

## Sustainable Solid Waste Management from the Perspective of Policy

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### Abstract

*Traditionally, issues of solid waste management were mainly considered as technical issues and often analysed from the perspective of technology. However, based on the concepts of integrated sustainable solid waste management (ISWM), it is argued that issues of solid waste management is not purely technological, instead it is strongly influenced by the aspects of policy, social, economy, institutional and environment. In a developing country like Malaysia, policy plays an important driver to improve its solid waste management and this is clearly demonstrated when the government of Malaysia has recently introduced a mandatory household waste separation in Peninsular Malaysia starting from the 1<sup>st</sup> of September 2015. Therefore, the aim of this paper is to highlight the aspect of policy in the context of solid waste management. Previous study has shown that adequate policy played an important factor towards sustainable solid waste management. However, their study did not clearly explain the meaning of adequate policy and the important elements consisted under an adequate policy. Therefore, the purpose of this paper is to explore the meaning of an adequate policy and to identify the important elements consisted in an adequate policy. The findings of this study would be significant to be used as a guideline, especially for the local government to analyse whether they have an adequate policy or not as this information would guide the local government to develop more adequate policy in order to achieve more sustainable solid waste management.*

*Keywords: policy aspect; adequate policy; comprehensive policy; specific policy*

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### Introduction

Increasing waste generation has been generally contributed by the increase of population and this situation is commonly experienced by most developing countries particularly which are currently experience rapid economic growth. As a consequence, their composition of waste generation becomes more complex and extremely heterogeneous, due to the higher purchasing power where majority of the society is able to spend their money on a variety types of products including the latest ones. Starting from the year 1980s to 2000s, Malaysia also experiences an apparent increase of complexity in terms of its waste generation (Agamuthu, Fauziah, & Kahlil, 2009). According to the study conducted by Yiing and Latifah (2014), Malaysia would face a major problem with its solid waste management such as issues of limited spaces, health issues, as well as environmental issues due to an annual increase of its waste generation and dependence on landfilling as their method of disposal.

Furthermore, according to World Bank (1993), one of the three leading environmental issues experienced by municipalities in Malaysia is solid waste management. The persistent increase of waste generation is not only due to an increase of population and economic activities, but it is also highly contributed by the raising rate of waste generation produced by individuals. The complexity of solid waste generation and the increase of diverse sources of waste generation are intensify with the growing industrialisation and modernisation (Mohd Nasir Hassan, Rakmi Abdul Rahman, Theng Lee Chong, Zakaria, & Awang, 2000).

Generally, reducing the quantity of waste generation is the main intention of waste management. This is done by reducing the total number of waste generation as it would help to reduce the cost of disposal and the negative impacts towards the environment (Pitt & Smith, 2003). There are consistent arguments regarding the issues of environmental sustainability, and sustainable waste management is among the frequent issues being debated. However, the issues of sustainable solid waste management have become more significant with the raising trend of waste generation due to the increase of population growth (Periathamby Agamuthu, Fauziah, & Noorazamiah Aiza, 2007).

Although solid waste management is a complex problem, most of the previous studies showed that most municipalities attempted to address it from the perspective of technology. However, according to the concept of integrated and sustainable solid waste management (ISWM), solid waste management should not only be tackled from the perspective of technology alone, but it should consider other aspects like environmental, socio cultural, policy, institutional and economic, so the system can function more effectively (Anschütz, IJgosse, & Scheinberg, 2004; Guerrero *et al.*, 2013). Therefore, the common assessment of solid waste management that only focuses on the technological aspect is strongly criticised by the concepts of ISWM (Zurbrügg, Vögeli, Potting, & Buuren, 2011). Besides, according to a study conducted by Kum, Sharp, and Harnpornchai (2005), solid waste management was not solely about technical issues but it heavily influenced by the aspect as stated in the concepts of ISWM.

