



A Study of Understanding of Garbage Classification of Populations and Various Issues in Bangkok and Its Peripherals

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ABSTRACT

The study of the understanding of garbage classification of people in Bangkok and its peripheral had three objectives: studying about people's understanding of garbage classification, factors affecting the process, and identifying problems of the process. This study is survey research by randomly distributing online questionnaires. For data collection, it consisted of two parts: The first part consisted of multiple choices questions about the understanding of garbage classification. The second part consisted of an open-ended question about problems that the respondents have encountered and a self-evaluation form about how well do they think they understand about garbage classification. The population that we studied was 600 people in Bangkok and its peripheral by using a statistical analysis program to analyze the data. Percentages, frequencies, arithmetic means, and standard deviations are used as descriptive data.

The study found that the understanding of garbage classification of the population is at a good level as a percentage of 69.21%, which showed that the understanding and behavior of people affect garbage classification. The majority of the population commented that the reasons that most people cannot classify the garbage as well as it should are that the garbage classification criteria are not clear, and the government sectors and some people have not cooperated in this process. Thus, this research studies about how well do people in Bangkok and its peripherals understand about garbage classification and uses the results and conclusions to develop garbage classification processes for people and the government sectors to classify the garbage more effectively.

Keywords: Garbage classification, Populations, Waste management

INTRODUCTION

Nowadays, waste has become a very big issue in the urban and peri-urban areas in Bangkok.

One of the first critical steps in the process of developing a reliable waste management plan requires the performance of littering behavior analysis.

According to the survey of the Pollution Control Department, in 2018, people in Thailand generated wastes 28 million tons per year, which was

approximately 76,000 tons per day. In addition, the abilities and participations in garbage classification were less than 70%. For example, the technologies that can be used for waste disposal in Thailand were not enough to manage all of the garbage, and most people did not have enough knowledge and understanding of the process; they cannot apply it to their daily lives. As a result, 7 million tons of wastes were incorrectly eliminated. In order to live in a healthy environment and to reduce the usages of

natural resources, people around the world, including Thailand, should follow the principles of protecting natural surroundings, reducing the amount of waste, and classifying them. Wrong methods not only affect the amount of waste that is increasing but also it has huge direct and indirect impacts on the environment. Therefore, developing and preserving a healthy environment are some of the most important tasks for many agencies and governments that it has to be solved quickly.

There are several studies about waste management and concern garbage classification. Thailand is now facing a big city waste problem because of people's behavior, and limitations of many local organizations, such as budgets and staff. Therefore, the government has set solutions for these problems by focusing on reducing the amount of garbage and reusing the waste by applying 3R methods in order to make Thailand a zero-waste country. To set the solutions, the government may change some laws to suit the present environment, manage and improve local organizations' operations, and support policies about forming substantial garbage management. (Parliament, 2019) The interim government announced a roadmap for solving the Municipal Solid Waste (MSW) problems of the country by revising the laws and regulations concerning the problem. At the end of 2018, the central government came up with new plans and a policy framework to solve the MSW problems by using the framework of regional waste management, which gives the leading role to the provincial governor and provincial administrative organization (PAO) of the local governments with promoting incinerator with electricity plants and sanitary landfills with proper treatment. However, the rural local governments possibly have a lack of technical and financial supports and inadequate knowledgeable staff for operation. (Kojima, 2019)

The Pollution Control Department's report, a study of situations, policies, and solutions of garbage eradication in Thailand was conducted. Because garbage has been directly and indirectly producing a lot of pollution to the environment, it has become an important issue that needs to be solved urgently. Therefore, this research stipulated policies and measures that would lead to complete management: making an agreement between the provinces, setting up an organization that deals with garbage, having

people's cooperatives, and planning the budget. (Pollution Control Department, 2004)

A study of waste management problems in Rajabhat University's campuses that are located in the central region of Thailand is conducted to study problems and efficiencies of waste management and to propose solutions. The study found that the waste eradication skill, which tells efficiencies, of people on the campuses is moderately good. On the other hand, the study found problems. Most of them are about solid waste management and the number of people getting involved in the process. For the solutions, the author suggested for continuing activities or campaigns that raise awareness of waste separation in order to make this university a great example for nearby communities. (Shouchupon, 2017) and a personal interview survey was undertaken at Nongtha Tai Village in Vientiane illustrated waste management practices at the village or urban community level. The survey determined waste volume and usages and recorded villager's attitudes towards waste. The villagers expressed a desire that they are included in discussions or decisions regarding waste within their village. They suggested that they need supports for waste separation activities and those specific bins or plastic bags should be provided for this purpose. They also showed interest in setting up a biodegradable system at the village level for the organic component, by either using vermiculture or producing fertilizer from compost. (Khouangvichit et al., 2009)

