HUMAN BEHAVIOUR TOWARDS WASTE SEGREGATION AT SOURCE AND 3R PRACTICES IN PENANG

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EXECUTIVE SUMMARY

Penang Green Council (PGC Strategies Sdn Bhd) has carried out a study on the public perception of Penang residents towards waste separation at source and 3R practices from 29 July 2015 till 29 September 2015. This study aimed to gather feedbacks from questionnaire distributed at supermarkets, wet markets, schools and also through online survey.

A total of 1,484 respondentss have responded to the survey. The data obtained were later descriptively analysed using SPSS Version 22. Analysis results show that majority of the respondentss understood the 3R concept and practice it in their daily lives. Most of the respondentss separate recyclable items such as paper (80.20%), newspaper (76.9%), however, the rate for electronic waste is lower at 35%. It is because there is market demand from the recyclers and papers are easy to keep and segregate. As such, the government should give more attention towards activity and program related to electronic waste to cultivate the awareness and education for the public, besides preparing more amenities and infrastructure such as suitable waste containers at collection areas for electronics waste.

Regarding practice of 3R to reduce waste, the result illustrates that the implementation of “No Free Plastic Bag Day” since 6th July 2009 is considered successful based on 80.7% of respondentss who brought along their own bags for shopping.

Apart from this, the study also found that only 25.1% of the respondentss practice food waste composting. Two reasons identified are not having enough space for composting activity (56.5%) and the lack of knowledge on how to compost (49.4%). It is also due to the limited space in housing areas such as flat, apartment and terrace. In Malaysia, 45% of the municipal solid waste composition is food waste and ends up in landfill, the activity and program for food waste composting need to be strengthened state wide to create awareness and education.

Besides, the majority of respondentss (86.5%) supported that law to be enforced to increase recycling rate in Penang. Majority of the respondentss believe more people will separate their waste if the laws are enforced. This is in line with the Penang Government's vision of Waste Segregation at Source in June 2016. As a whole, waste separation at source and 3R practices can be further strengthened with strong co-operation from all parties especially the government, private sector, education institution, NGO and the community.

When the respondentss were asked to suggest options for waste management system in Penang when the Pulau Burung Landfill reached its lifespan, 70.4% suggested the strengthen of waste segregation at source/3R policies and practices as , 66.3% suggested to adopt technologies or facilities such as Waste- To – Energy Technology or safe incinerator in Pulau Burung Landfill, only 35.7% suggested of a new sanitary landfill in Penang,

1.0 Introduction

A study on "Human Behaviour towards Waste Segregation at Source And 3R Practices In Penang" was carried out by Penang Green Council (PGC Strategies Sdn. Bhd) from 29th July 2015 till 29th September 2015. PGC is a non-profit, governmental organisation that nurtures, facilitates and co-ordinates environmental caused in Penang. Since 2011, there are number of projects and programmes that have been conducted to meet the vision of making Penang a green state. The programmes includes house-to-house education campaign, green camp, zero waste network, corporate social responsibility, Penang Green Innovation Incentive and Penang International Green Carnival.

These programmes have identified seven issues concerning recycling and disposal of solid wastes in Penang

-recycling practices among residents,
-reuse of plastic bags to throw out waste,
-lack of time to segregate the waste,
-lack of space or limited space to segregate waste especially those staying in flats or apartments,
-lack of recycle bins
-practise of open burning
-active unregistered recyclers.

Actually, the environment could be preserved and conserved if human beings could understand about their responsibility towards nature. Therefore, this study was performed with the aim to identify whether the Penang's residents have positive behaviour towards environment based on programmes that were carried out since 2011.

The objectives of this study are identifying the public understanding of waste segregation at source, recycling and 3R practices and identifying the human behaviour towards environment.

2.0 Methodology

In order to achieve the objectives, a questionnaire survey was conducted on 1, 484 residents. Referring to Krejcie and Morgan (1970) sample size table, the number of respondentss for this study is sufficient to represent the total population in Penang which is 1,647,716 residents (Department of Statistics Malaysia, 2013).This study applied simple random sampling to select the respondentss.

