Human Behavior in The Practice of Waste Segregation at Source

Yamuna Selvakumaran, Rahimah Binti Wahid

In-Text Citation: (Selvakumaran & Wahid, 2022)
To Cite this Article: Selvakumaran, Y., & Wahid, R. B. (2022). Human Behavior in The Practice of Waste Segregation at Source. *International Journal of Academic Research in Business and Social Sciences*, *12*(1), 130–143.

Full Terms & Conditions of access and use can be found at
http://hrmars.com/index.php/pages/detail/publication-ethics

Human Behavior in The Practice of Waste Segregation at Source

Yamuna Selvakumaran, Rahimah Binti Wahid

Department of Social Studies and Citizenship, Faculty of Human Sciences, Sultan Idris
Education University, Tanjong Malim, Perak, Malaysia
Email: yamu6064@gmail.com, rahimah.wahid@fsk.upsi.edu.my

Abstract
Segregation at source is critical to its recycling and disposal. Lack of segregation, collection and transportation of unsegregated mixed waste to the landfills has a negative impact on the environment. When we segregate waste, it reduces the amount of waste that reaches landfills, thereby taking up less space. Pollution of air and water can be considerably reduced when hazardous waste is separated and treated separately. Hence, this study assessed the resident's knowledge about waste segregation practices and the behaviour of residents practising waste segregation practices at source. A survey was conducted among 377 residents living around Segamat town. Respondent's knowledge and the behaviour were assessed through a questionnaire. Results show a high level of knowledge about waste segregation among residents (Mean = 4.54, Standard deviation = 0.54). Majority of residents understand the meaning, concept and purpose of waste segregation. They understand the ways to separate the wastes according to the practice of waste segregation at source. Next, the resident's behaviour on practising waste segregation also at a high level (Mean = 4.61, Standard deviation = 0.38). Majority of residents shows an interest practising waste segregation by separate plastic, paper, glass, aluminium, iron, fabric, wood materials and tree branches before dispose. In conclusion, the resident's knowledge and behaviour towards waste segregation can be considered at a good level. More investigation is warranted to examine the impacts of waste segregation at source on environment.
Keywords: Behaviour, Knowledge, Rractice, Segregation, Solid Waste.

Introduction
The issue of solid waste management is a serious issue at the global and national levels. The problem of solid waste management in Malaysia is only at a satisfactory stage and is still at the reform stage (Komoo, 2016). Among the issues involving solid waste management is the continuous generation of waste in Malaysia. This issue is evidenced in Harian Metro (Zulkipli & Dawum, 2016) where, it is estimated that each individual in Malaysia has generated 1.5 kg of garbage per day. The issue of solid waste increases if a developing city fails to manage solid waste properly. The problem of managing solid waste in the right way is not only a serious problem in urban areas, but around the world (Wilson & Velis, 2015). According to Mesjasz-

Lech (2014) proper solid waste management is very important to drive sustainable urban development.

Malaysia is also no exception to the problem of solid waste management. On average, the Malaysian population produces about 37,890 tonnes of waste per day with 1.17 kilograms (kg) in line with the increase in population per day (Anuar, 2019). Waste management means a process that involves matters such as transportation, site planning, material handling, on-site operations, reuse, segregation and recycling and disposal at the final stage (Osmani, 2012). Cheku (2014) found that there was an increase in the generation of solid waste that increased to 33,000 metric tons. According to the 2018 Annual Report by the Solid Waste Management and Public Cleaning Corporation of the Ministry of Housing and Local Government (2018), a total of 39 landfills are monitored by state in peninsular Malaysia to ensure smooth waste management.

