The Social Sciences 11 (24): 5803-5809, 2016
ISSN: 1818-5800

Household Solid Waste Recycling: a Comparison Between Malaysia and Singapore from the Legal Perspective

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Abstract: This study presents an evaluation on household solid waste recycling legal provisions in Malaysia and Singapore. Solid waste has become a central issue particularly in developing countries. The generation of solid waste has increased thus, becoming one of the major causes of pollutions prevailing particularly in developing countries. The sustainable and effective solid waste management is important in order to mitigate or reduce solid waste's negative impacts on the environment. One of the issues relating to solid waste management in developing countries including Malaysia is the low recycling rate. Recycling is one of the options in 3R (Reduce, Reuse and Recycle). Singapore, on the other hand has successfully established a sound material recycling society in the country. This study evaluates several aspects of solid waste management in Malaysia and Singapore, namely, solid waste management practiced in both countries, legislations regulating solid waste management and specific provisions on household solid waste recycling as contained in statutes and regulations in both countries. The finding indicates that landfill is the last option of the waste disposal method in Singapore. In Singapore, the focus is on waste minimization and recycling. Meanwhile, it is discovered that Malaysia prefers landfill over other methods of waste disposal. Similarities could be seen in terms of both countries' commitments to effectively manage solid waste through the enactment of laws particularly legislations to regulate household solid waste recycling. Nevertheless, the systematic waste collection and recycling strategies would help Malaysia in order to enhance the household solid waste recycling in Malaysia.

Key words: Solid waste, legislation, environment, Malaysia, recycling

INTRODUCTION

Managing waste in a country is a challenging task. The management of waste particularly in industrialized countries such as Malaysia needs closer attention (Badgie *et al*., 2012). The main issues on solid waste management in developing countries include the lack of legislation, policies and long-term strategy (Sinha *et al*., 2014). An effective solid waste management is crucial in order to evade environmental impacts (Behzad *et al*., 2011). Examples of environmental impacts include air, water and land pollutions (Behzad *et al*., 2011). These impacts may give rise to public health hazards (Sinha *et al*., 2014). Therefore, wastes should be managed according to sustainable development (Manaf *et al*., 2009).

Household solid waste in particular may cause environmental problem because of the increased production of household solid waste in Malaysia (Jalil, 2010). The organic portion of the municipal solid waste in Malaysia is the main source of pollution in a landfill (Xiang *et al*., 2014). Hence, solid waste should be managed effectively and sustainably in order to avoid negative impacts that it may bring. As far as the solid waste generation is concerned, it is indicated that solid wastes generation has increased annually (Agamuthu *et al*., 2009; Dinie and Mashitah, 2013; Moh and Manaf, 2014). Such an increase is caused by a number of factors such as increased industrial activities (Nyirenda and Ngwakwe, 2014), growth in urban population (Badgie *et al*., 2012) also the increase of income in the urban population (Jalil, 2010).

Various driven factors influence the effective solid waste management which include institutional and legal factors (Guerrero *et al*., 2013). Solid waste generation, for instance is influenced among others by legislation and policy (Hasnah *et al*., 2012). The importance of legislation and policies could be seen in its role as the government's instruments to support a better solid waste management (Hasnah *et al*., 2012). Besides, ineffective solid waste

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management is a sign of the problem of policy implementation (Abas and Seow, 2014a, b). It is agreed that the legislation which reflects policy incentive on household recycling, may tighten the norms which eventually will increase social sanctions and feeling of guilt if the society does not comply (Hoornweg and Bhada-Tata, 2012). Moreover, a clear legal framework and effective enforcement is crucial in order to successfully implement a solid waste management policy (Periathamby *et al*., 2009). It is further highlighted that legislation could be a factor that influences the effectiveness or ineffectiveness of a solid waste management policy (Agamuthu *et al*., 2009) Therefore, legislation is considered vital specifically in making the policy related to solid waste management successful.