Three approaches were applied for this study. The first approach is an online survey which was done by asking the respondents to fill up the questionnaires through Google Drive. Meanwhile, the second approach is organizing road shows which were held in shopping malls, wet markets, factories and also house-to-house campaigns. The survey was conducted during every weekend and selection of places to distribute the questionnaire was based on focus point of resident every Saturday and Sunday. Another approach is distributed to green schools in Penang. All the questionnaires were analysed using Statistical Package for Social Sciences (SPSS) version 22. The descriptive analysis was performed to extract the results.

3.0 Results

Table 1 shows detail information about data collected for this study.

Table 1: The three approaches of data collection

Approach		Number of questionnaire distributed	Number of questionnaire returned
Online Survey	Google drive	500	410
Road show	Shopping mall: Queensbay Komtar ICT Mall	400	884
	Wet market: Tanjung Bungah Penaga	300	
	Factories: FMM (Federation of Malaysian Manufactures HGST	300	
	House to House: University Height Taman Penaga Permai Taman Puteri Gunung	500	
Green Schools	Distribute to 122 Green Schools	1220	190
TOTAL		1,500	1,484

Source: Fieldwork (2015)

4.0 Analysis and Findings

The questionnaire design is divided into four components namely,
1.respondents's profile,
2.understanding of waste segregation and 3R practices,
3.common practices towards waste segregation and 3R practices,
4.human behaviour related to the environment.

4.1 Respondentss' profile

The respondents consists of 41.2% male and 58.8% female. The majority or 53.0% of them are 26 years old to 45 years old followed by 25.6% are 18 years old to 25 years old and 21.5% are among 46 years old and above.

The majority respondents or 51.8% stayed in landed house (terrace/semi-d/ bungalow). Meanwhile, 36.6% of them stayed in high rise building (flat/ apartment/ condominium) and another 11.6% stayed in other type of houses.

Based on district, this study was able to obtain information from respondents in all districts. The majority or 31.0% of respondents are coming from Timur Laut, followed by 22.2% from Seberang Perai Tengah, 20.9% from Seberang Perai Utara, 16.9% from Barat Daya and 9.0% from Seberang Perai Selatan.

Table 2 shows detailed information about respondents' profile.

Table 2: The respondents' profile

Respondents's Profile		Frequency	Percentage (%)
Gender	Male	612	41.2
	Female	872	58.8
Age	18 years old – 25 years old	378	25.5
	26 years old – 45 years old	787	53.0
	46 years and above	319	21.5
Type of housing/ building	Landed house (terrace/semi-d/bungalow)	769	51.8
	High rise building (flat/ apartment/condominium)	543	36.6
	Others	172	11.6
District	Seberang Perai Utara	310	20.9
	Seberang Perai Tengah	329	22.2
	Seberang Perai Selatan	134	9.0
	TimurLaut	460	31.0
	Barat Daya	251	16.9

Source: Fieldwork (2015)

4.2 Understanding of waste segregation and 3R practices

In general, this section is designed to identify the respondents' awareness about recycling rate at international and state level. Besides, this part also presents their knowledge about the importance of 3R practices.

The analysis shows that majority of respondents lack awareness about recycling rate. It shows that only 31.6% noticed the recycling rate in Penang for year 2014 and only 19.3% know about recycling rate in Switzerland. Even though the respondents lack of awareness about the recycling rate, but they are concerned about the recycling program and activity within their settlement area. It can be proved based on their feedback on "*Is recycling program and activity in your area sufficient?"*. The result shows that 87.6% of respondents found that the program and activity about recycling is inadequate.

Table 3 describes the respondents' awareness about recycling rate and recycling program.