A questionnaire about the difficulties of applying city garbage classification, factors influencing people's behavior, and suggestions on related procedures were conducted. The subjects are mainly parents and nearby neighborhoods at Taiheyuan, Guiyuannan, Beili, Yizhuang Central Elementary School. Most of the respondents expressed that the smell of the trash and the trash in the containers has already mixed are the reasons hindering them from practicing garbage classification, and there are many other types of difficulties they were facing during the process, such as spaces, troubles, and confusions. Most of the respondents suggested the government to advocate more by advertisements, and implement regulations about garbage classification.

Therefore, the suggestions for promoting garbage classification to people are supporting through

advertisements on televisions or the internet as well as setting the staff to execute garbage classification system and charging disposal fee. (Wang et al., 2017)

From the situation of waste management in Thailand, there is a lot of concern about waste management and garbage classification, this research was conducted to investigate how well do people in Bangkok and nearby provinces know about garbage classification. According to the problems, our research team has set up the problem before researching how well do people know about garbage classification and how they can apply it to their daily lives. After setting up the problem, we hypothesized that a basic understanding of people and various factors affecting garbage classification.

OBJECTIVE

1. To analyze the understanding of people in Bangkok and nearby provinces about garbage classification
2. To study and develop garbage classification of populations in Bangkok and its peripherals

MATERIALS AND METHODS

The following section describes the research design for this study.

In this study, our research team collected primary data randomly by an online questionnaire, which is a research instrument consisted of a series of questions for gathering information from respondents, and

secondary data from past researches. The criteria for this questionnaire consisted of two parts. The first part consisted of 14 multiple choices questions about the understanding of garbage classification, which each correct answer is worth one point. The second part consisted of an open-ended question about problems that the respondents have encountered in their daily lives and a self-evaluation form about how well do they think they understand about garbage classification.

This questionnaire was conducted among 600 respondents. Each of the respondents was approached and asked for his or her participation online. Most of the respondents were students. Each of the students (age below 20 years) was approached during their free time at their schools or houses. The adults (age 20 and over) didn't get any benefits from doing this questionnaire, or they didn't have much free time; some of them did not do it. As a result, the number of participants from the adults' group was lower than expected: 222 adults answered the questionnaire, which was about 37%.

Descriptive and inferential statistics were used to analyze the data. The respondents' views towards the influence of garbage classification are shown as mean scores from 600 responses, ranging from having the least to the most understandings of this topic. The respondents' main scores from the questionnaire were displayed using a frequency table.

RESULTS

Baseline understanding of Garbage Classification						
	Waste disposal	Reduction of the garbage	Types of rubbish bin	Types of garbage	The environmental impact from the disposal of illegal waste	Average
Percentage	90.39	83.34	78.89	74.93	18.50	69.21
Frequency	543	500	474	468	111	419.2
S.D.	0.085	0.144	0.155	0.160	N/A	0.068

Table 1, shows the rate of values related to the understanding of people from the first part of the questionnaire.

1. Table 1 shows the rate of values about the baseline understanding of garbage classification of the population from the first part of the questionnaire.

Overall, the respondents that understands about waste disposal account for the largest proportion, while the respondents that understand about the environmental impact from the disposal of illegal waste account for the smallest proportion.

Out of 600 surveys, participants tended to surge to 90.39% for waste disposal as they have the most

understanding, 83.34% for reduction of the garbage which is the second most understanding topic, 78.89% for types of rubbish bin, 74.93% for types of garbage and 18.50% for the environmental impact from the disposal of illegal waste as they have the least understanding. The average score is 10.66 out of 14, or if it is calculated as a percentage will get 76.14%. All of which are still not able to apply the knowledge to actually separate the waste, or not fully effective as illustrated in Table 1.

