


SOLID WASTE SEPARATION AT SOURCE AMONG HOUSEHOLDS FOR SUSTAINABLE SOLID WASTE MANAGEMENT: THE APPLICATION OF THE SOLID WASTE AND PUBLIC CLEANSING MANAGEMENT ACT 2007



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ABSTRACT

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Worldwide solid waste generation has increased significantly. Source separation and recycling are important elements in solid waste management as both offer sustainable and effective solutions to the mounting waste issue. Beginning 1 September 2015, Perlis, Kedah, Pahang, Negeri Sembilan, Malacca, Johor, and the Federal Territories of Kuala Lumpur and Putrajaya mandated the separation of solid waste at source or from households as provided under the Solid Waste and Public Cleansing Management Act 2007 (Act 672). Nevertheless, issues such as the increase in the population, poor enforcement, and lack of proper infrastructure might hinder the successful implementation of the programme. This paper studies provisions on the separation of solid waste at source among households under the act and related challenges. The method used is library research and interviews. The findings of this paper is that the enforcement of mandatory separation of solid waste at source among households is a promising move towards enhancing sustainable solid waste management in Malaysia but there is space for improvement in order to ensure its successful implementation.

Contribution/ Originality: The paper's primary contribution is finding that separation of waste at source for recycling is a practicable choice to be implemented in Malaysia. Nevertheless, there are some challenges that could hinder the successful implementation of compulsory solid waste separation in Malaysia which has started in 2015.

1. INTRODUCTION

One of the most serious environmental problems in developing countries is solid waste management (Mere *et al.*, 2017). Solid waste management may be defined as that discipline associated with control over the generation, storage, collection, transfer and transport, processing, and final disposal of solid wastes in accordance with the best principles of public health, economics, engineering, conservation, aesthetics, and environmental considerations (Agamuthu, 2001). There is a variety of solid waste management practices in the world though the basic elements are generally similar. Figure 1 illustrates the common practice of waste management in many developing countries. It shows that though the implementation of energy recovery is minimal, recycling, reusing and reducing waste disposal is practiced widely in many developing countries, specifically those in Asia and the Pacific Islands. Waste

disposal here generally refers to landfilling (Agamuthu and Fauziah, 2014). It is affirmed that in developing countries, there is less attention given to waste minimization strategies which result in the sending of wastes to dumpsites for final disposal (Noor *et al.*, 2014).

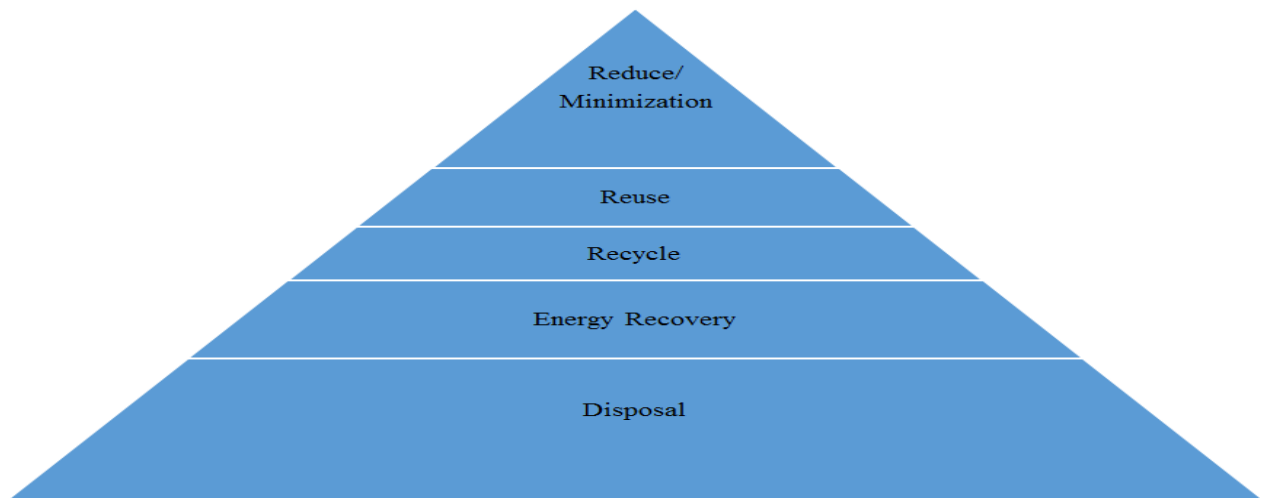


Figure-1. Common waste management practices in many developing countries

Source: Agamuthu and Fauziah (2014)

Sustainable solid waste management is a management which contributes to three important aspects of sustainable development, that is, the environment, economic and social wellbeing, and this is indicated by the reduction in waste generation (United Nations Institute for Training and Research, 2013).

