup>14</sup>.

The congress of these associations is independent from the member municipalities. In many cases, such associations consist of neighbouring municipalities and the mayor of one of the members is inaugurated as a head. According to the Local Autonomy Law, inter-municipal organisations ought to make agreements regarding several points, such as election of congress members and selection of members to an executive committee. The number of congress members, selected from the assembly of a respective municipality, are commonly decided based on the population size. For instance, the Osaka Waste Management Authority consists of four municipalities. There are 22 assembly members: 15 members from Osaka City, the largest city amongst them, three from Yao City, and two each from Matsubara City and Moriguchi City,<sup>15</sup> In the case of the Congress of Clean Authority of Tokyo, there are 23 congress members and they are all chairs of the assembly of the 23 participating wards in Tokyo.

Public–private composition includes various kinds of public–private partnerships (PPP), including private finance initiatives (PFI) and design–build–operate (DBO) as well as outsourcing, which will be explained later. Cooperation amongst different types of actors, e.g. municipalities (inter-municipal organisations), other public entities, and the private sector can be classified as mixed.

Cooperation can be aimed for single-purpose or multi-purpose. For example, if a partial affairs association is established only for waste management, it is considered as single-

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<sup>13</sup> Translation for the names of associations are not fixed. For example, *ichibu jimmu kumiai* can be translated as partial administrative cooperation, partial cooperative, or any terms.

<sup>14</sup> The number is only for waste treatment, excluding operation of facilities for recycling and sewage. Regarding the number of cases, there would be an overlap in counting when some organisations deal with multiple duties.

<sup>15</sup> See the articles of the Osaka Waste Management Authority. <http://www.osaka-env-paa.jp/index.html>

purpose. If the association is organised for several aims, e.g. sewage or firefighting, it is considered as multi-purpose.

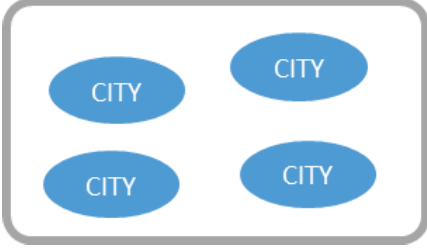
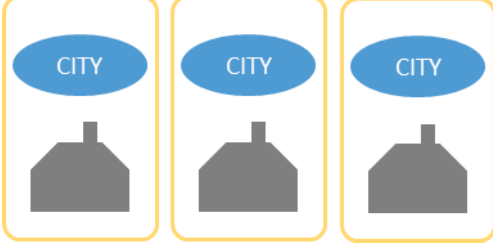
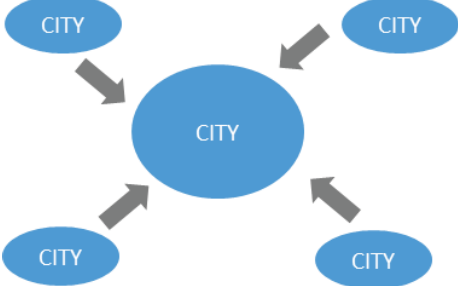
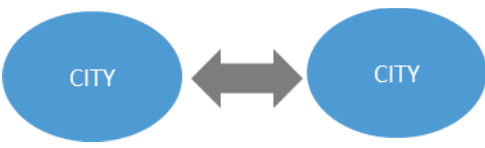
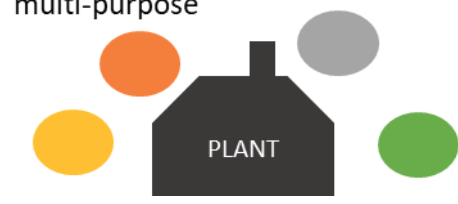
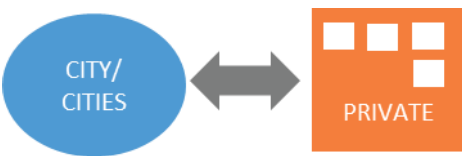
The degree of organisational integration also differs in each form of cooperation. Municipalities can choose to establish a separate governmental body like a partial affairs association or to make agreements. Abe (2010) explained that a cooperation scheme is not limited within the legal framework but also entails various committees, meetings, or even informal exchanges of information amongst officers between municipalities.