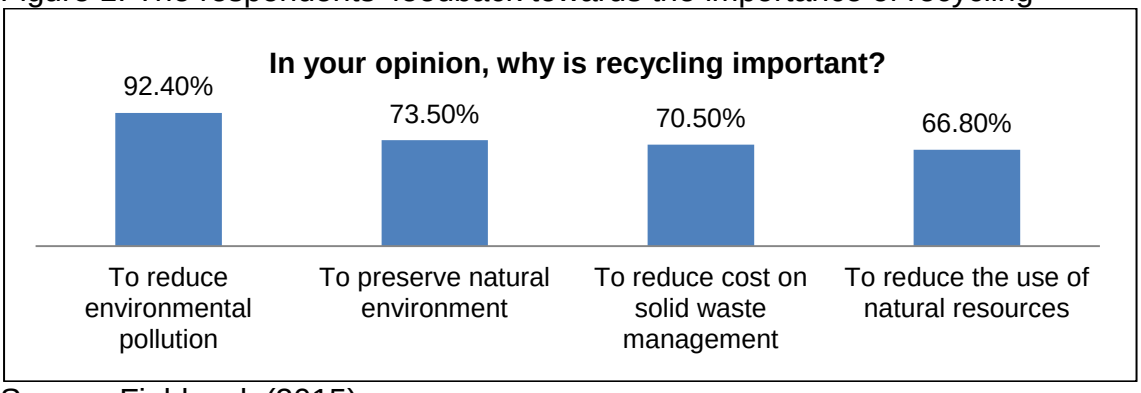
Table 3: Respondents's awareness about recycling rate and recycling program.

Understanding of 3R practices and waste segregation	Yes		No	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Awareness about recycling rate in Penang in year 2014	469	31.6	1,015	68.4
Awareness about recycling rate in Switzerland	286	19.3	1,198	80.7
Is the recycling program and activity in your area is enough?	184	12.4	1,300	87.6

Source: Fieldwork (2015)

Besides that, this study found that the respondents have a high level of understanding towards the importance of recycling. There are four important features of recycling listed in the questionnaire. Nearly everyone agree that recycling is important to reduce environmental pollution (92.4%), to preserve natural environment (73.5%), to reduce the use of natural resources (70.5%) and to reduce solid waste management cost (66.8%).

Figure 1: The respondents' feedback towards the importance of recycling



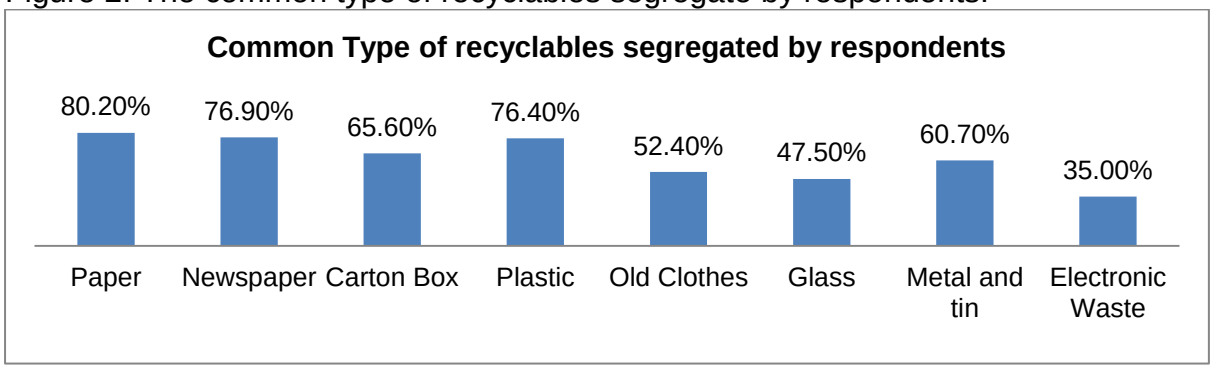
Source: Fieldwork (2015)

Overall, this result shows that the majority of respondents have a high level of understanding towards the importance of recycling but they have lack of awareness about the recycling rate. In this case, the level of understanding about importance of recycling is much important if compared to awareness about recycling rate. Normally, the recycling rate is provided by the Ministry of Urban Wellbeing, Housing and Local Government and it is informed to the public through the mass media like television and newspaper. Based on this result, it indicates that more publicity about recycling rate in Penang should be done to create awareness about the current rate of recycling. Hence, the information will then inspire the residents to recycle waste properly.