The government has introduced the Practice of Segregation of Waste at Source to overcome the problem of waste management. Segregation of waste at source is the process of separating solid waste generated at source according to the composition of solid waste such as plastic, paper and other recycled materials consisting of aluminum cans, iron or metal, glass or ceramics, electrical goods or other electronic waste, rubber, fabric materials, footwear, leather and hazardous waste and residual waste (food waste, disposable diapers and other dirty waste). Based on the regulations under the Solid Waste Management and Public Cleaning Act 2007 (Act 672), the government has made it mandatory to segregate waste at source in stages from 1 September 2015 in Kuala Lumpur, Putrajaya, Pahang, Johor, Melaka, Negeri Sembilan, Perlis and Kedah. This practice is still encouraged among the population. The practice of waste segregation at source was enforced on 1 June 2016. The implementation of waste segregation at source was carried out in three phases, namely the first phase (notification), phase 2 (implementation) and phase 3 (enforcement). Beginning in January 2015, information related to waste segregation at source began to be disseminated through newspapers, television, social media, briefings and seminars. In phase 2, the implementation, began to be implemented in September 2015. Next in phase 3, the enforcement of waste segregation at source will start on June 1, 2016. Compounds of up to RM500 will be imposed on individuals who do not use waste segregation practices at source. Enforcement of waste segregation at these sources is to ensure low quantities of solid waste are sent to landfills, prevent disposal of recyclable materials, reduce national spending on solid waste disposal, and compliance with the Solid Waste Management and Public Cleaning Act 2007 (National Solid Waste Management Department, 2021). The practice of waste segregation at source has been enforced from June 1, 2016 in Segamat town. Each house and shop is supplied with green rubbish bins according to different sizes. House occupants are provided with green bins with a capacity of one hundred and twenty liters while shop owners are provided with green bins with a capacity of two hundred and forty liters (National Solid Waste Management Department, 2021). Citizens are advised to segregate their rubbish before putting it in the green bin. The appointed concession company will collect solid waste once a week as prescribed. Furthermore, bulk waste will be collected on different days.

The development that took place in the Segamat urban area, not only improved the socio - economic status of the community but also had a negative impact on the community and the environment. Among the main problems identified in the Segamat urban area is the attitude of the community that does not separate solid waste before throwing it into the bins provided. In addition, the community in Segamat town binds leftover waste such as kitchen waste, food waste with recycled waste such as paper and glass bottles in the same plastic.

At the same time, the community in Segamat town does not manage garden waste such as dried leaves, twigs, banana stems, coconut fronds as well as bulk waste such as beds, sofas and damaged cupboards properly. They do not segregate garden waste and bulk waste with recycled waste. However, the Segamat town council area community burns bulk waste and garden waste as an easier way comparing with waste segregation. According to the Department of Environment, Segamat recorded an unhealthy Air Pollution Index (API) reading of 153 due to open burning (Bernama, 2021). In addition, the community in the Segamat Municipal Council area dumps solid waste into rivers, ponds or drains. Clogged drains make it difficult for water to flow during the heavy rainy season. This factor is one of the reasons for the issue of flash floods that occur around the Segamat area. Based on data obtained the December 2006 floods have caused 16 deaths and a total of 104,023 residents had to be evacuated (Gasim et al., 2010). One of the main causes of this flood phenomenon is the continuous heavy rains in December. Therefore, this study will examine

- The knowledge of the residents about waste segregation at source
- Behavior of the residents in practicing waste segregation practices at source

Literature Review
Resident's Knowledge of Solid Waste Management
The study of Saifudin & Aimi (2020) emphasizes the educational knowledge of solid waste recycling practices among the residents of Taman Tapai Indah. Awareness of the community around Taman Tapai Indah is at a low level. The study of Saifudin & Aimi (2020) identified that the solid waste generated by the community in Taman Tapai Indah is very high. Irregular solid waste management has resulted in garbage piles being disposed of not according to the prescribed types. The awareness of the residents in Taman Tapai Indah is at a low level on solid waste management, especially irregular waste disposal. Low public knowledge has caused many environmental problems such as odor pollution, soil pollution, air pollution and this will affect human health.

Pak et al (2018) conducted a study to identify the level of awareness and knowledge of the village community about the importance of caring for the environment as well as the impact of knowledge improvement programs on recycling practices on recycling practices among the rural population. The Government Transformation Program 2.0 (GTP 2.0) has introduced a measure to develop rural areas and increase the income of the rural population (Pemandu, 2017). The main factor that causes the failure of recycling in Malaysia is because it does not practice waste segregation at source. The results of the study showed that the majority of the respondents had knowledge and awareness of recycling practices based on the findings that the majority of the population agreed that the waste materials around them can be recycled. Many recycling practice campaigns in Malaysia focus on the population, especially in urban housing estates.