Solid waste management practices in Malaysia begin from waste collection to transporting it to assigned places such as transfer stations, recycling facilities, treatment plants, or landfills for final disposal (Mohamed *et al.*, 2014). Control of complex measures is needed in solid waste management process due to the reason that it is costly and time-consuming (Mohammad *et al.*, 2013). It is emphasized that the public should be encouraged to practise the separation of waste for example to separate hazardous materials from municipal wastes due to environmental reasons and also to mitigate risks to waste workers (United Nations Human Settlements Programme (Un-Habitat), 2010). This paper studies the separation of solid waste at source among households as contained in the existing law.

2. OVERVIEW OF SOLID WASTE MANAGEMENT IN MALAYSIA BEFORE AND AFTER THE SOLID WASTE AND PUBLIC CLEANSING MANAGEMENT ACT 2007 (Act 672)

Prior to 1995, solid waste management was under the responsibility of local and state governments according to the Local Government Act 1976 (Act 171). This is provided under section 72 (1) (a) of the Local Government Act 1976 which states among others that a local authority shall have power to do all or any of the following things which include “to establish, maintain and carry out such sanitary services for the removal and destruction of, or otherwise dealing with, night soil, slops rubbish, litter, dead animals and all kinds of refuse and effluent”.

During that material time, the roles of the federal, state, and local governments in solid waste issues differed. The local governments provided direct solid waste collection services or leased them out to private contractors, the federal government through the Ministry of Urban Wellbeing, Housing and Local Government, Ministry of Health, and the Economic Planning Unit provided the technical and financial assistance while the state governments provided the land for disposal facilities and have function in the management of the local authorities (Moh and Latifah, 2017). The responsibilities of the local authorities included collecting and transporting waste to disposal sites and operating recycling centers or contracting them out to the private sector (Moh and Latifah, 2014). In order to guarantee satisfactory standard of services level of solid waste management, financial position of the local authorities is one of the important aspects (Noor *et al.*, 2017).

On 6 September 1995, solid waste management was privatized by the government. Consequently, an interim privatization programme was implemented in the middle and south zones on 8 April 1998 and in the north zone on 1 November 2009 before full privatization was effected on 1 September 2011 (Solid Waste and Public Cleansing Management Corporation, 2016). A long-term agreement during that material time was not possible due to the requirement that legislation transferring executive authority to the federal government needed to be passed first (Nadzri and Larsen, 2008).

With the enforcement of Act 672 in 2011, the federal government took over solid waste management from several state governments which surrendered their executive powers on it. Currently, the local governments function only in respect of providing costs together with the federal government for public cleansing. The cost is channeled to the Solid Waste and Public Cleansing Management Fund. Solid waste management has since been privatized to three concession companies for a period of 22 years. However, Perak, Selangor, Terengganu, Kelantan, and Pulau Pinang have yet to accede to Act 672 (Muharrir, 2016). It is said that Malaysia is the only country which practices federalization in respect of solid waste management (Muharrir, 2016).

3. SOLID WASTE MANAGEMENT SERVICES IN MALAYSIA

Solid waste management services are defined under section 2 of Act 672 as “the separation, storage, collection, transportation, transfer, processing, recycling, treatment and disposal of controlled solid waste.” In general, open dumping and burning of wastes were practised in Malaysia until the early 1990s when landfills began to become the main choice for solid waste disposal (Anwar *et al.*, 2014). The method of implementation of solid waste collection is 2+1 namely, twice weekly for the collection of household solid waste and once a week for the collection of recycled waste (SWPCMC, 2016).

Landfilling is currently the preferred method of solid waste disposal in Malaysia (Mohamed *et al.*, 2014) and strict measures and practices are enforced on sanitary landfills while the use and operations of non-sanitary landfills have ceased in stages (Sharifah *et al.*, 2013). Currently, there are 302 landfills in Malaysia of which 163 are still in operation (Table 1). As shown in the table, Sarawak has the highest percentage of operating landfills at around 30% of the total due mainly to the size of the state (Anwar *et al.*, 2014). Some landfills are no longer operating and were either closed because they had been used up to their total capacity or had adverse impacts on the surrounding environment.