4.3 Practices towards waste segregation and 3R practices

This section is designed to identify the common practices among respondents towards 3R practices and waste segregation. From the analysis, 78.6% of respondents segregate the recyclables. Paper (80.20%), newspapers (76.90%), and plastics (76.40%) are among the common type of recyclables segregated by the respondents. These items are easy to segregate because the weight is light and size is small. Another reason identified is that household can sell these to vendors and recycling companies. In addition, respondents also segregate carton box (65.6%), metal and tin (60.7%) and old clothes (52.40%). However, less than 50% of respondents segregate glass (47.5%) and electronic waste (35.0%). The reason might be lack of information about ways to segregate electronic waste if compared to paper and plastic which have regular collectors or recyclers. Figure 2 illustrates the common type of recyclables segregate by respondents.

Figure 2: The common type of recyclables segregate by respondents.



Source: Fieldwork (2015)

Next analysis is the provision of recycle bin. Feedback given by respondents reveals that the provision of recycle bins within their settlement area is inadequate. Only 26.7% of respondents said that there is recycle bin have been provided however it is not enough to cater demand from residents. From this result, it gives a clearer overview that the authority need to provide more recycle bins to encourage the residents to practice recycling and waste segregation. Table 3 describes in detail about provision of recycle bins.

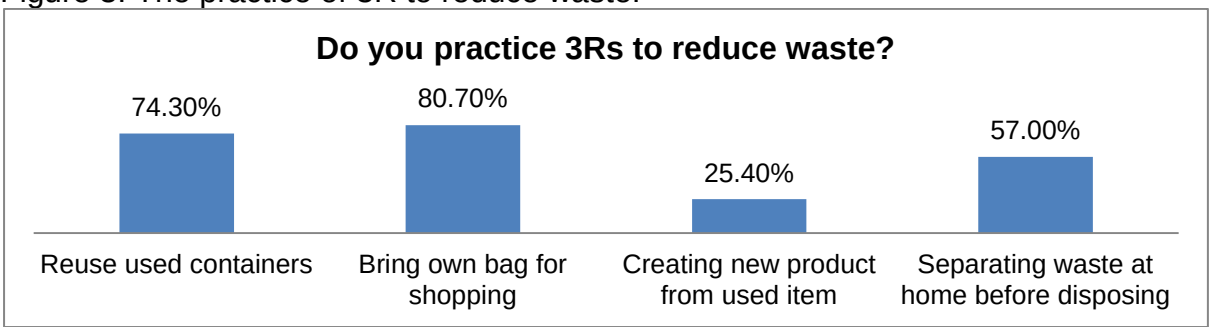
Table 3: Provision of recycle bin

Provision of recycle bin	Yes		No	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Is the recycle bin provided in your area?	396	26.7	1,088	73.3
If Yes, is it sufficient?	340	22.9	1,144	77.1

Source: Fieldwork (2015)

Regarding the practice of 3R to reduce waste, the result shows that the implementation of "No Free Plastic Bag Day" since 6th July 2009 is considered successful based on 80.7% of respondents who brought along their own bags for shopping. In addition, the respondents also practice other ways to reduce waste such as reusing used containers (74.3%), separating waste at home before disposing (57.0%) and creating new products from used item (25.4%). From the result, it seems that very small numbers of respondents are separating waste at home. Meaning that, the government need to emphasize that waste reduction to landfill starts from segregation at source. On the other hand, very few respondents created new products from used item because this is entails an individual's creativity and ability. Following Figure 3 illustrates the practice of 3R to reduce waste.

Figure 3: The practice of 3R to reduce waste.