Previous studies have shown that the sustainability of solid waste management is traditionally analysed from the aspect of technical or technological, but as mentioned earlier by the concept of ISWM, the sustainability of solid waste management does not depend solely on the aspect of technology alone, instead other aspects need to be considered. In a developing country like Malaysia, policy plays an important driver to improve its solid waste management and this is clearly demonstrated when the government of Malaysia introduced a mandatory household waste separation in the Peninsular Malaysia starting from the 1<sup>st</sup> of September 2015 (Laman Web Rasmi Jabatan Pengurusan Sisa Pepejal Negara, n.d.). Therefore, this study attempts to highlight solid waste management from the perspective of policy. According to Guerrero *et al.*, (2013), the aspect of policy plays an important roles in influencing the sustainability of solid waste management and their studies pointed out that having adequate policies is one of the critical factors towards influencing a sustainable solid waste management. However, most studies did not clearly describe the meaning of adequate policy and the important elements consisted under adequate policy. Thus, the purpose of this paper is to explore the meaning of adequate policy and to identify the important elements consisted in an adequate policy. The findings of this study are significant to be used as a guideline especially for the local government to analyse whether they have an adequate policy or not, as having this information would guide the local government towards more sustainable solid waste management especially when attempting to address the solid waste issues from the perspective of policy.

### ***Sustainable Solid Waste Management***

According to Tchobanoglous, Theisen and Vigil (1993), solid waste management can be defined as a discipline associated with the control of waste generation, storage, collection, transfer and transport, processing and disposal of solid wastes. Meanwhile, according to

Idowu, Omirin, and Osagie (2011), sustainable development is defined as developments that meet the demands of the present generation without undermining the chances of the following generation to meet their own. Meanwhile, Ogwueleka (2009) defines municipal solid waste management (MSWM) as a process which involves recycling, collecting, transferring, treating, recovering resources and waste disposal within the city area. Sustainable solid waste management is achieved when the process of waste management is continually managed in a way that it could maintain and preserve the wellbeing of the people as well the environment (Adewole, 2009).

### ***Definition of Policy***

There are various definitions of policy suggested by various authors. According to Dye (2002), policy is defined as “what government do and not do, when they do it, what difference do they make” while Harold Lasswell defines it as “*a projected programme of goals, values and practices*” (Starling, 1979). Apart from that, Easton (1979) defines policy as “the impact of government activities,” whereas Anderson (1997) defines policy as “*a purposive course of action followed by an actor or set of actors in dealing with a problem or matter of concern*”. Furthermore, Austin Ranney defines policy as “*a selected line of action or a declaration of intent*” (Lester & Stewart, 2000), and Birkland (2011) defines policy as law, regulation, ruling, decision and order respectively or any combination of these. Despite the various definitions of the term of policy, overall definitions have agreed that a policy is referring to government actions or activities that are involved in making decisions towards achieving certain goals, especially addressing the issues of public.

### ***Exploring Adequate policy***

Guerrero *et al.*, (2013) pointed out that adequate policies play an important role in influencing the sustainability of solid waste management system from the perspective policy. However, their study does not clearly describe the meaning of an adequate policy and the important elements consisted under adequate policy. According to Abass and Wee (2015), a sustainable solid waste management strongly is influenced by the support of good policy and an effective implementation of policy is demonstrated when there is a sustainable solid waste management. Previous studies have shown that many countries that have lack of adequate policy in their solid waste management would face many challenges to effectively manage their solid waste. For example, the absence of an adequate policy pertaining to solid waste management has become the main contributing factor towards the severe issues of solid waste in the city of Jordan namely Zarqa and as a result, the city suffers negative environmental and health impact (Mrayyan & Hamdi, 2006). Similarly, although the activity of recycling in India is promising, but due to lack of adequate policy to encourage the recycling industry by the government it affects the effectiveness of its recycling activities. The activities of recycling in India are mainly contributed by the informal sectors, where they are able to recycle 10% from the total waste produce, but unfortunately, without the support from the government to encourage the recycling industry, may be difficult to boost the recycling activities in India without a policy (Apo, 2007). In addition, Agunwamba (1998) has claimed that lack of adequate policy is among the main factor that hamper the effective solid waste management system in a developing country like Nigeria. As a result, its government is unable to address many critical issues under its solid waste management.

Overall, Nigeria does not have a comprehensive policy on its solid waste management that can cover the whole waste system elements.