Next the study of Sakawi et al (2017a) found that the majority of respondents understand the concept of recycling and show positive findings on the community's knowledge of the concept of recycling and this is the basis for the implementation of recycling practices in solid waste management. Although the respondents had a high level of knowledge about the concept and practice of recycling, they claimed to have never been involved or there was no awareness campaign on recycling in their housing area.

Moreover, the study of Sakawi et al (2017b) assessed the level of community awareness, knowledge and perception in solid waste management and public cleaning the study area. Solid Waste Management and Public Cleaning Corporation (PPSPPA) or SWCorp Batu Pahat is

directly involved in PSPP, especially in the supervision and monitoring of waste collection works by concessionaires, landfill operations, receiving complaints and acting on complaints on solid waste management. Subsequently, hygiene KPIs have been introduced to ensure that concessionaires always perform their PSPP responsibilities and duties in a systematic and good manner. Studies on public awareness of waste management and public cleaning (PSPPA) show a very high level. The majority of residents are aware that solid waste management does need to be done, aware of the benefits gained from the importance of solid waste and public cleaning being well managed.

Behavior and Attitude of Society in Solid Waste Management

Ling (2018) studied the attitude of the population, the suitability of the collection system, the problems and the suitability of the recycling program that has been done until now. As a result of the questionnaire, the types of solid waste generated are food waste, old newspapers, paper, plastic materials, glass and bottles as well as aluminum cans. Next, the factors influencing the disposal process are the moisture rate and the energy value. The results of the study found that the moisture rate and energy value are at a very high level in Sibu City. The study concludes that the solid waste collection system in Sarawak is very efficient and satisfactory. However, the soil in Bandar Sibu shows a very high plastic index.

Faisal et al (2016) found that there are students at UUM who are weak in the implementation of recycling programs and this creates unsystematic solid waste management. Some UUM students who do not understand the importance of the environment like to throw plastic and leftover food around their places to eat. After conducting a study, Faisal et al (2016) found that the level of knowledge is very high among UUM students. Meanwhile, the attitude of UUM students towards recycling is still at a low level. Although they have knowledge about recycling, but they do less recycling and are less aware of the importance of recycling and environmental conservation in the future.

Seow (2010) has conducted a study to examine the community's behavior towards recycling programs in the district of Batu Pahat, Johor. The findings of the study showed that only 5% of the respondents were following the recycling program even though the respondents had a high knowledge of the recycling program. In addition, respondents in Batu Pahat Johor have a low level of knowledge about the use of three -color recycled bins and they use less three -color bins provided by the local authority. Although the residents of Batu Pahat Johor have a high awareness of the importance of recycling, but they find it difficult to practice recycling in daily life.

Methodology

This study uses a quantitative approach with survey design through the distribution of questionnaires to the public in the city of Segamat. Next, the area selected for this study is Segamat city. The population of Segamat town is 213,000 people. (Department of Statistics Malaysia, 2017). Segamat urban area is 2851 square kilometers (Department of Statistics Malaysia, 2017). A total of 377 residents were selected as the study sample based on the determination of the sample size of Krejcie and Morgan (1970) corresponding to the size of the study population. The instrument used is a questionnaire in obtaining quantitative data constructed by the researcher in accordance with the agreement of experts in the relevant field. At the same time, questionnaires were distributed to 30 residents around the town of Buloh Kasap for a pilot test. Respondents consisted of 18 males and 12 females. Overall, the

value of trust for the two construct variables is very high, namely "Knowledge" of 0.803 and "Attitude" of 0.876.

This study uses descriptive statistical analysis. Descriptive statistics should begin with the data preparation phase, which should provide the collected data for statistical analysis (Bhattacherjee, 2012). Descriptive statistics were used to analyze the level of residents knowledge about waste segregation practices at source and the resident's behaviour in the implementation of waste segregation practices at source. Descriptive statistics are used in this study in the form of frequency, percentage, mean, and standard deviation. The process of analyzing these quantitative data is done descriptively through computerized analysis using Statistical Package for the Social Science (SPSS) software. This study elaborates this descriptive analysis by using the behavioral mean interpretation table that has been formulated by Riduwan (2012) Table 1.

