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*Original Paper*

## Public Perception and Awareness: Urban Park Facilities towards Promoting Recycling Activity

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### Abstract

Recycling is important in increasing the quality of the environment, especially in urban areas. Most Malaysian dispose of their waste in landfills rather than recycling. Recycling is crucial as it can decrease the amount of waste dumped in landfills. It can be seen that urban parks in Malaysia provide facilities for the public to put recyclable waste like glass, bottles, and paper. However, there are issues of littering the waste by the public in the park. It shows that the rate of recycling awareness among Malaysian citizens is still low and needs more encouragement to save the environment in the future. This research aims to evaluate the factors influencing community involvement in recycling to increase awareness of recycling waste in an urban park. Based on data collected by observation, site inventory and analysis, and questionnaire survey, most respondents are aware of the recycling campaign and their perception of the benefits of recycling activity to the environment and economy. The public is aware of the recycling campaign; however, the limitation of facilities and lack of encouragement from authorities make the campaign unsuccessful in Malaysia. Thus, several suggestions and recommendations are taken from respondents regarding increasing recycling awareness among Malaysians.

**Keywords:** recycling, landscape design, waste, environment, urban park, landscape facilities

### 1. Introduction

Recycling is the process of collecting and processing materials that have been thrown as trash and converting the waste material into new products to reduce the consumption of fresh raw materials, reduce energy usage, and reduce air and water pollution. Most of the biggest environmental problems come from unmanageable waste management, especially in urban areas. The volume of waste from food, domestic, industrial, and agricultural sectors have thrown out every day is increasing year by year. It impacts the natural environment and human health when waste management is inefficient and poor services. One factor that led to the increasing number of solid wastes is population growth. Agamuthu (2001) claimed that solid waste generation in Malaysia has increased by 3% every year. It comes to a

critical stage due to the impact of rapid development, urban migration, and attitudes among the community. The Deputy Minister of Housing and Local Government reported that Malaysian was estimated to waste up to 33,000 tons of waste per day, and this amount is expected to increase by 22% by the year 2020 (Sinar Harian, January 19, 2014).

According to Ali (2008), the average per capita of solid waste in Malaysia varies from 0.5 to 0.8 kg per person in a day, depending on an area's economic and geographical status. Currently, the only method that Malaysia has practised in waste management is the landfill approach. However, the existing sites for landfills in Malaysia have already reached the limit to accommodate the waste. There is a lack of space for new landfills due to township, residential, and tourism development. The authorities are looking for other approaches to dispose of all the wastes produced daily. The quality of the environment today is in a lower range, and it became more harmful day by day, especially in urban areas, because of insufficient solid waste management in Malaysia. According to Agamuthu (2001), the total solid waste generated in Malaysia was about 5.6 million tons or 15,000 million kg per day, comprising of domestic waste about 12 1000,000 kg per day and commercial waste of about 3,100,000 kg per day in 1998. Furthermore, Lau (2004) reported that solid waste in Malaysia is predicted to increase from 292 kg/ capita to 511 kg/ capita in 25 years, starting from 2000.

In addition, Malaysia is practising improper landfill management, leading to an abundance of recyclable and non-recyclable wastes. Sharifah and Latifah (2013) stated that landfills in Malaysia were in bad condition due to a lack of proper management and maintenance systems like lining systems, leachate treatment systems, and gas venting systems. Moreover, Ghazali et al. (1997) explained that landfills impact environmental problems that affect public health and the ecosystem in the surrounding area. Ministry of Housing and Local Government Malaysia has reported that there are 183 landfills sited that are still in operation out of 292 landfills (Ghazali et al., 2014).

#### *Recycling in Malaysia*

Recycling in Malaysia was introduced in Petaling Jaya in 1991. It involved source separation with curbside collection by recycling vehicles. In 1996, there was a programme Yellow Box Recycling where it helps the public place their recyclables collection of waste weekly (Agamuthu, 2001). Next, a recycling campaign was introduced by the Ministry of House and Local Government in the year 2000. It is an initiative to educate people on the habit of the 3Rs to reduce the number of landfills, decrease 40-70% of total expenditure on solid waste management and less invasion of waste. This target was set to reach at least one percent annual increase in recycling until 2020 (MHLG, 2006).