Basic self-assessment about understanding in waste separation



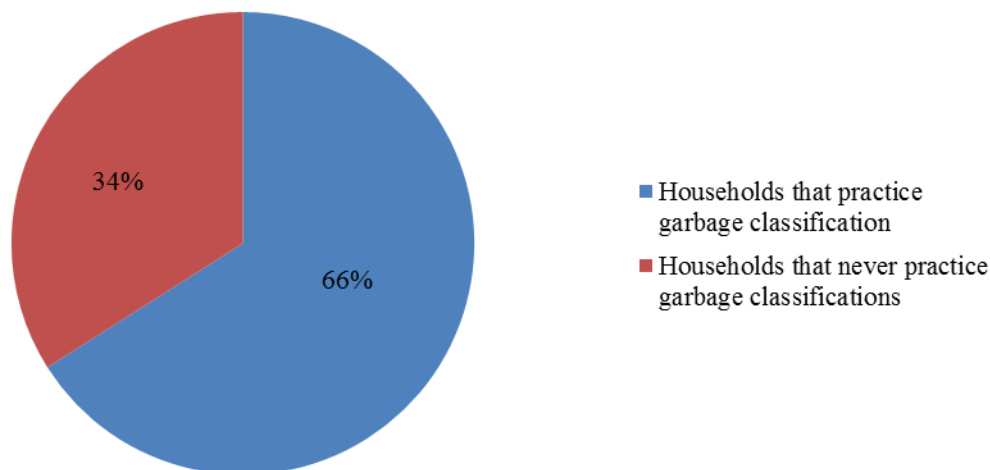
Figure 1, shows the results of a survey in which basic self-assessment about understanding of waste separation.

2. As shown in Figure 1, the pie chart shows the results of a self-assessment about the understanding of waste separation from the second part of the survey. In general, each person has different thoughts about their abilities to separate their garbage.

From the main, it is clear that the majority of the survey participants think they can classify garbage at a fair level accounts for half of the total population

(53.7 %). In comparison, the second largest group is the survey participants who think they have a basic self-assessment about understanding in waste separation at a good level, which represented 29.3%. Only the small minority think they can do that at an excellent level for 9.4%, while the survey participants who think they cannot classify the garbage only 7.6%.

People's Behavior of garbage classification



People's Behavior of plastic bags and bottles

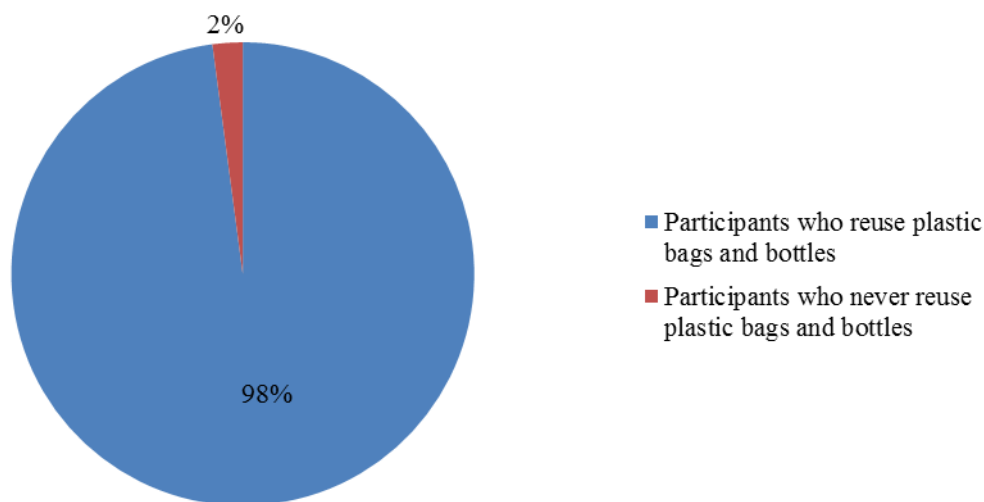


Figure 2, illustrates the number of households that practice garbage classifications and the number or participants who reuse plastic bags and bottles.

3. In Figure 2, the pie charts illustrate the number of households that practice garbage classification and the number of participants who reuse plastic bags and bottles.

On the whole, the number of participants who reuse plastic bags and bottles is larger than the number of households that practice garbage classification.

The number of households that practice garbage classification comprised nearly two-thirds of the total

survey participants in Bangkok and its peripherals (66%). In comparison, the number of households that never practice garbage classification comprised one-third of the total survey participants in Bangkok and its peripherals (34%).

97.9% of the survey participants reuse plastic bags and bottles while 2.1% never reuse plastic bags and bottles.