The management of solid waste includes recycling. As legislation is essential in the solid waste management, legislation regulating recycling should be adequate in order to effectively implement recycling. Recycling is one of the options in 3R which consists of three activities that is, Reduce, Reuse and Recycle. The significance of the 3R principles could be seen in terms of leading the society's life towards a sustainable lifestyle (Samiha, 2013). Moreover, solid waste prevention, minimization and recycling should be the priority in solid waste management (Dinie and Mashitah, 2013). Recycling also constitutes the most favoured ways of solid waste disposal due its benefit as basic resources for industries (Agamuthu and Hamid, 2014). Hwa (2007) views that:

> "The rate of recycling in Asian developing countries is far from satisfactory. The low recycling rate can be attributed to poor strategic planning and to the implementation and the enforcement of the policies"

Therefore, effective policies with strict regulation on the recycling program, along with other factors as practiced in many countries, for instance Singapore, have successfully increased the recycling habit among the people (Agamuthu and Hamid, 2014). The recycling rate in Malaysia in 2012 was 10.5%. This rate is far from satisfactory as compared to the recycling rate in Singapore in 2013 which was 61% (www.nea.gov.sg/). As mentioned previously, the legislation on recycling plays an important role in ensuring the successful implementation of recycling. Therefore, Malaysia's lower recycling rate compared to Singapore suggests that Singapore has a comprehensive and an efficient management of solid waste specifically household solid waste recycling. This study presents an evaluation on the legal approach in Malaysia and Singapore in respect of household solid waste recycling. This researcher aims to see the strengths of Singapore that could be learned by Malaysia in order to enhance the household solid waste recycling management in Malaysia.

SINGAPORE'S LEGAL APPROACH ON HOUSEHOLD SOLID WASTE RECYCLING

Solid waste management practice in singapore: An effective Environmental Management System ensures a clean and green environment in Singapore (Lye, 2014). On waste management, it has been highlighted that solid waste production in Singapore has increased substantially that is, 1,260 tonnes per day in 1970 as compared to 8338 tonnes per day in 2014 (http://www.nea.gov.sg/energy-waste/waste-management/overview).

Singapore's solid waste collection system is all-inclusive whereby there is daily collection and disposal of solid waste (Lye, 2013). Besides, Singapore is one of the countries which conduct systematic management on recycling and waste minimization by concentrating on a number of matters including laws, policies and guidelines (Ali and Sion, 2014). The objective of waste management in Singapore is to develop a sound material recycling society through the implementation of 3R (Zhang *et al*., 2010). The integrated solid waste management system in Singapore upholds two key thrusts which are waste minimization and recycling (www.nea.gov.sg/). From this, it could be seen that waste minimization is given priority in the solid waste management hierarchy (Bai and Sutanto, 2002). It is also pertinent to note that some of the strategies in waste management and recycling in Singapore include the promotion of less packaging and recycled products as well as financial support for recycling.

As far as the waste disposal in Singapore is concerned, the preferred method is the solid waste incineration apart from the waste minimization at the source (Bai and Sutanto, 2002). Landfill is the last option of disposal method due to the very limited landfill capacity for waste disposal (Bai and Sutanto, 2002). Currently, Singapore's landfill is the Semakau landfill which is an offshore landfill created in order to cater for waste disposal needs (Zhang *et al*., 2010). It is safe to conclude at this point that the emphasis in Singapore is on waste minimization and recycling, while landfill is the last option of the waste disposal methods available.

Basic legislations on solid waste management in singapore: The waste management in Singapore is regulated by the Environmental Public Health Act, Chapter 95 (Act 14 of 1987) (EPHA) and its subsidiary

laws including the Environmental Public Health (General Waste Collection) Regulations (Lye, 2013). EPHA is an Act which consolidates laws relating to environmental public health and other related matters (Preamble of EPHA).

