

## A Review of Barriers That Hinder Households To Separate Solid Waste at Source

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Starting from 1 September 2015, the government of Malaysia has launched a waste separation program where households in Putrajaya, Kuala Lumpur, Melaka, Negeri Sembilan, Johor, Pahang, Perlis and Kedah have to separate their solid waste according to its composition. However, after one year of implementation, the participation of households in this program is still low. Thus, this paper reviews the barriers of solid waste separation at source based on the results gained from previous researches that have been conducted around the world. It was identified from the review that the barriers could be divided into five (5) main categories namely facility, attitude, knowledge, commitment and enforcement. These barriers could be among the issues that hindering total participation of Malaysian society in the country's solid waste separation program. Further research should be conducted to identify which of these barriers that has contributed most to the poor participation of Malaysian society in the program. Clear understanding on the actual problem in executing the program may then lead to the formulation of the right and effective strategy and policy for solid waste separation at source initiatives in Malaysia.

**Keywords:** Waste Separation, Waste Segregation, Barriers of Waste Separation, Main Barrier

### 1. Introduction

Solid waste management is one of the worldwide challenge that brings upon varieties of initiatives at local and global level to overcome the declining environmental quality. In authorities perspective, the challenges is due to the increasing amount of solid waste that needs to be managed, the cost of large-scale management costs, the lack of understanding of the factors affecting the different levels of solid waste management and the relationships needed to ensure the entire operating system is functioning (Guerrero, 2013).

In the 1970s, as Malaysian population density is still low, the need for a systematic and centralized solid waste management was not seen to be important. However, in line with population growth, rapid urbanization and development, the solid waste has continuously generated to an alarming level (Nur Khaliesah Abdul Malik *et al.*, 2015). The larger amount of the solid waste is recyclables which include paper, glass, metal and aluminum which represent 60 percent of the total waste volume. , The amount of solid waste generated in Malaysia is estimated to exceed 38,000 tonnes by 2020 where recyclable items represent 60 percent of the total waste volume. Major cause of this problem is due to poor practice of solid waste separation at source among Malaysian citizens (Fitriyah Razali, 2017). The implications of this practice are the loss of these resources and the rapid utilization of the landfill space.

Recently, the Ministry of Urban Wellbeing, Housing and Local Government has clearly outlined that solid waste separation at source program would be their main agenda at present as well as in years to come. Thus, starting from 1 September 2015 all premises are required to separate solid waste at the source. This implementation is pursuant to regulations under Solid Waste and Public Cleansing Management Act 2007 (Act 672) enforced in Johor, Melaka, Negeri Sembilan, Pahang, Kedah, Perlis, Kuala Lumpur and Putrajaya. Solid waste separation at source is a practice of separating or setting aside goods and post-consumer materials produced by household from entering mixed waste streams (Lardinois and Ferudy, 2000). These waste will be stored in designated containers or bins in order to facilitate recycling and disposal.

This paper explains why the recycling programs in Malaysia that have been launched twice, in 1993 and 2001, and present solid waste separation at source program was always backfired in Malaysia. Although the government have simplified the recycling program through this current program, still the barriers that hinder households from separating solid waste at source remain unclear presently. Thus, the purpose of this paper is to explain the barriers that hinder waste separation behavior among Malaysian households, which is important to improve current strategies in increasing the involvement of Malaysian society in solid waste separation at source program. This paper starts with the history of recycling programs in Malaysia and followed by the barriers of solid waste separation at source that found from previous researches.

## **2. Solid Waste Separation in Malaysia**

The current solid waste separation at source program reminisced about how Malaysia has committed itself to improve solid waste management services in accordance with the Rio Declaration signed in 1992. The very first Recycling Program had been introduced in 1993 as an effort undertaken by the government of Malaysia through the Ministry of Housing and Local Government (MHLG) towards sustainable environment. This long-term strategy program aims to transform the “throw-away” culture among the citizens into “conserving” one (Omran and Mahmood, 2002). Unfortunately, it was reported that the program has failed whereby public participation was far too slow thus did not improve the existing waste management practice.