In Japan, the cooperation of municipalities on waste management was initially proposed for reducing the volume of waste being dumped and regulation pollution of waste incineration plants around the 1970s. Since then, the aim has been shifted to increase efficiency in MSW management and to contribute to sustainable development, including climate change mitigation. Japan struggles with depopulation and its world-leading aging rate, and financial shortages and a lack of capacity for MSW are severe issues at the local level. On the other hand, waste reduction and greenhouse gas emissions are a prerequisite for sustainable waste management. Inter-municipal or regional cooperation can expect economies of scale; these require a smaller number of waste management facilities than those being treated by a respective municipality, resulting in reduced costs. Under such circumstances, the government expects that collaboration in several cities for waste management will be enhanced to increase efficiency and build a reciprocal relationship amongst partner cities.

Through notification by the Ministry of Health, Labour and Welfare in 1997, the national government has encouraged municipalities to cooperate in this way. In 2019, the MoE released a new notice on wide-area waste management and concentration for securing sustainable and adequate treatment (MoE, 2019a).

The MoE (2019a) addresses the purposes of regional cooperation and concentration as (i) securing sustainable and proper treatment, (ii) implementation of climate change mitigation measures, (iii) promotion of the use of biomass and waste as resources, (iv) reinforcement of disaster measurement, and (v) creation of new values in the community accepting the facility.

**Table 3.2. Different Types of Regional Cooperation and Centralisation**

Types	Image	Description
(1) Establishing (inter-municipal) organisations		<p>Neighbouring municipalities establish an inter-municipal association for treating waste together.</p> <p>Examples: partial administrative associations, wide-area cooperatives or other forms of cooperation/agreement</p>
(2) Sharing the roles of MSW treatment amongst municipalities		<p>Several municipalities share the roles of waste treatment and divide the tasks based on the type of waste.</p>
(3) Accepting of MSW at a large municipality from smaller municipalities		<p>A large municipality accepts and treats MSW from surrounding small municipalities.</p>
(4) Mutual support amongst municipalities in case of waste plant closure for restoration		<p>In case of closure of waste facilities due to the restoration of main facilities of waste management treatment, other municipalities cooperate to treat MSW.</p>
(5) Multi-use MSW plant with other infrastructure		<p>Waste treatment facility has multi-functionality, including sewage treatment facilities.</p>
(6) Utilisation of private sector (PPP)		<p>Municipality (or inter-municipal organisation) consigns waste treatment to facilities of private enterprises to fortify the waste facilities.</p> <p>Examples: PFI/PPP, outsourcing</p>

MSW = municipal waste management, PFI = private finance initiative, PPP = public–private partnership.

Source: MoE (2019a). The brackets and examples were added by authors.



Table 3.2 describes six different methods for implementing regional cooperation and centralisation stated in the notice by MoE (2019a). Besides (5), all the methods could be considered as different types of cooperation amongst cities and/or the private sector.

**(1) Establishing (inter-municipal) organisations:** one of the major methods is to establish an organisation with neighbouring municipalities to achieve cooperation for waste treatment, such as partial administrative associations or wide-area cooperatives.

**(2) Sharing the roles of MSW treatment amongst municipalities:** several municipalities share the role of waste treatment, and each municipality takes a part of the entire MSW treatment. In the case of cities like Yokosuka and Miura in Kanagawa Prefecture, for instance, two municipalities signed the agreement to share the roles of waste treatment. Yokosuka City is in charge of construction and maintenance of intermediate facilities, whilst Miura City takes a part of the construction and maintenance of the final disposal facility (Yokosuka City and Miura City, 2008). They share the costs of construction, maintenance, and the restoration of facilities (Yokosuka City and Miura City, 2008).