Recycling is mostly regulated by the EPHA and also the Environmental Public Health (General Waste Collection) Regulations which was passed in pursuance to section 113 of the Environmental Public Health Act. The Law Revision Commisioners have renumbered the provision in the 2002 Revised Edition. The current number of section 113 provision is section 111. Section 111 (1) of the Environmental Public Health Act provides to the effect that the Agency may make regulations in respect of matters stated in the Third Schedule with the approval of the Minister.

The agency as referred to in the above provision is the National Environment Agency (Section 2 of EPHA). The National Environment Agency is established and incorporated under the National Environment Agency Act, Chapter 195 (Act 4 of 2002). The National Environment Agency was established under Singapore's Ministry of Environment and Water Resources on 1 July 2002 (Lye, 2013). Section 11 (1) of the National Environment Agency Act provides the functions and duties of the National Environment Agency which include among others its function to promote the use of efficient pollution control technologies and waste recycling (Section 11 (1) (n) of the National Environment Agency Act). Thus, a number of acts and regulations have been passed in order to govern solid waste management in Singapore.

Relevant provisions on the recycling of household solid waste in singapore: A number of provisions under the EPHA and regulations passed under it govern recycling in Singapore. Section 2 of EPHA states that waste includes among others any substance which constitutes a scrap material or an effluent or other unwanted surplus substance, any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled and anything which is discarded or otherwise dealt with as if it were waste shall be presumed to be waste (Section 2 of EPHA). Generally, the main categories of solid waste in Singapore are; domestic refuse, industrial refuse and institutional refuse. Household solid waste falls under the category of domestic refuse (Zhang *et al*., 2010).

Section 2 of the EPHA defines recyclable as "such refuse, waste or other material or thing as may be prescribed by the Agency with the approval of the Minister, to be capable of being recycled or reused". General waste is defined under Regulation 2 (g) (i) and (ii) of the Environmental Public Health (General Waste Collection) Regulations as to include "recyclables that have been deposited in any receptacle referred to in Section 10 (1) (c) of the Act or provided in any residential property for the purpose of recycling" (Regulation 2 (g) (i) and (ii) of the Environmental Public Health (General Waste Collection) Regulations). Therefore, recyclables fall under the category of general waste. Section 10 (1) (c) of EPHA referred to in the above regulation provides to the effect that that the Director General may require that receptacles to be provided, constructed or reconstructed by the owner or occupier of any premises.

Section 2 of EPHA defines "disposal facility" as to include among others a recycling facility. Based on this definition, a recycling facility is one of the disposal facilities. Recycling facility is further defined as "any premises used for the sorting, segregation, processing or treatment of refuse, waste or any other material or thing for the primary purpose of recycling or reuse" (Section 2 of EPHA).

On the collection and transport of the recyclables, Regulation 7A (1) of the Environmental Public Health (General Waste Collection) Regulations provides to the effect that only a licensee who is a holder of a permit can collect any waste for recycling. The details of the procedure to apply for permit for the collection of waste for recycling are stated in Regulation 7B of the Environmental Public Health (General Waste Collection) Regulations.Regulation 17A of the Environmental Public Health (General Waste Collection) Regulations addresses the duty of a permit holder to transport all the collected waste for recycling to any recycling facility.

It is to be noted that recycling is not mandatory in Singapore and there are no laws for the mandatory separation of wastes (Lye, 2008). Nevertheless, rigorous regulations in Singapore increase the participation from the public and private sectors in recycling activities to the extent that recycling practice has become a habit (Agamuthu and Hamid, 2014). It could be seen that recycling is greatly emphasized in Singapore through the comprehensive regulations managing the collection and disposal of solid waste and in particular, the recyclables.