CONCLUSION

According to the results of the survey, it can be concluded that effective waste separation strongly depends on people, whether the public sector or the government sector. The population has a good baseline understanding of garbage classification, but in their real lives, they are not able to apply the knowledge that they have to sort the waste. In order to reduce the amount of garbage, it is better to suggest people to do the following.

1. There should be certain criteria for waste sorting, which is a general standard used throughout the country, for example, they should have clearly specified colors and purposes of the bin for citizens in order to understand the same ways as the others. It can help the garbage classification to be more efficiently.
2. There should be adopted policies about the process for all sectors. For instance, if any houses do not separate the rubbish in the municipality, the rubbish of that house will not be collected. In addition, the municipality should increase service fees for garbage classification.
3. Not only parents should cultivate children's awareness about waste disposal but also the teachers should teach them since they were adolescents.
4. Increasing efficiencies of a collection and disposal system is another contributing factor, such as taking the example from Laos which involves the government in this matter.
5. The public sectors should make media for learning about garbage classification covering all areas and promote them to the communities so that people can access easily.

DISCUSSION

According to the multiple-choices part of the questionnaire, most people (69.21%) understand about garbage classification by having the most understanding about waste disposal (90.39%) because people have already gotten familiar with eradicating or eliminating their own garbage in their daily lives. On the other hand, people have the least understanding of the environmental impact on disposal of illegal waste (18.50%) because people, nowadays, do not pay much attention to the environment, as seen at many tourist attractions places. In addition, it may result from public relations

are not thorough, which satisfy with Figure 1 that shows that Thailand people have a fair to a good level of understanding of garbage classification.

However, when we analyzed their behavior by reading through the respondents' answers to a subjective question in the questionnaire, we found that the respondents know how to eliminate food waste; in their real lives, they cannot apply their knowledge to separate their waste: First, they might not understand the categories of the waste they want to throw away. Second, sorted disposal containers for different types of waste are not enough. Third, the colors of each type of rubbish at different places describe different types of littering, which cause people to confuse with containers' symbols and colors.

Human traits are also important to the results of garbage classification. People commented that they do not know what kind of garbage should be left, think that the garbage classification process is complicated, a waste of time and unnecessary to their daily lives, and see previous people not separate waste cause them to imitate that bad behavior.

Moreover, some people don't understand why they have to separate the garbage because they think that once they separated, that separated garbage will still get combined together by the garbage trucks as the garbage transportation system has not had the waste separation system. Therefore, some people always separate wastes, but some do not. For instance, in the container for recyclable waste, just only one other types of wastes, such as food scraps, will spoil all those recyclable waste, which cannot be brought into the recycling process. Cleaning those recyclable wastes will be a waste of money and time, and not worth brought into the recycling process.

It has been debatable whether the cost of garbage classification is high or not; some people think it is not necessary, or requires cooperation from many sectors. If the public sectors or the government sectors do just only one group, the separation of waste will not be possible. In addition, there are still many other related factors, for example, people who do not know waste separation will not be able to separate the waste correctly as they have not received promotions and public relations from various organizations. Therefore, we should make media for

learning about garbage classification and promote them to the communities.

In accordance with Wang, Kong and Wang (2017), most of the respondents suggested for advocating more about garbage classification through advertisement and internet implement regulations about the process. Also, according to Khouangvichit et al. (2009), the respondents suggested that specific bins and plastic bags should be provided to support waste separation activities. Therefore, we can adapt this project to Thailand so that people can get educated about the process and can easily separate waste at anywhere and anytime.

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REFERENCES

1. Adhithya Prasanna, M., Vikash Kaushal, S., & Mahalakshmi, P. (2018). Survey on identification and classification of waste for efficient disposal and recycling. *International Journal of Engineering & Technology*, 7(2.8), 520-523. Retrieved from <https://www.sciencepubco.com/index.php/ijet/article/view/10513>
2. Arttachariya, P.C. (2012). Environmentalism and Green Purchasing Behavior: A Study on Graduate Students in Bangkok, Thailand. Retrieved from https://www.bu.ac.th/knowledgecenter/epaper/july_dec2012/pdf/ac01.pdf
3. Delgermaa, G., &Matsumoto, T. (2016). A Study of Waste Management of Households in Ulaanbaatar Based on Questionnaire Surveys. *International Journal of*

Environmental Science and Development, 7(5), 368-371. doi : 10.7763/IJESD.2016.V7.802