Table 1: Interpretation of Mean Behavior

Min Score	Interpretation
1.00 – 1.99	Weak
2.00 – 2.99	Low
3.00 – 3.99	Moderate
4.00 – 5.00	High

Source : Riduwan (2012)

Results and Discussion
Respondent Profile
This section describes the background analysis of the respondents in Segamat town. Table 2 explains the background of the respondents.

Table 2: Respondent Profile

Category	Description	Frequency (N)	Percentage(%)
Age	18-20 years old	12	3.2
	21-25 years old	42	11.1
	26-30 years old	66	17.5
	31-35 years old	65	17.2
	36-40 years old	149	39.5
	41-60 years old	43	11.4
Gender	Male	142	37.7
	Female	235	62.3
Race	Malay	201	53.3
	Chinese	69	18.3
	Indian	107	28.4
	Islam		
	Hindu	197	52.3
Religion	Buddha	107	28.4
		73	19.4
Marital status	Married	300	79.6
	Single	77	20.4
	Widow/widower	0	0
Education	UPSR	40	10.6
	PT3	12	3.2
	SPM	283	75.1
	STPM	4	1.1
	Diploma	32	8.5
	Degree	6	1.6
Settlement period	< 1 years	15	4
	1-5 years	29	7.7
	5-10 years	13	3.4
	10-15 years	35	9.3
	>15 years	285	75.6
Income	<RM1000	6	1.6
	RM1000-RM3000	245	65
	RM3000-RM5000	118	31.3
	>RM5000	8	2.1
Job	Self-employment	29	7.7
	Government	25	6.6
	Private	308	81.7

	Others	15	4
Knowledge about 'waste segregation at source'	Television	74	19.6
	Radio	3	0.8
	Facebook	153	40.6
	Newspaper	45	12
	Friends	64	17
	Neighbour	38	10.1

Findings show that respondents in the age group of 36-40 years show a high number of 149 people (39.5 %) followed by female respondents of 235 people (62.3 %) and 201 respondents of Malay descent. In addition, Muslim respondents are a total of 197 people (52.3 %), followed by respondents who are married which is 79.6% followed by SPM qualified respondents which is 75.1 %. Next, a total of 285 respondents who have lived for more than 15 years. Furthermore, respondents with income between RM1000-RM3000 which is 245 people followed by respondents who work in the private sector which is 308 people and respondents who know this practice through Facebook which is 153 people.

Level of Knowledge about Waste Segregation at Source
Table 3 shows the mean of the overall mean items of resident's knowledge with waste segregation practices at source was 4.54 (s.p = .54). This indicates that the level of resident's knowledge is high about waste segregation practices at source.

Table 3: Level of Knowledge about Waste Segregation at Source

	Mean	Standard Deviation
Systematic waste management in Segamat Municipal Council area	4.45	.66
Systematic waste management helps keep the area clean	4.57	.55
Systematic waste management is very important for the development of the Segamat Municipal Council area	4.67	.50
The practice of waste segregation at source is very useful in waste management in Segamat	4.81	.43
Understand the meaning of waste segregation practices at source.	4.47	.65
Understand the concept of waste segregation at source.	4.57	.55

Identify the purpose of practicing waste segregation practices at source	4.67	.50
Understand the ways to separate waste according to the practice of waste separation at source	4.80	.43
Understand the impact of practicing waste segregation practices at source on society	4.46	.65
Understand the impact of practicing waste segregation practices at source on the environment	4.57	.55
Have a green bin provided by the government to dispose of garbage	4.68	.50
My neighbor has a green barrel	4.81	.42
Know the garbage collection schedule	.54	.68
Total	**4.54**	**.28**

These findings indicate that society is already exposed to these new practices. For example, the analysis shows that the level of knowledge of the residents is at a high level in understanding the meaning of waste segregation practices at the source. Next, residents had a high level of understanding of the concept of waste segregation at source. For example, the results of the study of Derahim et al (2012) showed a low level of knowledge of students in creating a sustainable campus. They stated that they know how to preserve and conserve the environment well. Furthermore, the level of knowledge of UKM students on sustainable development is at a moderate level of 51.6 percent.

