

Public Participation and Municipal Solid Waste Management in Selected Asian Cities

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This paper discusses the role of public participation (PP) in the process of pursuing sustainable practices for municipal solid waste management (MSWM) in selected Asian cities. The paper is structured in three sections. First, the importance of public participation on MSWM is addressed. Second, the cases presented in the 5th Thematic Seminar of the Kitakyushu Initiative (KI) are reviewed and compared. Finally, lessons from the cases and recommendations for MSWM are given.

Public Participation on MSWM

Municipal solid waste management is a complex activity due to its direct relationship with people's behaviour. Therefore, environmental awareness and public participation are key factors in identifying long-term solutions for this problem. Management of solid waste in both developing cities and developed cities cannot be considered isolated; it has to be analyzed in the context of other issues, such as urbanisation level, stage of economic development, and educational level of the population. In less developed cities, where sanitation is poor, waste problems emerge; for these cases, it is necessary to build awareness of hygienic and sanitary conditions. In rapidly industrialising cities, rapid urbanisation and a constant change in consumption patterns and social behaviour cause massive waste generation beyond the management capability of the local governments. Many local municipalities with their limited human, technical, financial, and institutional capability demonstrate low capacity to cope with the multi-dimensional problems of solid waste management. This leads to inadequate sanitary conditions in communities, creating a need for the involvement of other institutions, the private sector, NGOs, and residents to deal with these problems effectively and efficiently. Developed cities faced problems similar to those of developing cities in the past, and their population possess these experiences of coping with environmental issues, including waste management. In these cities, large amounts of waste are produced; however, in many of these cities there are groups leading activities aiming to integrate residents into programmes for source separation, recycling, and waste reduction.

The characteristics of public participation change significantly depending on the stage of development of the city or country involved. However, its importance cannot be disregarded in any case. The public plays an important role in keeping the city clean, in collecting and properly disposing the waste, in recycling activities, in the permitting process for municipal solid waste facilities, and finally in the decision making process for waste management and urban planning. Since waste is generated by everyone, hindering the involvement of residents in the decision-making process concerning waste management may lead to failure of the management plan. For the same reason, waste management is very much a social problem. It is important to cope with the social and political issues. Connected with these are economic issues, and it is necessary seek effective solutions within practical cost limitations. The public should be closely involved in the undertaking. Without their support, both directly and through their elected representatives, no progress will be made. This linkage of technical and socio-political disciplines brings challenges as well as fascination to the field of waste management (Tammemagi, 1999).

The incentives for public participation in MSW management include improvement of the sanitary and environmental conditions, transparency of the decision-making process, and opportunities to provide input on decisions that affect the communities. Municipalities that implemented recycling programs report that

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the return of the revenue from selling recycled items to the community is one of the major incentives for participation in source separation.

Table 1 shows the analytical framework for public participation in MSWM as discussed in the 5th Thematic Seminar of the Kitakyushu Initiative.

Table 1. Analytical framework for public participation in solid waste management

Driving forces	Forms	Approaches	Activities
Political will, governance, institutions: decentralization and regulation, economy and market, public pressure	Community participation, NGO and NPO involvement, participation of business owners, and other stakeholders	Grass-root or bottom-up and top-down	Awareness campaign, source separation and recycling, cost sharing for waste treatment and disposal, site selection for waste treatment and disposal, decision on type of waste treatment

Cases of the 5th Thematic Seminar

Local government officials from five Asian cities presented the successful stories of their respective cities. The five cases demonstrated clearly the differences in size, stage of economic development of the represented cities, and environmental awareness and participation of their respective residents. Table 2 presents general information and summarises the waste management practices in each of the selected cities: Dhaka (Bangladesh), Nonthaburi (Thailand), Cebu (Philippines), Ube, and Minamata (Japan).

Table 2. City and waste management profile

City	Dhaka	Nonthaburi	Cebu	Ube	Minamata*
Population (thousand)	10,000	273	720	175	31
Area (km ²)	360	39	326	210	163
Waste generation (ton/day)	5,000	300	511	176	29
Waste per capita (kg/p/d)	0.50	1.09	0.71	1.01	0.94
Budget spent in MSWM (% of total budget)	15	23	6.3	4	2.2
Main activity	Political and economical centre	Agriculture, commerce, and industry	Trade and services	Industry	Industry

* Minamata's waste generation includes 6 ton/day (or 0.17 kg/p/d) of recyclable material.