4. Fiorillo, D.M. (2013). Household waste recycling: National survey evidence from Italy. *Journal of environmental planning and management*, 56(8). doi : 10.1080/09640568.2012.709180
5. Kaewsuksai, P.P. (2006). The Study for The Approach of Solid Waste Management at Srinakharinwirot University, Ongkarak Campus. Master thesis, M.S. (Environmental Science). Retrieved from http://thesis.swu.ac.th/swuthesis/Env_Sci/Prapaporn_K.pdf
6. Khotpathoum, V.L. (2008). Solid Waste Management in Vientiane, Lao PDR. Partial fulfillment of the requirements for a Master Degree at the School of Geography ,and Environmental Studies, University of Tasmania. Retrieved from https://eprints.utas.edu.au/20705/1/whole_KhotpathoumVongvilay2009_thesis.pdf
7. Khouangvichit, S.P., Songkasiri, W.T., Stefan, C.L., Commins, T.R., & Touch. V.S. (2009). Survey on Participation of Nongtha Tai Villagers (Lao PDR) in Household Waste Management. *Asian Journal on Energy and Environment*, 10(02), 53-61. Retrieved from https://www.researchgate.net/publication/236646136_Survey_on_Participation_of_Nongtha_Tai_Villagers_Lao_PDR_in_Household_Waste_Management
8. Knickmeyer, D. (2018). Social Factors Influencing Household Waste Separation: Good practices to improve the recycling performance of urban areas. *Journal of Cleaner Production*. Retrieved from https://www.researchgate.net/publication/339784626_SOCIAL_FACTORS_INFLUENCING_HOUSEHOLD_WASTE_SEPARATION_Good_practices_to_improve_the_recycling_performance_of_urban_areas
9. Kojima, M.K. (2019). Municipal Solid Waste Management in Thai Local Governments: The State of the problem and prospects for regional waste management. IDE-JETRO.

- Retrieved from https://www.ide.go.jp/library/English/Publish/Download/Ec/pdf/201903_ch04.pdf
10. Leahy, S.P. (2018). The Growing Zero-Waste Community is Radically Slashing their waste output, while living more fulfilling lives. Retrieved from <https://www.nationalgeographic.com/news/2018/05/zero-waste-families-plastic-cultures>
 11. Lovai, N.R. (2006). Waste management survey report and waste management manual for Barakau village, Central province, Papua New Guinea. IWP-Pacific Technical report, 26. Retrieved from https://www.sprep.org/att/publication/000529_IWP_PTR26.pdf
 12. Pollution Control Department. (2018). Thailand's Pollution Situation in 2018. Retrieved from http://www.pcd.go.th/file/Thailand%20Pollution%20Report%202018_Thai.pdf
 13. Sukchuay, N.W. (2018). Waste Management Behavior of People in the Residential Area of Bandan Municipality in Bandan Subdistrict Municipality, Arunyaphathep District, Sakaeo Province. Faculty of political science and law, Burapha university. Retrieved from http://digital_collect.lib.buu.ac.th/dcms/files/56910345.pdf
 14. Suma, Y.N., Pasukphun, N.Y., Hongtong, A.T., Keawdunglek, V.V., Laor, P.D., & Apidechkul, T.C. (2019). Waste Composition Evaluation for Solid Waste Management Guideline in Highland Rural Tourist Area in Thailand. *Applied Environmental Research*, 41(2), 13-26. Retrieved from <http://www.tci-thaijo.org/index.php/aer>
 15. Tian, M., Pu, B., Chen, Y., & Zhu, Z. (2019). Consumer's Waste Classification Intention in China: An Extended Theory of Planned Behavior Model. *Sustainability*, 11, 6699. doi : 10.3390/su11246999
 16. Rujasiri, P.N. (2011). Garbage Management Behavior of Secondary Students in Traill International School. Master of Science (Environmental Management). Retrieved from <http://library1.nida.ac.th/termpaper6/sd/2555/19774.pdf>
 17. Vassanadumrongdee, S., & Kittipongvises, S. (2018). Factors influencing source separation intention and willingness to pay for improving waste management in Bangkok, Thailand. *Sustainable Environment Research*, 28(2), 90-99. doi : 10.1016/j.serj.2017.11.003
 18. Wang, D.-L., Kong, X.-M., & Wang, Y. (2017). Difficulty and Measure Analysis of City Garbage Classification. *DEStech Transactions on Engineering and Technology Research*, 48-53. doi : 10.12783/dtetr/amsm2017/1481