However, the Segamat residents in this study has a high level of knowledge in understanding the ways of segregating waste. In addition Sakawi et al (2017a) found that solid waste generation in Malaysia increased in line with population growth. The results show that the community's knowledge on the concept of recycling and separation of recyclable items is quite high. However, the level of exposure to the program and dissemination of information on recycling facilities by local authorities is very low.

The respondents involved in this study are respondents who live in Segamat town and are of the opinion that waste management in the municipal area is very systematic and complies with all the correct assessment and implementation methods. This can be evidenced through the annual report issued by the Solid Waste Management and Public Cleaning Corporation, Ministry of Housing and Local Government, 2018 which states that briefings have been given on waste segregation at source to the community as well as teachers and school children. This value clearly expresses the opinion of most respondents that the planned solid waste management has helped the respondents in the area to maintain cleanliness.

The residents in this study argued that this practice is very important in the society in this pandemic era because hygiene plays an important role in maintaining the level of health at the right peak. With the implementation of many programs leading to waste segregation at source and the briefing sessions that have been held by SWCorp have provided exposure to

this practice and made the community more concerned. Most of the residents have accepted and fully understood the purpose of society and also the respondents need to practice waste segregation practices at the source which indeed provides many benefits.

In addition to the impact on society this practice is also said to bring an equivalent impact to the environment which is indeed important to ecological balance. The government's efforts to supply rubbish bins to the community around the state of Johor has yielded lucrative results by enabling the community, especially the respondents to practice waste segregation effectively.

Only a handful of people know the garbage collection schedule because there is not enough disclosure. To overcome such problems, local authorities need to prepare a schedule so that the community is aware of the arrival of garbage disposal.

Resident's Behavior In The Practice Of Waste Segregation At Source
The mean for the resident's behavior in the practice of waste segregation at source was high at 4.61 (s.p = 0.38) (Table 4).

Table 4: Resident's Behavior In The Practice Of Waste Segregation At Source

	Mean	Standard Deviation
Practice waste segregation practices at source	4.80	.43
Isolate plastic materials	4.80	.43
Separate paper materials	4.80	.43
Isolate glass materials	4.80	.43
Isolate aluminum materials	4.80	.43
Isolate iron materials	4.80	.43
Isolate fabric materials	4.80	.43
Isolate tree branches	4.80	.43
Isolate wood materials	4.80	.43
Bind each composition of waste using a different plastic	4.80	.43
Put the garbage plastic into the green bin provided	4.80	.43
Putting bulk waste	4.80	.43

(tree branches, furniture, wood) on the shoulder of the road on the day of collection of bulk residue		
Your neighbors segregate trash	3.37	.83
Dealers segregate waste	3.21	.89
Educate my children to segregate trash	4.81	.42
Share knowledge of this practice to others.	4.81	.42
Total	**4.61**	**.38**

The number of residents who segregate solid waste according to the prescribed composition is at a high level. A large number of residents segregate solid waste such as plastic, paper, glass, aluminum, iron and fabric. In addition, the majority of respondents segregate bulk waste such as tree twigs, wood materials well. The segregated waste materials were put in different plastic bags to facilitate recycling. As for bulk waste, the residents have sorted and placed it on the shoulder of the road on the day of collection to facilitate those who collect garbage. The findings of the study also show that they showed less interest in segregating recyclable waste and disposing it into green bins.

The analysis conducted on the behaviour of the residents in the implementation of waste segregation in this study shows that most traders are less responsive to waste segregation in their place of business. For example, traders of food stalls, stalls and restaurants show a moderate level in practicing waste segregation practices at source. Nevertheless, study respondents did not fail to educate their children about waste segregation practices at source. There are parents who show how to separate waste such as plastic, paper and glass before throwing it into green bins.

The respondent of this study assumed that the level of resident's behaviour in the implementation of waste segregation practices at source would be effective if they shared about the practice with others because the relevant information could be disseminated widely. The majority of respondents are proud of themselves who like to share their existing knowledge about waste segregation practices at source to others.

Alireza et al (2016) in his study have established that the highest solid waste management achievement is something related to the implementation of programs that can be done to encourage the participation of the surrounding community. The level of implementation according to him is that community participation is to end the geography related to the environment especially the segregation of waste at source.