**(3) Accepting of MSW at a large municipality from smaller municipalities:** a large municipality accepts MSW from neighbouring small municipalities and treats the wastes. These small municipalities pay the waste treatment costs to the large municipality. For example, Kitakyushu City, a metropolitan city in Fukuoka prefecture, made an agreement with 16 neighbouring smaller municipalities to accept the solid waste that they generated. They currently plan to develop it as an administrative body, the Kitakyushu Wide Area Region (*Kitakyuhu koikiken*), and the agreements on regional waste cooperation will be included within the vision of the body (Kitakyushu City, 2019).

**(4) Mutual support amongst municipalities in case of waste plant closure:** this is a case considered for situations in which a waste treatment facility is closed such as for restoration and other municipalities need to cooperate for MSW treatment.

**(5) Multi-use of MSW plants with other infrastructure:** to utilise an MSW plant efficiently, multi-use of plants is encouraged, such as with sewage treatment.

**(6) Utilisation of private sector (PPP):** a municipality(ies) or inter-municipal organisation builds a partnership with the private sector through PFI or outsourcing. This concept will be explained later in this section.

Table 3.2 does not cover all types of cooperation. Municipalities form different settings that are suitable for them. Fukuoka City, the capital of Fukuoka prefecture is another case. The city and four neighbouring cities established an association called 'Fukuoka Metropolitan Region Nambu Association,' which consists of a population of 1.8 million people. The five member municipalities signed an agreement in 2002, and the association

started to manage an incineration facility with the capacity of 510 tons/day and a landfill site in 2016 (Fukuoka Metropolitan Region Nambu Association, n.d.). Fukuoka City itself possesses three other incineration plants, but the city is a part member of an association, whilst retaining its own waste facilities (Fukuoka Metropolitan Region Nambu Association, n.d.).

The merging of municipalities is another way to enjoy economies of scale. In some western European countries such as Germany or Sweden, the merging of local governments has been promoted for efficient and sufficient delivery of public services, whereas France and Spain keep small-scale cities and maintain services mainly by regional cooperation (Kamo, 2010; Hulst, et al., 2009). In Japan, there was a large-scale amalgamation of municipalities in the 2000s, resulting in a decrease in the number of municipalities from about 3,200 to about 1,800. Although the arrangements for inter-municipal cooperation are maintained, the merger affected the waste management policy as well. Inter-municipal cooperation could also be considered an excuse to avoid this kind of amalgamation (National Association of Chairpersons of City Councils, 2018). However, even in the event of amalgamation, it does not mean that the roles of inter-municipal organisations decrease. Rather, its significance is increased as such organisations function intermediately between the lower and higher levels of governments, which builds up a 'multi-tier government' (Kamo et al., 2010).

### **2.3.2. Challenges of Inter-municipal Cooperation**

Although municipalities are motivated to build cooperation due to considerations of cost efficiencies of public service delivery, transaction costs or start-up and coordination costs could be higher than those for a single municipality (Bel and Warner, 2015; Hulst, et al., 2009). Inter-municipal cooperation has increased in number in Japan, but some municipalities face difficulties. This section introduces the following three cases as examples of the challenges municipalities face.

*Case 1: Failure in consensus building amongst municipalities and citizens (Tagawa East Environment Sanitation Association)*

In the Tagawa region, located in Fukuoka Prefecture, four municipalities agreed to build a new incineration plant in 2000. They established a partial administrative association in the following year and decided to build the plant until 2005. However, the site selection process has taken them 12 years because of four different changes to the proposed site,

resulting in the dismantling of the cooperative arrangement in the end (MIC, 2016). It was caused by Not in My Back Yard issues (NIMBY), strong opposition from residents, and different views amongst member municipalities (Soeda Town, 2018; MIC, 2016). They later proposed to build small-scale (less than 100 tons/day) plants in each city separately, yet the plan was again opposed by residents. After reorganising and adding new member cities, they have finally agreed to co-build a new facility in one of the member municipalities, Oto Town, in 2017 (Soeda Town, 2018).