Table-1. Landfill sites in Malaysia

State	Number of Landfills in Operation	Number of Closed Landfills	Incinerators
Johor	13	23	0
Melaka	1	7	0
Negeri Sembilan	7	11	0
Kedah	8	7	1
Perlis	1	1	0
Perak	17	13	1
Kelantan	11	9	0
Pahang	16	16	2
Terengganu	9	11	0
WP Kuala Lumpur	0	10	0
Pulau Pinang	2	1	0
Selangor	9	14	0
Sabah	19	2	0
Sarawak	49	14	0
WP Labuan	1	0	0
Total	163	139	4

Source: SWPCMC (2016).

Table 2 shows the number of sanitary and inert landfills in Malaysia. Of the eight sanitary landfills two are in Johor, and three each in Sarawak and Selangor. There are three inert landfills, one in Pulau Pinang and two in Selangor. This indicates that other landfills in Malaysia are non-sanitary landfills. Table 2 indicates that most landfills in Malaysia are non-sanitary landfills. Currently, there are only a few sanitary landfills in Malaysia. According to Agamuthu (2014) non-sanitary landfills normally have a base on natural clay lining as liners whereas sanitary landfills are designed with landfill liners to avoid leachate migration into the groundwater system and to provide a system for gas collection.

Table-2. Sanitary solid waste disposal sites in Malaysia

State	No. of Sanitary Landfills	No. of Inert Landfills
Johor	2	-
Kedah	-	-
Kelantan	-	-
Melaka	-	-
Negeri Sembilan	-	-
Pahang	-	-
Perak	-	-
Perlis	-	-
Pulau Pinang	-	1
Sabah	-	-
Sarawak	3	-
Selangor	3	2
Terengganu	-	-
WP Kuala Lumpur	-	-
WP Labuan	-	-
Total	8	3

Source: National Solid Waste Management Department (2016)

Incineration is among the common disposal options but is the most expensive in waste management. Initially, incineration was developed in Malaysia for the purpose of disposing clinical and hazardous waste (Moh and Latifah, 2017). A study reveals that waste separation for recycling is a practicable choice in Malaysia due to the large proportion of recyclable materials in wastes whereas incineration is discouraged because of a number of factors including the fact that collected waste in Malaysia has high moisture content that makes it unsuitable for the operation of incinerators (Moh and Latifah, 2017).

4. SEPARATION OF SOLID WASTE AMONG HOUSEHOLDS UNDER THE SOLID WASTE AND PUBLIC CLEANSING MANAGEMENT ACT 2007 (ACT 672) FOR SUSTAINABLE SOLID WASTE MANAGEMENT

Section 74 (1) of Act 672 states that “the Director General may give written directions as he considers fit to any person for the purpose of ensuring the compliance with this Act, on the separation, handling and storage of any controlled solid waste in the possession of such person. Subsection 2 of the same section further provides that “any person who fails to comply with the direction under this subsection (1) commits an offence and shall, on conviction, be liable to a fine not exceeding one thousand ringgit.”

Under the above provision, the Director General has the right to provide written directions to any person on the separation, handling, and storage of any controlled solid waste in the possession of such person in order to ensure the compliance with the Act. Failure to comply with the direction is considered an offence and a fine not exceeding one thousand ringgit may be imposed on violators. Section 2 of the SWPCM Act 2007 (Act 672) provides that “Director General” means the Director General of Solid Waste and Public Cleansing Management appointed under section 5 which provides that the Minister shall appoint a Director General from amongst members of the public service, who shall head a department.

Beginning 1 September 2015, households in Perlis, Kedah, Pahang, Negeri Sembilan, Malacca, and Johor, and the Federal Territories of Kuala Lumpur and Putrajaya commenced the compulsory separation of solid waste at source or from households. This mandatory source separation provides the means for a higher recovery of recyclable materials and an extension of the operating capacity of landfills sites (Moh and Latifah, 2017).

The solid waste has to be separated by households based on the waste composition, that is, recyclable waste, residual waste, and bulky or garden waste. There are fixed schedules for the collection of the separated wastes involving a weekly collection for recyclable waste and bulky waste and twice weekly collections for residual waste. Types of recyclable wastes that need to be separated according to groups are paper, plastics, and others which are glass/ceramics, metal/steel/aluminium cans, electronic waste/small electronic appliances, leather/rubber/shoes/fabrics, hazardous waste, bulky waste, and garden/farm waste. Types of residual wastes placed inside the trash bin include kitchen waste, food waste, contaminated materials, and disposal diapers (www.kpkt.gov.my/separationatsource/, 12 October 2015).