MALAYSIA'S LEGAL APPROACH ON HOUSEHOLD SOLID WASTE RECYCLING

Solid waste management practice in Malaysia: In 2005, the total generation of solid waste in Malaysia was approximately 19, 000 tonnes per day according to the size of population of 26, 600, 000. The total generation of solid

waste in Malaysia was estimated from 21,600-27,000 according to the size of population of 27, 000, 000 in 2007. Meanwhile, based on the size of population of 28, 300, 000 in 2012, the total generation of solid waste in Malaysia was about 33, 000 tonnes per day. This shows that an increase of the solid waste generation in 2012 as compared to the generation of solid waste in 2005 and 2007 was mainly due to the increase of the population in 2012. Solid waste generation is observed to be increasing in Malaysia. In Malaysia, solid waste is regarded as one of the main contributors of soil and inland water pollution.

Solid waste management practices in countries in the world are distinguished based on whether a country is a high-income, middle income or low-income country (Halvorsen, 2012). The process in the solid waste management practice in Malaysia begins from the waste collection to transporting the wastes to the assigned places such as transfer station, recycling facilities, treatment plants or landfills for final disposal (Ghazali *et al*., 2014). Currently, landfilling is mostly preferred in Malaysia as compared to other ways of solid waste disposal namely by reducing, reusing, recycling, composting and incineration (Ghazali *et al*., 2014; Dinie and Mashitah, 2013). Thus, recycling law should be enforced in order to lessen the amount of waste sent to landfills (Ekanem *et al*., 2013). In short, the solid waste management process in Malaysia begins from solid waste collection to the solid waste disposal. The alternative ways of solid waste disposal such as recycling should be practiced due to the impacts of landfills to the environment.

Basic legislations on solid waste management in Malaysia: Malaysia gives emphasis to the development of the solid waste management at the national level since the signing of Rio Declaration in 1992 (Moh and Manaf, 2014). The 1992 Rio Declaration on Environment and Development is partly a statement of policies and ideals which is provided in Agenda 21 (Birnie and Redgwell, 2009). Chapter 21 of Agenda 21 which is entitled "Environmentally Sound Management of Solid Wastes and Sewage-Related Issues" stresses the international and regional supports and coordination in terms of reuse and recycling (Hanan, 2011). Paragraph 21.4 of Chapter 21, Agenda 1 provides that "environmentally sound waste management…must seek to address the root cause of the problem by attempting to change unsustainable patterns of production and consumption" (https://sustainable development.un.org/). One of the significant developments in Malaysia as far as solid waste management is concerned is the enactment of federal laws.

The federal law which is currently enforced in several States in Peninsular Malaysia and the Federal Territories of Kuala Lumpur and Putrajaya is the Solid Waste and Public Cleansing Management Act 2007 (Act 672) (SWPCM, 2007). SWPCM Act 2007 (Act 672) was enacted to "regulate the management of controlled solid waste and public cleansing for the purpose of maintaining proper sanitation and for matters incidental thereto" (Preamble of the SWPCM Act 2007 (Act 672)). In general, SWPCM Act 2007 (Act 672) contains the provisions which include among others the executive authority of the federal government on the solid waste and public cleansing management (Section 3 of the SWPCM Act 2007 (Act 672)), the appointment of the Director General of Solid Waste and Public Cleansing Management Department (Section 5 (1) of the SWPCM Act (Act 672)) and requirements that must be fulfilled before prescribed solid waste management facilities can be constructed or altered (Section 8 (1) of the SWPCM Act 2007 (Act 672)).

SWPCM (2011) Act 2007 (Act 672) has provided a new management system which is intended to solve issues arising from previous solid waste management. It is highlighted that the SWPCM Act 2007 (Act 672) has solved the issue of unsustainable system that is partly caused by subcontractors and unprofessional contractors (Jalil, 2010). Furthermore, the SWPCM Act 2007 (Act 672) provides a great arrangement if it is implemented effectively (Jalil, 2010). The power of the Minister to make regulations is provided under Section 108 of the SWPCM Act (Act 672). As a result, a number of regulations were enacted for the purpose to regulate solid waste and public cleansing in Malaysia. The enactment of the new statutes provides a new paradigm in solid waste management in particular.