Dhaka, the less economically developed but largest city in the group, shared its experience on environmental awareness campaign and implementation of a Kitakyushu Initiative (KI) pilot project. The local government and NGOs organised meetings to promote environmental awareness and public participation in waste collection activities. The project stimulated other NGOs and communities based organizations to launch participatory waste collection activities in other areas of the city.

Nonthaburi showed a successful pilot project, partially funded by the Kitakyushu Initiative (KI), on waste separation and recycling activities. The pilot project was implemented in two villages which obtained a 30% waste reduction and 20% waste recycling rate. A composting plant, which receives source

separated organic waste, was also established. Following the conclusion of the pilot project in December 2002, the communities and the local government have continued to implement waste separation and recycling activities.

Cebu, the second largest city in the Philippines, presented its structure on Urban Environmental Management, which is distinguished by public participation, private sector partnership, and international cooperation. The Cebu City Development Council (CDC) is integrated by 54 NGOs (40% of the membership), which is the largest NGO membership integrating a CDC in the Philippines, and part of the city budget is designated to projects carried out by NGOs. The Cebu City representative highlighted the partnership activities and challenges in coordinating the different actors in the decision making process. The city also presented the Community Waste Management program, which was piloted in five barangays², and later extended to six others. First, existing groups were identified and data was collected, orientation was carried out in each area, and Task Forces were created. The Task Forces managed the community waste.

The following presentation was from a mature city, Ube, whose municipality has strong commitment to reducing waste and performing recycling activities despite the high costs for recycling in Japan. The issue of public participation was addressed by providing information through meetings (briefing sections) and distribution of materials, such as posters, brochures, booklets, websites, and distribution of the list of waste categories to be separated. The amount of waste generated per capita has decreased together with an increase in recycling rates, which now accounts for 15% of the waste as opposed to 8.5% in 1996.

The last presentation was about Minamata City, a remarkable example of overcoming a tragic pollution-related problem leading to environmental awareness of the population. The tragedy was the impetus for public participation in all environmental issues, including waste management and recycling activities. The residents actively join source separation activities and waste is separated into 21 categories. Thanks to this practice, residents have gradually started adopting a more conscious approach for shopping; for instance, less packaging and wrapping material are preferred nowadays.

Table 3 summarizes the character of public participation in the five cities, citing the main environmental issue leading to the call for public participation in waste management. There are other environmental problems as well; for instance, lack of landfill sites is an issue in all cities. Significant differences in environmental concerns and public participation activities are observed among the cities.

Table 3. Comparison of the activities aimed to have public participation on the MSWM

City	Example of PP	Initiative	Main waste treatment practice	Main environmental concern
Dhaka	Public awareness campaign and public participation in waste collection	Pilot project supported by KI	Irregular collection and open dump	Hygiene and sanitary conditions
Nonthaburi	Source separation of waste, composting of organic waste	Pilot project supported by KI	Landfill	Lack disposal site
Cebu	NGO involvement in decision-making process	Public participation in the decision making process and pilot projects	Landfill	Groundwater contamination
Ube	Source separation of waste	Public participation in waste reduction	Incineration	Dioxin emission and waste reduction
Minamata	Source separation of waste	Separation of waste in 21 categories	Incineration	Human health

² Barangay is the smallest political unit, such as a village, in the Philippines.

Figure 1 depicts a scheme comparing the two opposite cases, Dhaka and Minamata, showing that other cities have characteristics in between the two cases. Dhaka's population, in general, has a low income and low educational level, leading to low environmental awareness. In Dhaka, recycling is a business performed by the informal sector; the collection of recyclable materials is done by scavengers. On the other hand, Minamata's population has a high income and high environmental awareness. Source separation and recycling of the waste is performed due to environmental concern rather than economical reasons, although the communities benefit from selling recyclables items. The recycling activities are coordinated by the municipality.