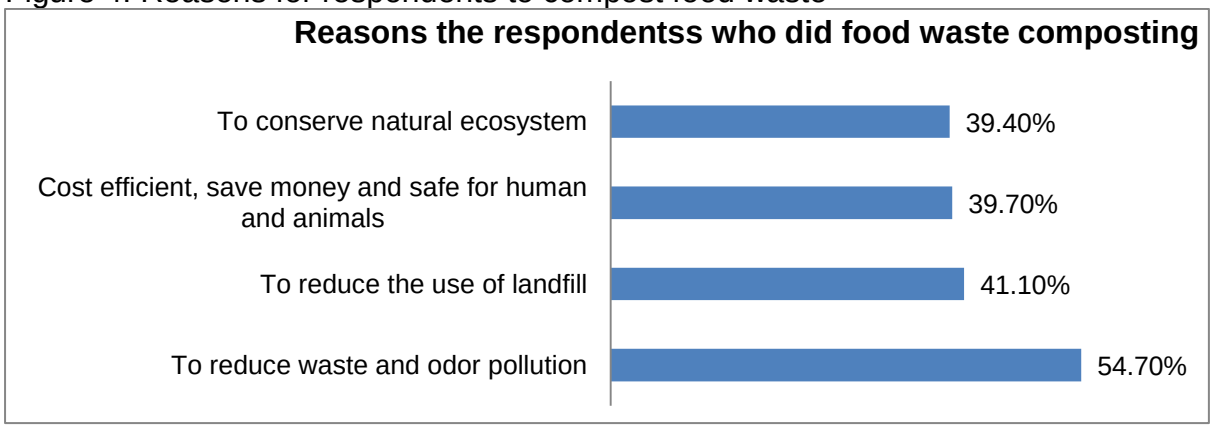
Source: Fieldwork (2015)

Another important issue is reducing food waste through composting. Unfortunately, only 25.1% of respondents practice food waste composting. According to the respondents, they practice composting because it could reduce waste and odour pollution (54.7%), reduce the use of landfill (41.1%), cost efficient, save money and safe for human and animals (39.7%) and conserve natural ecosystem (39.4%).

On the other hand, another 74.9% of respondents do not compost food waste because majority of them do not have enough space for composting activity (56.5%), do not know how to compost (49.4%), do not have sufficient time (37.2%) and they felt that the composting process is complicated (28.5%). Based on these results, it can be concluded that the respondents have lack of information about the importance of recycling food waste through composting as well as the lack of facilities and space for composting. This means that the more programs for facilities should be introduced for the community should emphasize on food composting.

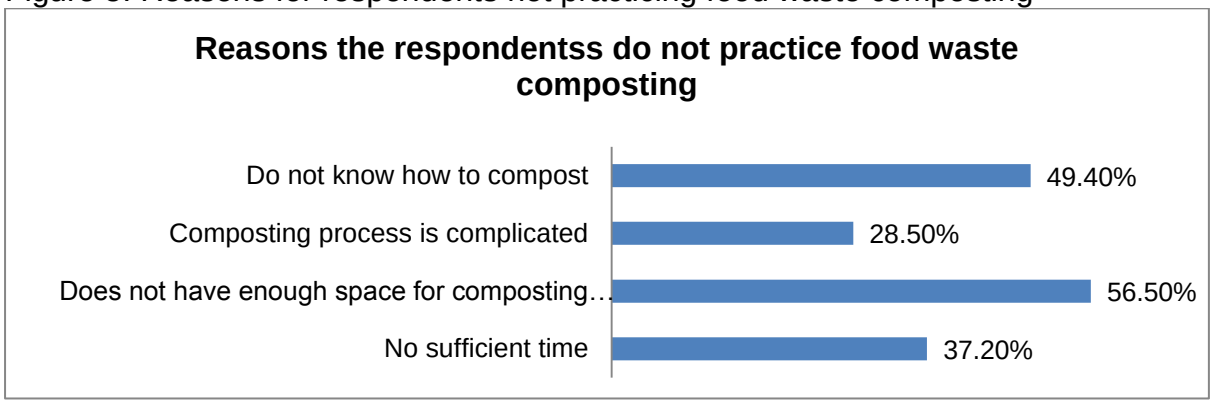
Figure 4 illustrates the reason for respondents practise the food waste composting.