The responsible ministry in charge of the municipal solid waste management is the Ministry of Urban Well Being, Housing and Local Government. The function of the Ministry of Urban Well Being, Housing and Local Government with respect to solid waste management includes providing an integrated, efficient, reliable and cost effective policy and regulatory systems (http://www.kpkt.gov.my/). A specific department, namely the National Solid Waste Department Malaysia is formed for the national integration of the solid waste management system (http://www.kpkt.gov.my/jpspn). The coming into force of the Solid Waste and Public Cleansing Management Act 2007 is anticipated to bring major transformation in waste management in Malaysia (Agamuthu *et al*., 2009).

Another relevant statute is the solid waste and public cleansing management corporation Act 2007 (Act 673)

which is passed in order "to provide for the establishment of the Solid Waste and Public Cleansing Management Corporation" (Preamble of is the Solid Waste and Public Cleansing Management Corporation Act 2007 (Act 673)). The Solid Waste and Public Cleansing Management Corporation is responsible for solid waste management and public cleansing which was previously under the local authorities (http://www.ppsppa.gov.my/). Before the federalization of the solid waste management, the local authorities are in charge of solid waste in their respective states. In addition to that, a number of statutes are also affected with the coming into force of the SWPCM Act 2007 (Act 672) that is, Town and Country Planning Act 1976 (Act 172), Street, Drainage and Building Act 1974 (Act 133) and Local Government Act 1976 (Act 171).

Relevant provisions on the recycling of household solid waste in Malaysia: Section 2 of Malaysia's Environmental Quality Act 1974 (Act 127) provides that:

> "Waste includes any matter prescribed to be scheduled waste, or any matter whether in a solid, semi-solid or liquid form, or in the form of gas or vapour which is emitted, discharged or deposited in the environment in such volume, composition or manner as to cause pollution as provided"

Based on the above definition of waste, solid waste is one type of waste. Section 2 of SWPCM Act 2007(Act 672) provides among others that solid waste includes any scrap material or other unwanted surplus substance or rejected products, any substance required to be disposed of, or any other material based on SWPCM Act 2007 (Act 672) or any other written law that is required by the authority to be disposed of excluding three types of wastes, namely, scheduled wastes, sewage and radioactive waste (Section 2 of the SWPCM Act 2007 (Act 672)).

Section 2 of SWPCM Act 2007 (Act 672) provides to the effect that household solid waste means "any solid waste generated by a household and of a kind that is ordinarily generated or produced by any premises when occupied as a dwelling house and includes garden waste" (Section 2 of the SWPCM Act 2007 (Act 672)). Recycling is the collection and separation of solid waste in order to produce products (Section 2 of the SWPCM Act 2007 (Act 672)). Recyclable waste is defined as "any household solid waste and solid waste similar to household solid waste which are separated for recycling…"(Regulation 2 of the Solid Waste and Public Cleansing Management (Scheme for Household Solid Waste and Solid Waste Similar to Household Solid Waste) Regulations 2011). Moreover, based on the definition of 'waste hierarchy' under Regulation 2 of the Solid Waste and Public Cleansing Management (Prescribed Solid Waste Management Facilities and Approval for the Construction, Alteration and Closure of Facilities) Regulations 2011, recycling is placed on the third rank of waste hierarchy. As far as recycling is concerned, the Minister may require any person to use specified amount of recycled materials for specified products, the implementation of coding and labeling systems for any product or material to promote recycling and the use of any method or manner for the purpose of recycling of the controlled solid waste (Section 101 (1) (c) (e) and (g) of the SWPCM Act 2007 (Act 672)). Failure to comply with the order is an offence and on conviction, a fine not exceeding ten thousand ringgit or imprisonment for a term not exceeding six months or both, may be imposed (Section 101 (2) of the SWPCM Act 2007 (Act 672)).