This example above shows that a waste treatment plan cannot be implemented until municipal governments reach an agreement. Steep resistance from the citizens living near the site is understandable since it seems unfair; the burdens should be equally shared amongst the member cities (Kurishima, 2004; Sasao, 2004). The costs for start-up and coordination could be enormously high unless a mutual consensus between municipalities and citizens is built. Public participation from the early stages of the process would help to build consensus and trust amongst cities and citizens (Sasao, 2019).

*Case 2: Cost efficiency and decision making through public preference (Yamagata wide-area environmental administrative association)*

In another case, an administration of inter-municipal cooperation decided to change a construction plan for a larger plant and divide the facilities into two plants (MIC, 2016). Four municipalities in Yamagata Prefecture previously planned to shut down three incineration plants and integrate them into a larger plant. A local partial administrative association (Yamagata Wide Area Environmental Administrative Association, *Yamagata koiki kankyo jimukumiai*) offered to take over the responsibility for building the new plant. However, the association could not persuade the residents in order to obtain a new construction site of approximately 6 hectares and ended up downscaling the facilities in 2010 and built two incineration plants within the area instead (MIC, 2016).

As seen in Case 2, a cooperative arrangement is aimed for improving cost efficiency, but sometimes, the perception from citizens is different. The optimal solution in cost might not be the best result for local communities. Similar to Case 1, consensus building amongst cities and citizens in the planning process is important.

*Case 3: Managing an irregular accident by an inter-municipal organisation (Gotemba City–Oyama Town Regional Administrative Association)*

The Gotemba City–Oyama Town Regional Administrative Association, a partial affairs association of two municipalities in Shizuoka Prefecture for multi-use purposes including solid waste management, decided to operate an refuse-derived fuel (RDF) centre in 1999. In the 1990s, RDF technology became popular amongst Japanese cities. In the early stages, it was introduced as an ideal treatment that enables the production of solid fuels from waste. However, some facilities failed to efficiently produce RDF, and they stopped their service because of financial deficit. In addition, a fatal steam explosion accident happened in one facility,<sup>16</sup> which gave a negative impression towards RDF technology.

In the case of the Gotemba City–Oyama Town Regional Administrative Association, the centre could treat 150 tons/day and generate RDF, which was meant to reduce the treatment costs by selling the fuel to local companies (Gotemba City–Oyama Town Regional Administrative Association, n.d.). However, they faced problems producing RDF as it was difficult to maintain the quality of the waste. Also, the salt contained within the food waste was believed to have increased the amount of chlorine in RDF, which could have harmed the furnaces and other infrastructure (Unozaawa, 2015). As a result, local companies hesitated to purchase RDF, so they had to seek companies outside the prefecture, which resulted in additional transportation costs. The facility was shut down in 2015, and the association ended up filing a lawsuit against the construction companies for architectural defects of the facility (Gotemba City–Oyama Town Regional Administrative Association, n.d.).

Inter-municipal cooperation functions well in certain contexts when member cities share the same purpose and work by sharing the tasks properly. Yet once they need to deal with an irregular occasion, making decisions and agreements become more complex and time consuming compared with a single municipal government. Also, it is indispensable to choose adequate technology whose costs, site conditions, and other relevant factors are all feasible.

Although the plans for regional cooperation are made by each prefecture, their implementation is still difficult. In other cases, municipalities are unable to demolish old plants because of budget shortages (MIC, 2016). As municipal cooperation accelerates, abandoned facilities increase. Given the huge costs of dismantling due to special

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<sup>16</sup> In 2003, an RDF silo exploded in Mie Prefecture, Japan, which caused injuries and the death of two firefighters.

treatments such as those needed to prevent dioxin emissions, this process would impose additional burdens on municipalities (National Association of Chairpersons of City Councils, 2018).