Basically, solid waste management system involves the process of managing waste generation, storage, collection, transfer and transport, processing and disposal of solid wastes (Tchobanoglous *et al.*, 1993). However, Nigeria has an incomprehensive policy to cover the entire activities involved in solid waste management, as example although its government has implemented a national environmental clean-up activity as monthly event to draw out the public cooperation, yet no attempt to promote proper dump sites. Besides, in several towns in Nigeria, wastes that are not separated would be bundled-up at an open dump site. Occasionally, moving the rubbish from the public view appears as the main intention. Hence, it is clear that there is no adequate planning for appropriate waste disposal despite implemented programme to maintain the cleanliness of the pressing environmental issues. Moreover, there are lack of policies in some important areas in solid waste management. For instance, although the activity of waste recycling and composting in Nigeria may potentially provide financial and environmental benefits to the country, it however is still not successfully implemented since the government does not have any comprehensive policy on waste recycling and composting. Hence, recycling in Nigeria is still considered at a very basic level (Afon, 2007; Agunwamba, 1998; Kofoworola, 2007). Besides, it is also aggravated by the absence of waste minimisation policy to boost the activity of recycling, thus affects the sustainability of its solid waste management (Agunwamba, 1998). Therefore, to ensure more sustainable solid waste management, it is crucial to have a comprehensive policy including proper planning on how to implement it.

Furthermore, based on Ezeah (2010), lack of comprehensive strategy document for sustainable waste management in capital city of Nigeria, has made it difficult to achieve sustainable solid waste management in the city. It is important to formulate a clear strategy in solid waste management, such as it is crucial to provide a clear aim for waste composting, recycling, prevention and reuse. Besides, the importance of a comprehensive policy has also been pointed out by Apo (2007), where in order to improve the solid waste management in the country of Nepal, it is imperative for the country to prepare comprehensive solid waste management plan at the national, regional and municipal. The plan should cover the whole waste elements such as, waste minimization, generation, reduction of waste, waste handling, storage and processing, transfer and transport, recycling, disposal and inspection systems once the waste is being disposed. Likewise, country like Iran acknowledges the importance of comprehensive policy, and has been clearly demonstrated under their proposed waste management bill, where comprehensive programme relating to solid waste management at the national level is incorporated under their bill (Apo, 2007).

Adopting comprehensive policy is one of the key elements towards the sustainable solid waste management in Singapore. The effectiveness of waste collection system in Singapore due to the implementation of the concept of comprehensive policy, where over the year, the government of Singapore has continuously improved its waste collection service so that it is more effective and sustainable (Apo, 2007). Hence, to ensure successful waste minimisation policy in Malaysia, it is important to have a comprehensive policy, such as it should also introduce waste segregation, effective collection of segregated waste and effective process of transporting the recyclable wastes. Unfortunately, the minimisation policy in Malaysia is still not comprehensive (Ministry of Housing and Local Government, 2006).

On the other hand, in developed countries, solid waste management is more sustainable since they have a comprehensive solid waste management policy which includes solid waste disposal, proper storage, collection and transportation (Mrayyan & Hamdi, 2006). According to Wilson (2007), developed countries have high concern about their environment and it is shown in their comprehensive waste management system, whereby it covers most of their waste elements, like exploiting their sanitary landfills, waste processing and treatment, material and energy recovery. On the other hand, developing countries have unregulated waste disposal and treatment of waste, energy, processing and uncommon material recovery (Asase, Yanful, Mensah, Stanford, & Amponsah, 2009).

Apart from that, according to Schübeler *et al.*, (1996) it is also important to have a clear policy especially in terms of legislation in Municipal Solid Waste Management. This is because the policies that have specific tasks and clear objectives could be implemented more effectively, as compared to the policies that are too general. General policies would affect the implementation process especially on the ground level (Abass & Wee, 2015). Similarly, Sakawi (2011) claimed that, objective of municipal solid waste management should be clear. For example, lack of clear waste management programme in New Zealand affected its waste management effectiveness towards reducing the generation of waste as compared to United Kingdom and Pennsylvania (Boyle, 2000). Likewise, the absence of clear strategies to implement waste management policies affects the effectiveness of solid waste management system (Ezeah & Roberts, 2012). Most countries especially in the developing ones do not have a clear policy in waste management. In Malaysia, for instance, waste management policies of waste reduction and recycling are too general (Ridhuan, 1994). Similarly, the absence of clear procedures and regulations on how to separate household wastes in Sabah, Malaysia has caused its local government unable to force the residents to segregate their wastes (Fatma Sabariah, Manaf, & Mariani, 2013). In general, according to Yiing and Latifah (2014), households may not be encouraged to participate in recycling their wastes when there are no clear-cut procedures on how to perform recycling. Mohd Nasir Hassan, Rakmi Abdul Rahman, Theng Lee Chong, Zakaria and Awang (2000), also claimed that recycling and reusing of wastes in Malaysia need clear-cut policies, because the policies could be implemented more effectively if the stakeholders were clear about the policy (Abas & Wee, 2015). However, with the current improvement of waste management policies and regulations in Malaysia, it is clearer pertaining to waste segregation where in the future, it may give some positive impacts towards the solid waste management in Malaysia, especially its landfills (P Agamuthu & Victor, 2011).