With regards to the separation of solid waste, Section 74 of the SWPCM Act 2007 (Act 672) whereby this provision outlines the power of the Director General of the Solid Waste and Public Cleansing Management Department to issue written direction on the separation, handling and storage of any controlled solid waste. Failure to comply with the direction is regarded as an offence and a fine not exceeding one thousand ringgit shall be imposed on conviction. The responsibility of the waste generator to conduct waste separation as outlined in the above provision aims to promote recycling and retrieve valuable components from the waste streams (Agamuthu and Hamid, 2014). The compulsory separation of solid waste at source or from the house by households was commenced on 1 September 2015 in several states in Malaysia that is Perlis, Kedah, Pahang, Negeri Sembilan, Malacca and Johor and the Federal Territories of Kuala Lumpur and Putrajaya. The objectives of the implementation of the mandatory separation of solid waste by the households are: to reduce the sending of solid waste to landfills; to reuse the recyclables; and to reduce the cost of solid waste management (http://www.nst.com.my/news/2015/09/giving-kitchen-waste-its-due). The early stage of the implementation will not involve any fine. A warning notice will be issued against those who fail to obey the order before the law is enforced effective 1 June 2016 (http://www.nst.com.my/news/2015/09/separating-wastes-routine-received-positive-feedback-rahman-dahlan).

In light of recyclable waste, Regulation 14 of the Solid Waste and Public Cleansing Management (Scheme for Household Solid Waste and Solid Waste Similar to Household Solid Waste) Regulations 2011 provides ways to manage recyclable wastes by outlining the

responsibility of the owner or occupier of landed premises which includes the responsibility to separate the recyclable wastes. Regulation 18 of the solid waste and public cleansing management (Scheme for Household Solid Waste and Solid Waste Similar to Household Solid Waste) Regulations 2011 allows an owner or occupier of landed premises to request for the collection of waste outside the collection schedule. In addition to that, Regulation 21 lays down the duty of the management body of the common property to provide one or more collection points. Regulation 26 (2) further provides the duty of the licensee for collection services to deliver several types of wastes including recyclable wastes to the prescribed solid waste management facilities.

CONCLUSION

Solid waste management is a global issue necessitating a systematic planning and enforcement of legislations. The above discussion has led to the following findings; firstly, landfill is the preferable method of waste disposal in Malaysia. In contrast, landfill is the last option of waste disposal method in Singapore mostly due to the limited landfill capacity. The emphasis in Singapore is on waste minimization and recycling. Besides, Singapore has systematic and comprehensive waste collection system. Secondly, both countries have provided legislations to govern solid waste management. A significant development in respect of solid waste management in Malaysia is the enactment of the SWPCM Act 2007 (Act 672) and other Acts as well as regulations. Nevertheless, for the time being, the SWPCM Act 2007 (Act 672) is only enforceable in several States in Peninsular Malaysia and the Federal Territories of Kuala Lumpur and Putrajaya. In Singapore, the main statute governing waste management for the whole country is the EPHA and its subsidiary laws such as the Environmental Public Health (General Waste Collection) Regulations. Thirdly, there are relevant provisions in statutes and regulations on recycling in Malaysia and Singapore. In Malaysia, waste and recycling related terms are sufficiently defined. The respective laws also provide several provisions on recycling, for instance Section 101 and Section 74 of the SWPCM Act 2007 (Act 672). Moreover, Regulation 14 of the Solid Waste and Public Cleansing Management (Scheme for Household Solid Waste and Solid Waste Similar to Household Solid Waste) Regulations 2011 is a provision for recyclable wastes. There is also provision on mandatory separation of waste in Malaysia. Meanwhile, in Singapore, provisions under the EPHA and the Environmental Public Health (General Waste Collection) Regulations govern the collection of waste and disposal of waste for recycling though there is no law on mandatory recycling and separation of waste in Singapore. There are provisions defining wase and recycling related terms. Hence, waste minimization and recycling should be greatly emphasized in Malaysia in order to reduce the use of landfilling. By looking into Singapore's experience, the systematic waste collection and recycling strategies would help Malaysia in order to enhance the household solid waste recycling in Malaysia. The law is stated as of 28 September 2015.

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