Due to the unsuccessful Recycling Program in 1993, another recycling campaign was re-launched in 2001. This year round programs known as 3Rs Campaign was aimed to increase public participation of households and to improve the recycling rate in Malaysia. This re-launched campaign came with a renewed objectives of cultivating the habit of 3Rs with recycling to reduce land use for waste disposal, reduce cost of solid waste management and to reduce the influx of new waste (Moh and Manaf, 2014). Despite of more money spent on massive publicity and public education, the recycling rate was reported to reach only 5 percent in 2011 and 9 percent in 2012 which is still too low in compare with neighboring countries such as Singapore which is 60% in 2012 and Philippine by 28% in 2006. Furthermore, this results was far too low thus did not promise the achievement of targeted 22% of recycling rate by the year of 2020.

In order to keep pursuing the targeted rate, starting from 1 September 2015, another program called Solid Waste Separation at Source has then been launched by the Ministry of Urban Wellbeing, Housing and Local Authorities; to be enforced in Johor, Negeri Sembilan, Melaka, Pahang, Kedah, Perlis, Kuala Lumpur and Putrajaya. In this program, all premises in those states are required to separate solid waste at source according to the waste composition such as recyclable waste, residual waste and bulky/garden waste by the respective households. By this way, it is believed that recycling would be easier as households can simply placing their recyclables into rubbish bins or container, which are within the convenience of their homes.

However, the findings from its early implementation reported a rather disappointing performance. It was reported that a month after the program started, a total of 12,829 reminders have already been issued to occupants of premises who did not separate recyclable discards from their solid waste. This situation is worrisome because firstly it shows the uncertainties for Malaysia to achieve its targeted recycling rate and secondly, it has indirectly proved a low involvement rate of Malaysian households in the effort to increase the quality of the environment in compare with other countries who have been recognized to be very committed in recycling practice such as Germany, Switzerland, Sweden and Denmark.

### **3.0 The Barriers that Hinder Households to Separate Solid Waste at Source**

As mentioned previously, in Malaysia the results from the Recycling Program and Solid Waste Separation at Source Program have been disappointing due to low participation and involvement of the Malaysian society. Furthermore, the involvement and participation of society in the source separation program greatly affects the success of household recycling program (Babaei *et al.*, 2015). Therefore, in concurrent with the present program held by the government, this paper will explain the barriers that keep hindering the society from separating their solid waste at home. Marican (1997) said that a success of a public policy vitally depends on how far the problems that needs to be resolved is fully comprehended. In policy context, it is vital for the policy makers to first understand the actual cause for poor participation so that they can establish the accurate strategies to reach the country's targeted recycling rate. If the real problem could not be grasped clearly, an accurate public policy can't be established in hope to fix the problem.

Based on previous researches, there are several reasons for the lack of participation in separation solid waste at source which then composed to five main barriers which are facility, attitude, knowledge, commitment and enforcement. These barriers will be explained in the next sub-topic.

#### **3.1 Facility**

Situational factor such as insufficient facilities, mixed transportation and disposal, poor collection service, inaccessibility and limited space are found to be the common reason for not separating their solid waste at source (Omran *et al.*, 2009; Zhang *et al.*, 2012; Xu *et al.*, 2015; Zeng *et al.*, 2016; Babaei, 2015). In Shanghai, the community that do not practice source separation emphasizes that sufficient facilities such as dustbin, storage room and containers are very important for a community to separate their solid waste (C.Zeng *et al.*, 2016). That means the more convenient the solid waste separation service, the higher the public participation in this program. It was supported by Zhang *et al.*, (2012) who found the same findings in Shanghai. Zhang *et al.* (2012) cited that society with insufficient facilities inside and outside of their homes results in low participation of the program. In the other hand, some individuals do not separate their waste because the sorted waste is mixed during transportation and disposal process. It can be concluded that due to insufficient facilities and poor collection services, the solid waste is still transported and disposed in a mixed state.

#### **3.2 Attitude**

This barrier is related to the society's lack of awareness on separation solid waste, lack of moral obligation and poor maintenance of the facilities by households. Personal attitude had the strongest correlation with waste separation intention (Karim *et al.*, 2013) because positive attitude results in a positive belief in oneself. This result was supported by Nigbur *et al.*, (2010) where found that attitude predicted the intention to recycle which then predicted the intention to recycle. In rural areas of mainland China stated that lack of separation awareness was the major barrier in participating source separation program. From a research by C.Zeng *et al.* (2016) found that the community education in the rural areas is very limited and lack of implementations. Therefore, various measure should be introduced such as a sufficient publicity program including public education and using media sources such as television, radio and internet by local government to boost society participation in source separation program.