Moreover, Malaysian Digest reported on their website on July 10, 2015, about the enforcement for people who do not divide the waste according to their types starting from June 1, 2016, with a maximum fine of RM1,000. This notice will be issued for people who fail to follow in the first three months after the Act is executed, and if they still refuse to do so, the action will be taken according to Act 672. In addition, this action should be stressed to enforce to the citizen the importance of recycling to save the environment due to the low rank of awareness among citizens on recycling the waste (Malaysian Digest, July 10, 2015). The local authorities have tried many approaches to educate the people on the benefits of recycling. For example, they have provided three different colours of the bin. Each colour represents the types of waste like blue for paper, brown for glass, and orange for plastic and aluminium. These three bins are located in certain urban parks, large residential areas, schools, university campuses, and other places with many people.

#### *Solid waste*

Generally, solid waste consists of solid materials that are inconvenient and give negative value to the economy. In contrast, municipal solid wastes consist of garbage and rubbish normally generated at home. The amount and composition of solid waste had increased day by day due to the increasing population, development in urban areas, and human lifestyle on disposing of the waste. In the year 2014, the total number of populations was 30 262 million, and it is expected to increase up to 36.8 million by the year 2040 (Department of Statistics, Malaysia, 2014).

Treatment and disposal of waste are various in different countries. It depends on the type of waste, the composition of waste, the infrastructure of management, economic aspects, workers that will handle the

waste, recycling strategy, contribution from the public, and the effect on the environment. Agamuthu (2010) reported that the idea of waste disposal should be environmentally friendly, no health hazard to human beings, economically, prioritize recycling methods, and not be labour-intensive.

#### *Waste Management Technology*

The waste management system in Malaysia has applied several techniques to dispose of the waste generated by the public every day, such as recycling, composting, incineration and landfill (Agamuthu, et al., 2009).

#### *Recycling*

Recycling is an important key component of waste disposal as it is an efficient technique that can reduce waste and save energy. Shahrom et al. (2012) defined 'recycling as the recovery of waste from products through their reuse, either for their original purpose or other purposes. Furthermore, the United States Environmental Protection Agency (USEPA) defines recycling as the process of collecting and processing the waste change into new products that give a lot of benefits to the community and the environment (Kian et al., 2015).

#### *Composting*

Composting is the biological decomposition of organic solid wastes under controlled conditions. It converts waste to reusable materials and produces soil that contains more organic matter for soil conditioner or fertilizer. This technique can reduce landfills' land usage, reduce energy consumption, and be environmentally friendly. Some conditions need to be considered due to the sensitiveness of microorganisms before embarking on composting, such as changes in moisture, temperature, pH, oxygen concentration, presence of toxic elements and type of organic material. Moreover, Agamuthu (2001) also mentioned that composting could be processed for compostable refuse wastes while non-compostable wastes like rubber, metals, glass and plastic should be separated before composting because those wastes could not be composted.

#### *Incineration*

Incineration is a waste treatment process that burns organic substances in waste materials. Agamuthu (2001) defined incineration as burning solid, liquid and flammable waste to gases. Incineration is the best way to dispose of combustible waste because it converts it into energy. It will reduce waste and become one of the best solutions practised in Metropolitan areas.

#### *Landfill*

A landfill site is a place to dispose of waste on the earth's surface. Rashidi (2016) claimed that a landfill is an efficient and the simplest way to dispose of the collected waste. Solid waste disposed of at landfill sites will produce liquid and gaseous emissions (Omar and Hani, 2005). This method is suitable to apply in large areas because inappropriate management of landfills will lead to environmental and social problems such as water contamination, flooding, noise pollution, unpleasant smell and view, and the most critical effect on public health.

## **2. Method**

This paper applied several methods to achieve the two objectives of the study. The overview of recycling practice in Malaysia can be identified through a comprehensive literature review. Besides that, site inventory and analysis have been conducted in KLCC Park and Titiwangsa Lake Garden for mapping, observation, and photographs to identify the factor that can create recycling awareness among society in an urban park.

In addition, a questionnaire survey was conducted (30 respondents) among the users of the parks. The purpose of surveying the public is to understand the community needs that can encourage them to recycle their wastes.