Another point is the increase in transportation costs. Transportation costs for collecting waste rise as areas expand, even though the waste collection process is cost-efficient with respect to maintenance fees (Fujii, 2005). Setting up waste transfer stations would be a solution to this. In the case of Kitakyushu City, as explained earlier, the city accepts waste from neighbouring municipalities. Nogata City, one such municipality, has built a transfer facility with a waste incineration capacity of 113 tons/day (Nogata City, 2015). Combustible waste (e.g. organic waste, paper, and plastics) are collected and sent to the facility in Nogata City, and are transported by large trucks to the incineration facility in Kitakyushu City. In this way, the frequency of travel is reduced (Kitakyushu City, 2015). 'The trucks also avoid driving through urban areas in Kitakyushu using major traffic roads like highways' (Kitakyushu City, 2015, p.2).

Although regional cooperation is actively implemented to prepare for natural disasters such as floods, heavy rain, or earthquakes, some cities consider the concentration of waste facilities risky. For instance, when they comprise islands within the territory, it would be troublesome if they were not able to transport waste across bridges or on ships because of natural disasters like typhoons or big storms.<sup>17</sup>

### **3.3.3. Public–Private Partnerships**

Public–private partnerships (PPP) are encouraged and some municipalities and inter-municipal organisations have introduced a plan to promote them to reduce costs and rationalise the operation through privatisation. One of the characteristics in Japan is that DBO is the most common way for PPPs, whereas PFI methods such as build–transfer–operate (BTO) or build–own–operate (BOO) are less often implemented. In DBO, a municipality possesses the facility and prepares the funds, whilst entrusting the private sector to design, build, and operate the facility. In many municipalities, DBO appears to be more feasible, since it would be more preferable and persuasive for the assembly and citizens to have a municipal government take on initiatives rather than pushing

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<sup>17</sup> Onomichi City, Hiroshima Prefecture, has lots of small islands in its territory. The city decided not to merge its waste treatment facilities in order to avoid the risk of natural disasters. Waste is transported from the islands by crossing bridges. If a bridge is closed and waste cannot be transported, space to keep the waste is limited on the islands, meaning that it must be kept at small-scale plants (MIC, 2016).

responsibility onto private companies (Arai, 2014).

The following example is a case of a PPP in a Japanese municipality that chose a BOT concession agreement instead of setting up an organisation for inter-municipal cooperation.

*Case 1: PPP for regional cooperation on MSW (Minami-izu Town)*

Minami-izu Town, Shizuoka Prefecture, had initially planned to organise a partial affairs association together with four neighbouring municipalities in 2013. But the discussion did not go well, as they could not agree on the distribution of administrative roles and the allocation of human resources (Cabinet Office, 2018a). As a result, the town decided not to form an association and instead entrusted the construction of facilities to a private company by introducing a BOT concession and having other municipalities entrust the treatment to the company (Cabinet Office, 2018a). The town plans to start its operations in 2023 (Cabinet Office, 2018b).

A BOT concession is expected to reduce the municipal administrative burdens, equalise expenses, and have value for money from other municipalities entrusted in the treatment (Cabinet Office, 2018b). The national government encourages BOT concessions especially for small municipalities that cannot afford wide-area cooperation or for those planning to cooperate in the future for whom the timing of plant closure does not match (Cabinet Office, 2018b). As seen in the case of Minami-izu, if each municipality agrees with the concessionaire, there is no need to establish a formal regional government body or to put the burden onto one municipality.

Another example is outsourcing to private enterprises. In Japan, outsourcing of intermediate treatment is rare but quite common in final disposal (Kurishima, 2004). Approximately 17% of municipalities do not own final disposal sites but entrust the treatment to private companies (MoE, 2019b). Amongst them, some prefectures cannot find the space for landfill sites within their regions so that waste, mostly post-incineration ash, is transported outside the territories to be disposed of by private companies. The total amount of solid waste transported externally in the fiscal year 2017 reached about 258,000 tons, 6.7% of the whole amount of final disposal in Japan (MoE, 2019b). Approximately 75% of this amount originated from the prefectures located in the Kanto region, where the population is dense.