Figure 4: Reasons for respondents to compost food waste



Source: Fieldwork (2015)

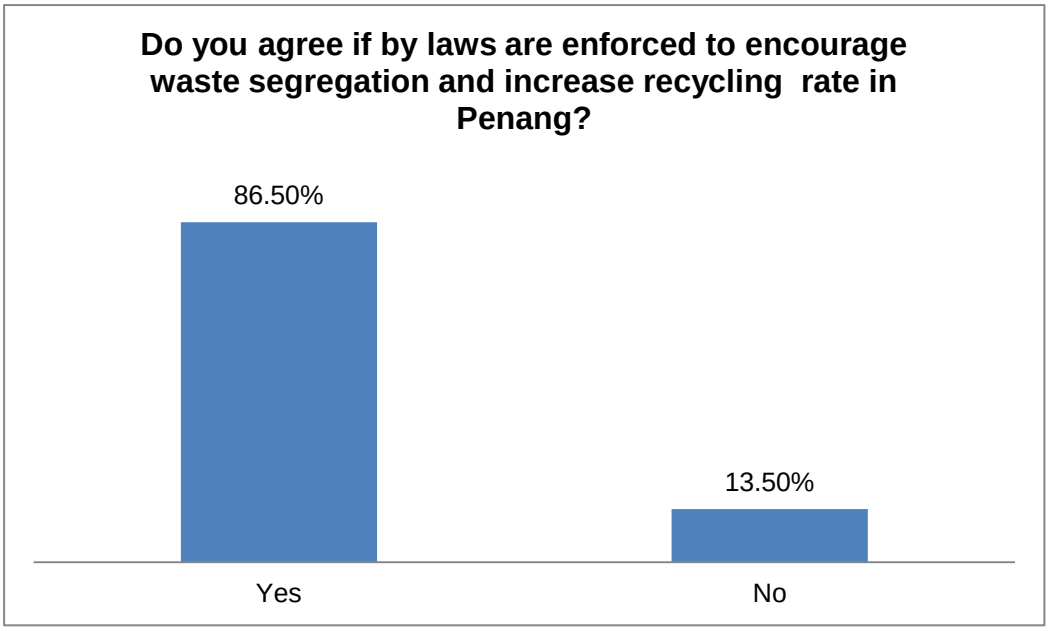
Figure 5: Reasons for respondents not practicing food waste composting



Source: Fieldwork (2015)

The next analysis shows that majority of respondents agree to enforce law to encourage waste segregation and increase recycling rate. It shows that 86.5% agree and only 13.50% disagree. Majority of the respondents believe more people will segregate at source if the laws are enforced. Figure 6 illustrates the agreement of the respondents of by- law enforcement to waste segregation and increase recycling rate in Penang.