Next, Sakawi et al (2010) have stated that community participation in aspects related to the environment in general is still at a lower level. Although the government has taken various approaches to encourage community involvement in advertised environmental care practices

but community involvement is indeed still low and no longer able to motivate the community (Agamuthu & Fauziah, 2010).

This situation is similar to the results of a study by Moh and Latifah (2016), who found that due to lack of participation, commitment, civic awareness and low level of community education, environmental issues, especially solid waste management, have not been resolved. Some of the factors that contribute to low recycling rates and community participation are the inability of authorities to maintain recycling programs, low demand for recycled materials, lack of recycling collection services, low awareness programs, and lack of enhanced policies or overall plans to national recycling program (Moh & Latifah, 2016).

Conclusion

This study is based on the implementation of waste segregation practices at source in solid waste management in Segamat Municipal Council area. Next, this study was conducted to identify the level of knowledge of waste segregation practices at source among the residents and analyze the behaviour of the residents in the implementation of waste segregation practices at source. The Segamat Municipal Council area was selected as the study location for this research. This study only focuses on the city of Segamat. Next, the study respondents consisted of 377 people. The results of the study found that the residents of Segamat town have a good knowledge about the practice of waste segregation at the source. High knowledge influences the attitude of the population to separate waste according to the correct composition. After learning of waste segregation practices at source, residents of Segamat town began segregating solid waste and helping concessionaires who dispose of garbage. The positive attitude of the residents has succeeded in creating a clean and sustainable urban area.

Acknowledgements

References

Anuar, S. S. (2019). Rakyat Malaysia hasil 37,890 tan sisa setiap hari. *Berita Harian*. Retrieved https://www.bharian.com.my/berita/nasional/2019/06/574909/rakyat-malaysia-hasil-37890-tan-sisa-setiap-hari

Alireza, F., Farzaneh, B., Jahanshaloo, L., Sidik, N. A., & Bayat, A. E. (2016). *Malaysia's stand on municipal solid waste conversion to energy: A review.Renewable and Sustainable Energy Reviews* ,58, 1007-1016.

Agamuthu, P., Fauziah, S. H., & Khidzir, K. (2009). Evolution of solid waste management in Malaysia: Impacts and implications of the solid waste bill, 2007. *Material Cycles and Waste Management*, *11*(2), 96-103.

Bernama (2021). Segamat catat ipu tidak sihat. Retrieved from https://www.wilayahku.com.my/segamat-catat-ipu-tidak-sihat/

Bhattacherjee, A. (2012). *Social science research: Principles, methods, and practices*. USA: University of South Florida.

Cheku, N. H. (2014). *Faktor yang mempengaruhi amalan kitar semula dalam kalangan generasi Y di IPT Negeri Terengganu (*Tesis Sarjana). Terengganu: Universiti Malaysia Terengganu.

Derahim, N., Hashim, H. S., Ali, N., & Aziz, S. (2012). UKM sebagai kampus lestari: Tinjauan awal pengetahuan, kesedaran dan penglibatan pelajar dan kakitangan di Kampus UKM Bangi. *Malaysia Journal of Society and Space*, 8(8), 76-90.

Faisal, H. M., Adilah, N., & Zulhumudi. (2017). Kitar semula Pengetahuan dan sikap mahasiswa Universiti Utara Malaysia terhadap pengurusan sisa pepejal. *In: Symposium on Technology Management & Logistics (STML-Go Green) 216, 6th-7th December 2016,* Universiti Utara Malaysia.

Giovanni, F., & Sabino, G. (2010). Public opinion and awareness towards MSW and separate collection programmes: A sociological procedure for selecting areas and citizens with a low level of knowledge. *Waste Management, 30*, 958-976.

Gasim, M. B., Surif, S., Mokhtar, M., Toriman, M. E., Abdul Rahim, S., & Bee, C. H. (2010). Analisis banjir Disember 2006: Tumpuan di kawasan bandar Segamat, Johor. *Jurnal Sains Malaysiana*, 39(3), 353-361.

Jabatan Pengurusan Sisa Pepejal Negara. (2021). Retrieved from https://jpspn.kpkt.gov.my/

Jabatan Perangkaan Malaysia. (2017). *Statistik penduduk 2017*.