While in Sao Paulo, Brazil, moral obligations had a great influence on the behavior of households to separate their solid waste at source. Campaigns that highlight households' moral obligation may improve public participation. Previous research conducted by Zhang D. *et al.*, (2015) found that moral obligation plays the largest role in ascertaining households' attitude. Meanwhile, Barr *et al.*, (2001) stated that society with high sense of moral obligation often regulates their thought and behaviors in life, as well as developing a better environmental attitude.

### 3.3 Knowledge

Lack of public education and insufficient knowledge of the existing program are the basic issues that hindering households from separating their solid waste at home (Omran *et al.*, 2009). Educating society including on how, what and where to recycle are very important (Williams and Kelly, 2003). Zhang W. (2012) stated that it would be impossible for society to participate in solid waste separation at source program without correct information. While Evison and Read (2001) stressed that awareness and promotion campaign held by authorities was important in order to increase the public participation. Besides that, public relations in recycling is important as it could be used as a tool to educate and motivate households into participating in this program (As Salhofer and Isaac, 2002).

In India, the success of community participation in waste management specifically in Mumbai, is a result of a good governance campaign between the government of India and Municipal Corporation of Greater Mumbai. Nur Khaliesah (2015) suggested to use internet as a major platform to spread the information and news to public as the internet has strong ability to enhance the knowledge and participation. Furthermore, by gaining knowledge on the importance of waste separation practice will enhance the level of awareness on this program. However, those just a measure or an educational tools to spread knowledge and educate public but it was very hard and challenging to change public attitude and behavior.

### 3.4 Commitment

In term of commitment, some of society keen to participate the program because they have limited time and some indicate that they were busy with work. As the process of separating solid waste at source requires effort, some society were reluctant to participate. More surprising, some of them consider the process as burdensome where they prefer to throw their solid waste directly to the dustbin without separating because it is easier and faster (Nur Khaliesah, 2015). Some residents in Guangzhou, China, believes that solid waste separation was not an easy task, hence, the households required to strengthen their guidance to involve in waste separation (Zhang D. *et al.*, 2015).

### 3.5 Enforcement

This barrier is related to the imperfect laws and regulations, lack of financial incentives (reward and penalty) and inefficient policy. Poorly designed and implemented campaigns will lead the participation rates to remain low (Evison and Read. 2001). The case study in Thailand showed that Bangkok does not have regulation or policy that enforced society to separate solid waste at source whereby it was currently conducted by scavengers and waste pickers. This situation led to a low recycling rate which is only 8 percent of total population which is very low compared to other cities (Sukholthaman and Sharp, 2016). Therefore, attractive strategies that stimulates residents to conduct source separation are needed.

Taiwan started a “four in one” recycling program in 1997 where local government, recycling enterprises, recycling foundation and the resident worked together. The local government and recycling enterprises were in charge of establishing a more efficient recycling system, while communities organize and reward the residents who’s participated in solid waste separation at source. However, this market mechanism in China was not well established in promoting community-based source separation in China. The crucial problems were analyzed and a new incentive-based source separation model was put forward to solve the problem of inefficient source separating (Xu *et al.*, 2015). In the other hand, a volume based collection fee system for solid waste in Incheon City, South Korea was successful because it was not only generate revenue for the corporation, but also reducing the amount of waste generated (UNESCAP, 2002). It shows how vital a policy maker should understand the actual cause so that they can establish the accurate strategies.

#### 4.0 Conclusion

Environmental crisis has been a worldwide issue that brings upon varieties of initiatives locally and globally. The initiatives undertaken have been integrating the involvement of all parties whereby public participation is a must. The low participation of the Malaysian society in current program called solid waste separation at source program is worrisome. It was identified from the previous researches that the barriers could be divided into five (5) main categories namely facility, attitude, knowledge, commitment and enforcement. These barriers could be among the issues that hindering total participation of Malaysian society in the country's solid waste separation program.

Further research should be conducted to identify which of these barriers that has contributed most to the poor participation of Malaysian society in the program. As part of public policy, waste separation behavior in Malaysia is considered new as it was just enforced since September 2015. This needs for clear understanding on the actual problems faced by households in executing the practice. Therefore, this paper aims to help government particularly the responsible ministry to determine the accurate strategic approaches to boost society's involvement in the program based on the barriers found. The findings of this paper will serve as a guideline for future researcher to identify which of the many barriers identified would be the main barrier to generate new concept based on the prioritized factor that influence separation behavior among households.

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