Issues of solid waste management are very complex where the increase of waste generation is influenced by the population, which burdens the local government particularly in developing countries. Hence, a clearer policy is imperative to address the complex issues in solid waste management (Agamuthu *et al.*, 2009). Lack of clear policy may pose negative effects to the environment. For example, absence of clear formulated policies on how to handle hazardous waste from industrial development pose negative effects to the environment in Nigeria (Adelegan, 2004). Without the initial setting up of a waste management system, broad legislation would be unable to improve sustainable waste management successfully (Agamuthu, 2004). Schübeler *et al.*, (1996) stated that in order to formulate proper legislation, bylaws, regulations and standard, as well as integrating broad legal structure of public health and environmental protection into solid waste management, it is crucial to have policy support.

### Summary of Adequate policies

The previous section has attempted to explore and discuss about the term of adequate policy as highlighted by Guerrero *et al.*, (2013). Although the previous section does not explicitly define what adequate policy is, it has somehow guided the study to summarise that adequate policy in the context of solid waste management refers to having a comprehensive and specific policy (refer to Figure 1). Therefore, based on the literature discussed in the previous section, there are two important elements identified in the terms of adequate policy. The first element is known as comprehensive policy, based on the previous literature, a policy is considered as comprehensive in the context of solid waste management when able to cover all the elements in waste management, such as generation and separation, collection, transfer and transportation, recycling, treatment and final disposal. In other words, comprehensive policy is achieved when the policy does not only try to address one particular element in the waste system elements, instead it should consider the rest of the elements so that the system will be more comprehensive and effective. For example, in order to ensure more effective recycling, a comprehensive recycling policy in solid waste management system is required. Adopting the concept of comprehensive policy, the policy should not only focus on recycling alone but should consider the other waste elements that may influence the success of the recycling policy like waste separation and collection. In other words, the policy should not be treated as a piece of solution.

Moreover, the second element identified under the adequate policy is specific. A specific policy is clear-cut or unambiguous. Having a clear-cut policy would make the policy more effective and efficient. For example, when the government introduced a recycling policy, the policy itself should be specific or clear especially in terms of how to implement it. A clear procedure should be prepared on how to carry out recycling as this procedure is imperative especially to the households, so that they know how to recycle. Past studies have shown that the absence of specific or clear policy would lead to the failure of the policy, since the people are not clear on how to execute it.

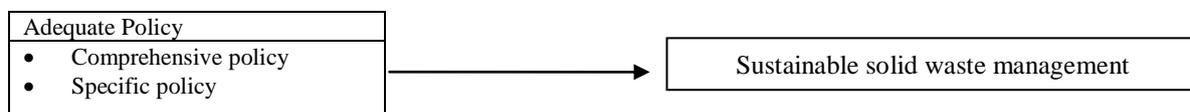


Figure 1: Adequate policy

### Conclusion

In conclusion, an adequate policy in the context of solid waste management is defined as a policy that has the elements of comprehensive policy and specific policy. Therefore, solid waste management policy is only considered as adequate when there are both comprehensive policy and specific policy. A solid waste management policy is considered as comprehensive when the policy is able to address the whole element in the waste system that basically includes waste generation, storage, collection, transfer and transport, processing and disposal of solid wastes. Meanwhile, specific policy is achieved when the policy introduced is

unambiguous or clear, especially on how to implement it. Therefore, to achieve more sustainable solid waste management from the perspective of policy, the policy needs to be comprehensive and specific.

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