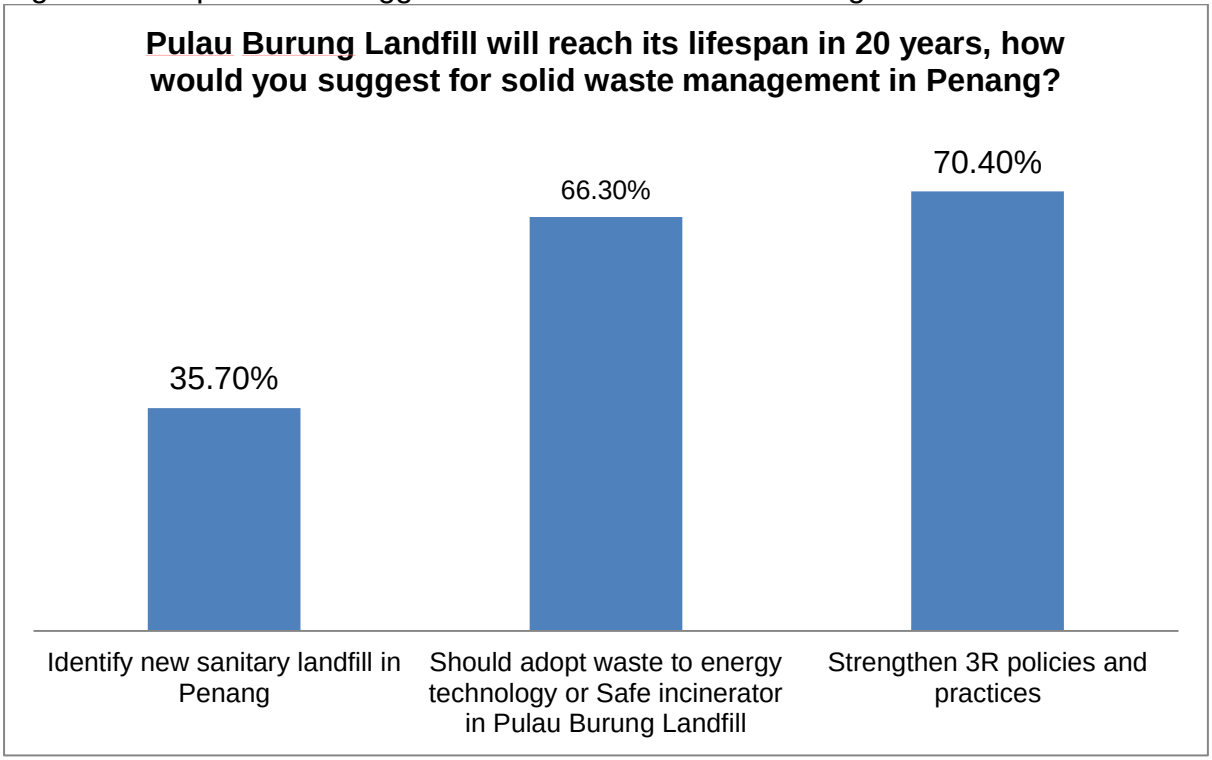
Figure 6: Agreement of the respondents of by- law enforcement to waste segregation and increase recycling rate in Penang



Source: Fieldwork (2015)

In order to have a better solid waste management in Penang, 70.40% of respondents suggest strengthening 3R policies and practices in Penang, 66.30% suggest technologies and facilities such as waste to energy technology or safe incinerator in Pulau Burung. This can be concluded that majority of the respondents prefer to enhance and have more 3R policies, programs and activities to create awareness and to educate the public, technologies and facilities should be the last resort of the waste management system as most of the waste management facilities are costly in terms of operation and maintenance. Meanwhile, only 35.7% of the respondents suggest identifying new sanitary landfill sites in Penang, scarcity of land could be the main reason. Following figure 7 illustrates respondents' suggestions for solid waste management approaches in Penang.

Figure 7: Respondents' suggestion for solid waste in Penang



Source: Fieldwork (2015)

4.4 Human behaviour related to the environment

From the descriptive analysis, it shows that all respondents have positive thinking and behaviour towards the environment. The analysis indicates most of them agree on four common practices, namely always bring reusable bag especially when shopping, choosing household items that are more environmental friendly, avoid requesting plastic bags when shopping and turn food waste into compost fertilizer. However, the survey also shows that the respondents feel uncomfortable when they have to pay more for environmental friendly products. The reason might be associated with the increases in the cost of living. In addition, the respondents understand that they are also responsible for the preservation of the environment, not only depending on government's efforts only. Overall, the current strategies to create awareness among Penang residents should be strengthened and messages should be spread out all over Penang. It shows that the efforts of the state government have made a positive impact on the behaviour of Penang residents.

Following figure 8 describe the mean for human behaviour related to the environment.