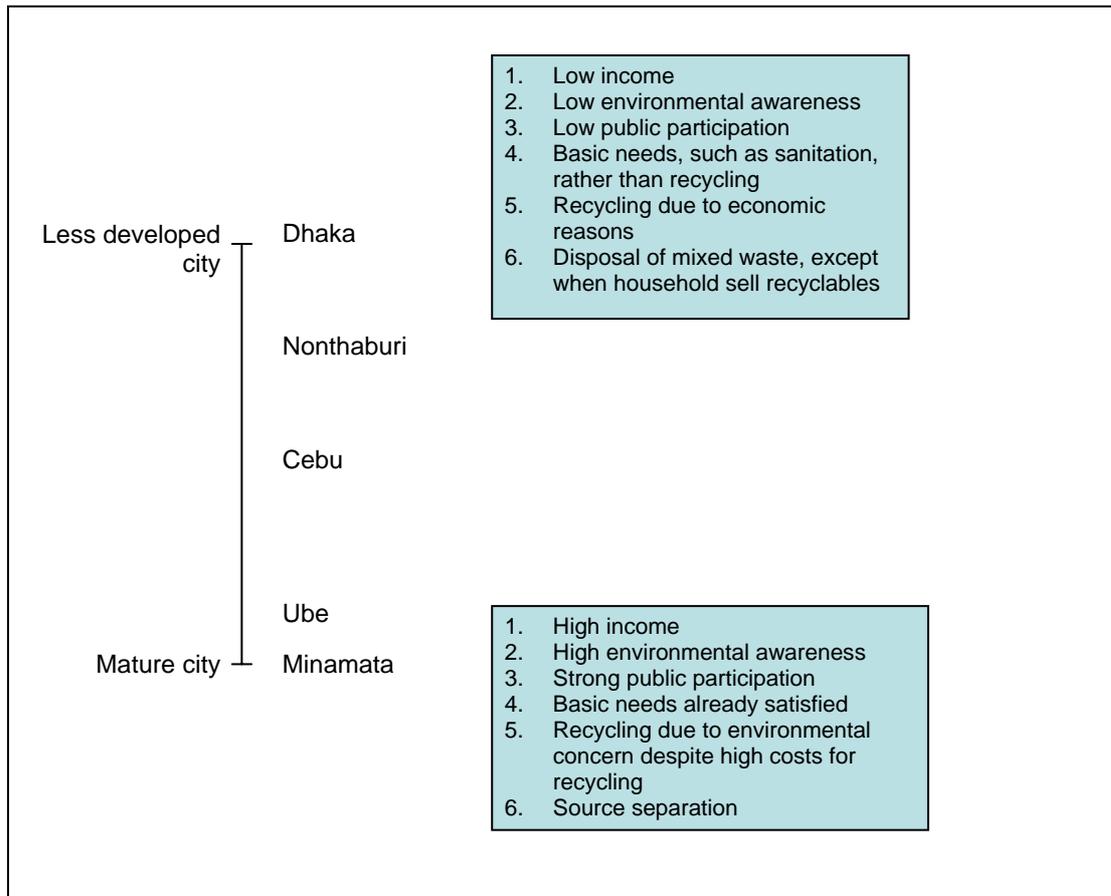


Figure 1. Development level of selected Asian cities

Overall discussion and recommendations

In Ube and Minamata, where incineration is the main waste treatment technique adopted, a high rate of waste diversion and recycling was achieved. It is worthy to assess if this diversion rate, in particular the diversion of plastic waste, is not leading to a drastic decrease in the caloric value of the waste making incineration inefficient. If the caloric value of the waste becomes too low, it is necessary to add fossil fuels to the incinerator, increasing then the CO₂ emission and overall environmental impact of the waste treatment. On the other hand, incineration of some types of plastic may lead to dioxin formation depending on incineration conditions. Therefore, it is recommended to carry out an evaluation of the economic and environmental effectiveness of both recycling activities and incineration. If too much energy has to be spent to recycle waste, and if this energy comes from fossil fuel or nuclear sources, the overall effect on the environment might have a more adverse impact on the environment than only incinerating the waste. Kitakyushu City has addressed with this issue by having the recycling factories, which are part of the Eco-Town project, operating using wind energy.

In developing cities, organic waste usually constitutes the main fraction of the waste. Landfilling this waste leads to extensive formation of methane, a powerful greenhouse gas. Incineration is not only costly, but usually inefficient for treating waste with high organic content. Biological treatment is usually the most appropriate way of treating this type of waste. Many cities are opting for composting process however the low marketability of the resulting compost may lead to an economically backward project. Anaerobic digestion (biogasification), although costly, may be more interesting for those cities, because the obtained product, methane, can be used easily and efficiently. Since the costs for installing a biodigester are high, financial instruments need to be developed. Clean Development Mechanism (CDM) projects would be suitable for obtaining the necessary funds for installing such biodigestors and then improving the waste management in developing cities.

Decision makers and the general public should be aware of the costs and the environmental impacts of all options for waste treatment, including recycling. Sustainable waste management can be only achieved when residents understand their burden on the environment, decide how much waste they will generate, and what to do with the waste they generate. Decision making on MSWM should not be made on top-down base; public participation in both the decision process and the actual management, i.e., by separating and disposing the waste properly, is essential for the long-term success of any management plan.

References

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