### 3. Result and Discussion

The public's recycling awareness and perspective were revealed in this study conducted in KLCC Park and Titiwangsa Lake Garden. The researcher also identified the public's need to facilitate them in recycling the waste. According to Aljaradin et al. (2011), in a study on public preparedness to recycle in Jordan, it is difficult to implement a successful recycling programme due to a lack of public understanding of waste separation and recycling procedures, benefits, and obligations.

As indicated in Table 1, the majority of the respondent in Titiwangsa Lake Garden are female (33.33%), while at KLCC Park majority of the respondent are male (36.67%). Most of the samples in the study are between 20-25 years old.

Table 1. Sample public recycling awareness study conducted in KLCC Park and Titiwangsa Lake Garden

Demographic		Titiwangsa Lake Garden		KLCC	
		Frequency	Percentage	Frequency	Percentage
Gender	Male	4	13.33%	11	36.67%
	Female	10	33.33%	5	16.67%
Age	<19	1	3.33%	3	10%
	20-25	13	43.33%	6	20%
	26-30	-	-	2	6.67%
	31-35	-	-	1	3.33%
	36-40	-	-	1	3.33%
	41-45	-	-	1	3.33%
	46-50	-	-	2	6.67%
	>50	-	-	1	3.33%

Note. n – 30.

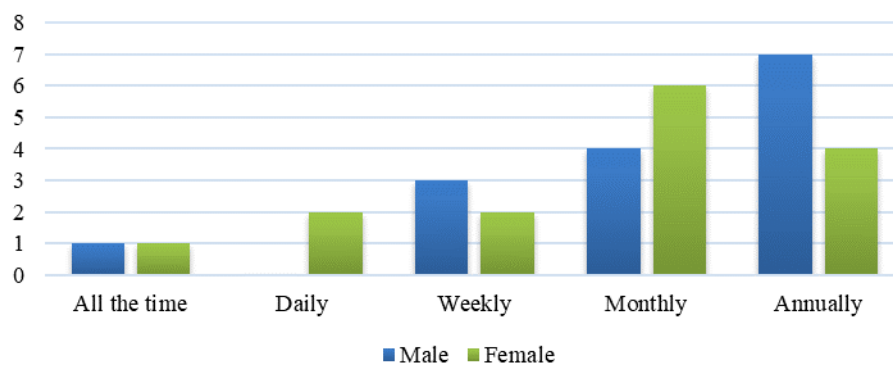


Figure 1. The pattern of the frequency of recycling activity among the public at KLCC Park and Titiwangsa Lake Garden

### ***Recycle awareness among the public***

The survey result in Figure 1 shows the frequency of recycling among the public. Most male respondents often recycle annually compared to females, who often recycle monthly. This result has supported Aljaradin (2011) finding where the researcher found that females are more responsible for recycling than males, but their knowledge of recycling is lower than males. It shows that most of the public still lacks in applying to recycle the waste in their daily lives. Then, Figure 2 presented the materials that the public often recycles, which the percentage shows 61% of materials are from papers, 23% from bottles, 13% from glasses, and 3% from other recycled materials.

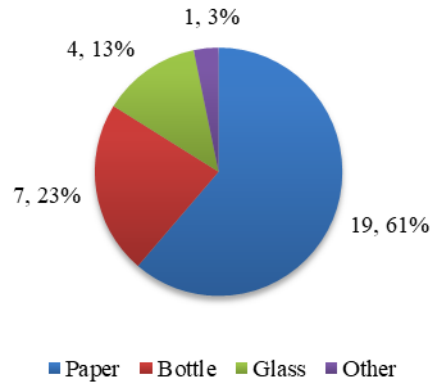


Figure 2. The percentage of recycled material that the public often recycles

### ***Public perception of recycling***

Most respondents believed that recycling waste can preserve our resources and protect wildlife throughout the survey. It comprises about 64%, and 23% of respondents said recycling could reduce landfill sites (Figure 3). Meanwhile, only three respondents claimed that recycling is good for the economy, and the balance said the recycling activity is a benefit for other reasons. The public wants to protect the environment because it can be harmful day by day if humans do not manage the environment properly. This result has been supported by Majid et al. (2021), with the finding having given a statistically significant relative effect between the consequences awareness and intention to do recycling.