*Case2: Outsourcing of sanitary landfill outside of a municipality (Saitama prefecture)*

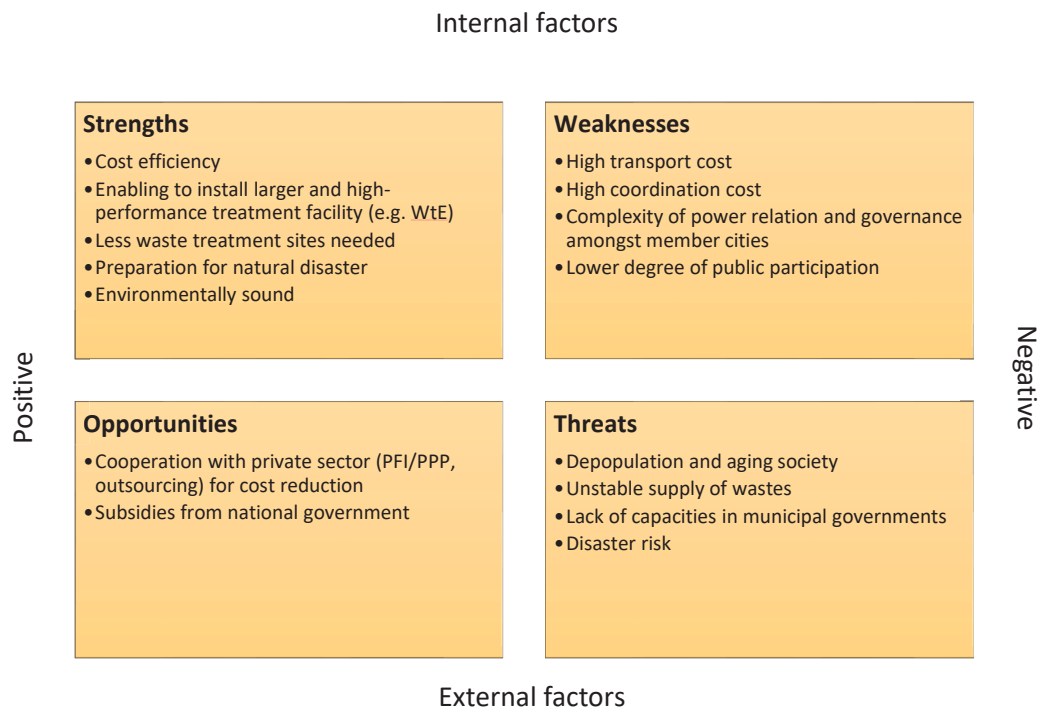
Saitama Prefecture, with a population of 7.3 million, is one of the prefectures that makes up the Greater Tokyo Area. Especially for densely populated cities close to Tokyo, it is difficult to afford a space for sanitary landfill. As the territory does not face the sea, it cannot reclaim land like the wards in Tokyo. Therefore, the prefecture has relied heavily on the landfill sites outside its territory. In 2017, the total amount of waste for final disposal was 99,772 tons and 56.5% was transported outside the prefecture (Saitama Prefecture, 2019). The amount of waste outsourced externally has exceeded 50% annually from 2011 to 2017 (Saitama Prefecture, 2019). Although the percentages are not specified, waste is transported not only to neighbouring prefectures but also to further regions. This amount ranges from 10,000 to 50,000 tons and is transported to the northern part of the country (Hokkaido and Tohoku), which can range in distance from around 300 kilometres to over 1,000 kilometres (MoE, 2019b).

When a city is densely populated and it is physically and financially difficult to find a waste disposal site, outsourcing to private companies outside the territory is often a feasible option. However, with respect to related costs, including outsourcing and transportation, municipalities need to analyse feasibility carefully. At the same time, having far-away disposal sites can make citizens (and even public officers) feel indifferent about the issues of waste reduction (Kurishima, 2004).

#### **2.4. SWOT Analysis on Inter-municipal Cooperation on MSW Management in Japan**

This chapter has discussed the current issues and challenges of inter-municipal cooperation in MSW management in Japan. Collaborative arrangement helps to decrease the burden of a respective municipality and contribute to the efficient management of waste. Yet challenges remain, such as high coordination costs, increased transportation costs, and issues of governance. Based on such situations, Figure 3.2 illustrates the SWOT analysis of inter-municipal cooperation on MSW management.