Jabatan Pengurusan Sisa Pepejal Negara. (2013). *Survey on solid waste composition, characteristics & existing practice of solid waste recycling in Malaysia*. Retrieved from https://jpspn.kpkt.gov.my/resources/index/user_1/Sumber_Rujukan/kajian/Final_Report_REVz.pdf

Komoo, I. (2016). Pengurusan sisa pepejal negara perlu ditingkat. *Berita Harian*. Retrieved from https://www.bharian.com.my/taxonomy/term/61/2016/08/188022/pengurusan-sisa-pepejal-negara-perlu-dipertingkat

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30(*3), 607-610.

Ling, S. K. (2018). Kajian pengurusan sisa pepejal perbandaran di Malaysia: Kajian kes di Kuching, Miri dan Sibu. *Asian Journal of Environment, History and Heritage, 2*(2), 111-118.

Moh, Y. C., & Latifah, M. (2016), Solid waste management transformation and future challenges of source separation and recycling practice in Malaysia.   Retrieved from http://dx.doi.org/10.1016/j.resconrec.2016.09.012

Md. Wahid, M., & Chamhuri, S. (2007). Knowledge, attitude and behavior of the urban poor concerning solid waste management: A case study. *Journal of Applied Sciences, 7*(22), 3356-3367.

Mesjasz-Lech, A. (2014). Municipal waste management in context of sustainable urban development. *Procedia – Social and Behavioral Sciences*, 151, 244-256.

Osmani, M. (2012). Construction waste minimization in the UK: Current pressures for change and approaches. *Procedia - Social and Behavioral Sciences, 40*, 37–40.

Pak, C., Haniza, N. A., Alwi, M., Norhayati, Ismail, S., & Nahar, A. S. (2018). The actants and KPI in privatization of solid waste management in Malaysia. In: *3rd UUM International Qualitative Research Conference (QRC),* 10-12 July 2018, Melaka, Malaysia.

Riduwan. (2012). *Skala pengukuran variable-variable: Penelitian.* Jakarta: Alfabeta, Bandung.

Saifudin, M., & Aimi, S. (2020). Pendidikan amalan kitar semula sisa pepejal kepada masyarakat. *Jurnal Geografi, 8*(1), 43-69.

Sakawi, Z., Ayup, S., & Sukimi, M. F. (2017a). Pengetahuan komuniti dan amalan pengurusan sisa pepejal di Negeri Sembilan. *Jurnal Geografia, 13*(4), 126-137.

Sakawi, Z., Abd Rahman, A. R., & Ayup, S. (2017b). Keberkesanan pengurusan sisa pepejal dan pembersihan awam selepas Akta 72: Kajian di Majlis Perbandaran Batu Pahat, Johor. *Jurnal Geografi, 5*(3), 72-84.

Sakawi, Z., Ali, M. H., Rostam, K., & Nor,M. A. R. (2010). Impak pengurusan tapak pelupusan atas kualiti air sungai di Malaysia: Iktibar dari pengalaman tapak pelupusan Pajam dan Sungai Pajam, Negeri Sembilan. *Malaysian Journal of Society and Space*, *6*(1), 50-59.

Seow, T. W. (2010). Sikap masyarakat terhadap program kitar semula: Kajian kes di Daerah Batu Pahat, Johor. *Journal of Techno-Social, 2*(1).

Tarmudi, Z., Abdullah, M. L., & Tap, A. O. M. (2009). An overview of municipal solid wastes generation in Malaysia. *Jurnal Teknologi, 51*, 1-15.

Wahida, A. (2015). *Kepentingan penglibatan kaum Wanita kearah kemapanan aktiviti kitar semula di negeri Kedah (*Tesis Ijazah Doktor Falsafah). Kedah: Universiti Utara Malaysia.

Wilson, D. C., & Velis, C. A. (2015). Waste management – still a global challenge in the 21st century: An evidence-based call for action. *Waste Management & Research*, 33(12), 1049-1051.

Zulkipli, N. L., & Dawum, G. (2016). 7986.47 tan sehari. Retrieved from https://www.hmetro.com.my/mutakhir/2016/11/179552/798647-tan-sehari