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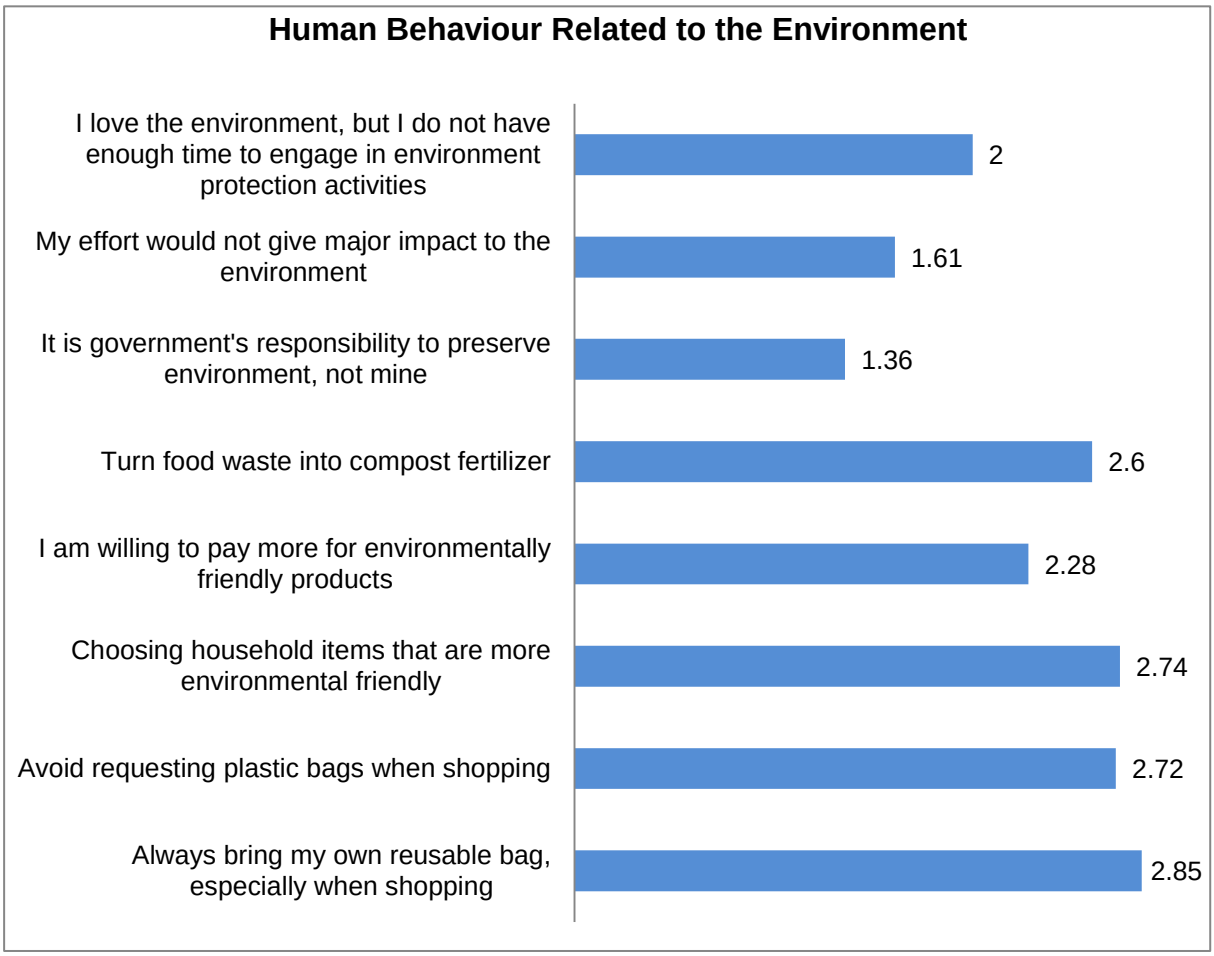

Source: Fieldwork (2015)