The mandatory waste separation scheme seeks to prevent the indiscriminate disposal of recyclable materials, reduce the amount of solid waste sent to landfills, reduce the financial allocation for solid waste disposal, and to ensure compliance with the SWPCM Act 2007 which makes it an offence not to separate solid waste (www.kpkt.gov.my/separationatsource/, 12 October 2015). The early stage of its implementation did not involve any penalties and a warning notice was issued against those failing to comply prior to its actual enforcement effective 1 June 2016 (Audrey, 2015) following which it would qualify as a compounding offence. Section 94 (1) of Act 672 states that “the Director General or the Corporation may, with the consent in writing of the Public Prosecutor, compound any offence committed by any person under this Act and prescribed to be a compoundable offence by regulations made under this Act...”. This means under Act 672, the Director General or the Corporation may compound any offence committed under the Act with the written consent of the Public Prosecutor.

Nevertheless, there are some challenges hindering the successful implementation of the solid waste separation scheme. Ravindran (2015) states that these include the increase in the population and whether relevant actions and programmes are commensurate with it, economic growth with rapid township developments giving rise to the issue of whether relevant authorities are ready to cope with the attendant increase in solid waste management needs, poor enforcement especially in regard to waste, and the absence of a waste management curriculum in the current education syllabus.

Moreover, a study by Guerrero *et al.* (2013) found, among others, that waste separation development programmes are constrained by the lack of know-how on technologies and good waste management practices and the low level of interest in environmental issues among the authorities. Besides, the lack of infrastructure for proper solid waste management especially equipment to collect sorted waste also constitutes an obstacle in waste separation (Guerrero *et al.*, 2013; Ravindran, 2015). The ambivalence of the public towards waste source separation is also a challenge (Ravindran, 2015; Moh and Latifah, 2017) as awareness on it is still low (Moh and Latifah, 2017).

The implementation of Act 672 and the Solid Waste and Public Cleansing Management Corporation Act 2007 (Act 673) which are not standardized in all states in Malaysia also constitute a challenge (Moh and Latifah, 2017). Act 672 is currently enforced only in the Johor, Kedah, Melaka, Negeri Sembilan, Pahang, Perlis, and the Federal Territories of Kuala Lumpur and Putrajaya while Perak, Selangor, Pulau Pinang, Kelantan, and Terengganu have yet to accede to it. Moh and Latifah (2017) also note the absence of specific measure in source separation and recycling because solid waste minimization only constitutes a part of the overall policy and plan strategies. It is contended that such actions focus on the removal and disposal of waste rather than the utilization of waste materials as resources (Moh and Latifah, 2017).

In short, solid waste separation is a preferable way of solid waste management which could decrease the use of landfilling and consequently extend the lifespan of existing landfills in Malaysia. Nevertheless, several challenges prevent or hinder the effective implementation of solid waste separation among households in Malaysia.

5. CONCLUSION

The common practice of waste management in many developing countries consists of minimization, reuse, recycle, energy recovery, and disposal. Waste disposal is significantly relied upon in many developing countries including Malaysia where the state and local governments were responsible for solid waste management before interim privatization in 1995. In 2011, Act 672 was enacted to allow solid waste management to be taken over by the federal government although some states declined to accede to it. As far as waste disposal is concerned, most landfills in Malaysia are non-sanitary in nature while incinerator operations are deemed unsuitable due to the high moisture content of the collected mixed waste. As such, the separation of waste for recycling is a practicable option. Section 74 of Act 672 covers the separation of solid waste. Compulsory solid waste separation at source was made mandatory in Malaysia beginning 1 September 2015 and failure to adhere to it became a compounding offence starting 1 June 2016. This shows a move towards enhancing sustainable solid waste management in Malaysia. However, there should be special attention on addressing several challenges such as the rising population, poor enforcement, and lack of proper infrastructure. It is proposed that the implementation of Act 672 be standardized in all states in addition to ensuring that the focus of the existing law should be on waste separation and minimization. In addition to that, the implementation of solid waste separation should be reviewed from time to time in order to cope with the challenges.

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