**Figure 3.2. SWOT Analysis of Inter-municipal Cooperation on MSW Management in Japan**



SWOT = strengths, weaknesses, opportunities, threats; PFI = private finance initiative, PPP = public-private partnership; WTE= waste-to-energy.  
 Source: Compiled by author (Hiratsuka-Sasaki).

As explained earlier, cost-efficiency is the main driver of cooperation. In the way of strengths, a municipality can afford to build a larger facility with high-performance technology for more efficient and environmentally sound treatment by working together. In such a case, fewer waste treatment sites are needed, and fewer disputes for site selection arise. In the way of opportunities, a municipality can also select to cooperate with the private sector and reduce administrative costs. The municipality can use several subsidies aimed for enhancement of regional cooperation as well as promoting PPP via, e.g. PFI.

On the contrary, high transportation costs and coordination costs need to be considered. Moreover, political power relations amongst the member cities might hinder smooth and efficient administration and management. Proximity to the citizens would also be lower, which might make consensus building difficult compared with a single municipal government (Sasao, 2019). Depopulation, an aging society, and a lack of human resources in MSW could serve as large incentives for inter-municipal cooperation. Waste reduction is important, but conversely, a large-scale incineration plant requires a stable supply of



waste for optimal use and energy generation. This is important, considering that a population decrease would cause an unstable waste supply. With respect to natural disasters, although inter-municipal cooperation functions in the context of preparation, concentration of waste facilities could be considered a risk as well.

## **2.5. Implications to ASEAN countries**

Inter-municipal cooperation varies in composition, scope, and degree of organisational integration depending on the needs and capabilities of municipalities. Cities can cooperate by establishing a separate organisation or simply making agreements. This chapter has focused on the cases under the purpose of waste management, but cooperation can have multi-purpose functionality. With respect to composition, higher-level governments (prefectural governments in the case of Japan) can also be considered as actors in building a vertical cooperation (Hulst, et al., 2009). In Japan, the role of prefectures is limited to offering technical support when requested by municipalities under the Waste Management and Public Cleansing Act (MIC, 2016). However, multi-dimensional support and cooperation between municipalities and prefectures might mitigate the burdens of municipalities. It is important to choose the most suitable approach and cooperation type for a respective municipality. Here, we state short implications to ASEAN countries on the basis of the main points of this chapter.

Compared with Japan, ASEAN countries have a limited legal basis to form associations of local government for waste management, whereas partial affairs associations on waste management are common in Japan as shown in this chapter. To promote inter-municipal cooperation, legal bases and guidelines to form such associations should be developed in each country. Central governments should also provide financial incentives to establish regional waste management.

It was observed that most of the municipalities in Japan use incineration facilities. With respect to the costs, many local governments in ASEAN countries, especially the small ones, would not be able to afford to introduce incineration technologies without subsidies or international aid. However, if several municipalities could cooperate, it would enhance the economic performance enabling the installation of better technology for waste facilities such as WTE. Increases in external costs, such as transportation, as a result of regional cooperation also need to be dealt with by setting up transfer stations. On the other hand, as shown in the case of the joint association between Gotemba City and Oyama Town, inadequate use of technology like RDF would lead to economic inefficiencies and high coordination costs amongst member municipalities. Local

governments need to investigate the optimal scale of operation and the selection of technology in initial-stage planning.

Also, inter-municipal cooperation would enhance PPP as it would foster the projects that small, single municipalities within the private sector cannot. Although DBO is dominant in Japan, PFI methods could be considered in ASEAN countries if several cities were able to cluster. Outsourcing to private enterprises outside a territory is another option, especially for large cities.

Lastly, issues of governance and public participation need to be considered. When cooperating with several municipalities, they need to build mutual trust to have stable power relations amongst the member cities to operate more sustainable MSW facilities. Public participation in the early stages in the process of building facilities enhances building trusts amongst citizens and municipalities. Although several issues need to be addressed, inter-municipal cooperation would be a means to enhance sustainable MSW management.

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