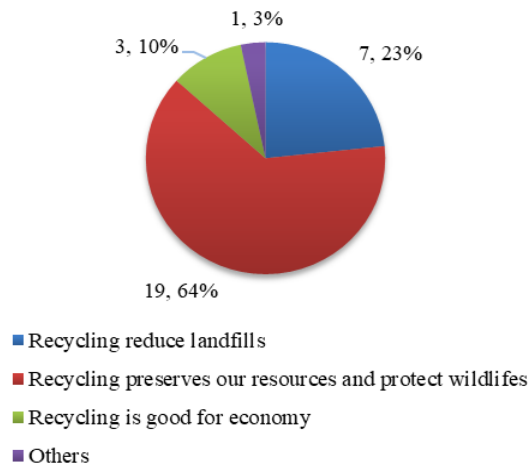


Figure 3. The percentage of public perception of recycling

### ***Public suggestions on recycling awareness***

The result from the survey summarized that among the suggestions on recycling awareness, the majority of 23 respondents strongly agreed with the suggestion to make the bin accessible and near the gathering area (Table 2). Followed by a second higher suggestion, in which 15 respondents strongly agreed and 14 respondents agreed with the idea of adding more recycle bins. This finding was supported by Malik et al. (2015) and Omran et al. (2009). They found that the distance to recycling facilities is the main reason that averts community participation in recycling. Moreover, the finding from Aljaradin (2011) also suggested that the provision of basic facilities for recycling should be parallel with the awareness program on recycling.

Table 2. Summarization from the suggestion in the questionnaire survey sample

Suggestion	Number of respondents				
	1	2	3	4	5
Add more recycle bin	2	-	-	13	15
Make the bin accessible and near to gathering area	3	-	1	3	23
Put a sign in the recycling area to notify the public	4	-	-	12	14
Fine for those who neglect the rules	3	2	8	2	15

Note. 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree

### **4. Recommendation**

The researcher recommends a composting garden in an open space in two case study areas as part of the recycling activity as indicated in Figure 4. Composting is one of the environmentally waste disposals that the public should practice in urban parks in encouraging them to dispose of their waste naturally and engage with landscape nature. The composting garden can attract more users to do composting and recycling simultaneously. It is good for the environment, offers an alternative to chemical fertilizer, and reduces landfill sites.

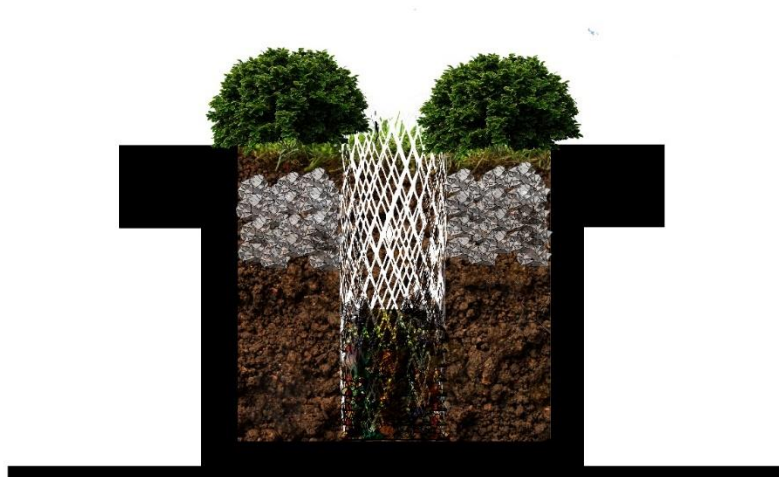


Figure 4. The example of composting garden in cross-section view

## 5. Conclusion

Although the public is aware of the recycling programme, it has been unsuccessful in Malaysia due to a lack of facilities and government support. If this problem is not addressed, it will escalate to more serious environmental problems. Therefore, through the suggestion that has been taken from the public, it will increase the level of recycling awareness regarding following the public's needs that can encourage them in recycling activity to ensure the environment will be safe for today's and next future generation.

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