International Journal of Sustainable Development and Planning
Vol. 17, No. 6, October, 2022, pp. 1887-1893
Journal homepage: http://iieta.org/journals/ijsdp

An Exploration and Comparison of Attitudes Towards the Participatory Solid Waste Management for Sustainable Development of Communities in Khaoroopchang Municipality, Songkhla Province, Thailand

Wassawadee Kaewprapun, Ampai Muensit, Ekarach Maliwan, Patcharin Kangkha, Onuma Suphattanakul*

Faculty of Liberal Arts, Rajamangala University of Technology Srivijaya, Songkhla 90000, Thailand

Corresponding Author Email: onuma.s@rmutsv.ac.th

https://doi.org/10.18280/ijsdp.170623

Received: 8 August 2022
Accepted: 27 September 2022

Keywords:
attitudes, solid waste management, sustainable development, participatory model

ABSTRACT

The purpose of this study is to explore and compare the community members' attitudes towards community participation in solid waste management. The participants in this research were 400 people in 3 communities in Khaoroopchang Municipality. The research instrument was a set of 5-point rating scale questionnaires, enquiring about the community members' attitudes towards the community's solid waste management. The statistics used for data analysis were mean, standard deviation, t-test, analysis of variance **(**ANOVA**)**, and LSD pairwise comparison. The results revealed that the community members' attitudes towards the participatory solid waste management were at a high level. The results also showed that people who had different ages, education, occupations, residences, and family incomes had different attitudes towards waste management. This research outcome serves as a guideline for community leaders in changing the behavior of each household in the community in terms of waste sorting, career enhancement, and increasing income in the community in order to be good role models and local philosophers for sustainable development.

1. INTRODUCTION

Currently, it is found that all over the world, including Thailand, are facing problems regarding waste management, which is a national urgent agenda. Because of the rapid growth of urban communities, the trend is becoming increasingly violent. The spread of the coronavirus disease in 2019 has forced all sectors to adjust their lifestyles. Working is a new way of life (the New Normal) that people have to work from home, so online shopping is available. In addition, In the new normal situation, people have to stay at home, they tend to buy products online more often, especially delivery food to eat at home, resulting in the increasing plastic garbage from food containers. Thus, plastic waste increases from packaging from food delivery services. As a result, it was found that the amount of plastic waste was approximately 6,300 tons per day. It is higher production of garbage than the normal situation (an increase of approximately 15%).

The increasing tendency of the garbage problem has influenced the acceleration of policies from sectors to manage the garbage more efficiently. These policies were stated in the Thai national economic and social development plan Vol. 12 in strategic plan No. 4, which aims to implement the plan from 2018-2021, aiming to have sustainable development which is environmentally friendly. These policies were also addressed in the national 20-year strategic plan, aiming to transfer the long-term strategic plan into practice [1]. This resulted in the more active driving of garbage management from the relevant organizations. There have been campaigns and activities organized such as reducing one-time-use plastic containers, aiming to reduce the garbage from the production procedure [1].

The Khaoroopchang Municipality is one of the communities that is currently facing the garbage problem as the community is newly established and the population tends to grow quickly, resulting in a greater amount of household garbage with an increasing average amount of garbage of 40 tons per day, coming from main sources such as food containers, garden waste, fat waste, and infectious waste. The municipality has managed this amount of garbage in some ways, e.g. using it as a landfill in an area of the community for 30 years (the village called "Bo-it" in Koh Taew, Muang, Songkhla), and the campaign for the community members to sort out the household garbage in bags to be collected regularly by the municipality (Interview data from Mr. Thanin Oui-Yawat, head of public health administration, on 19 May 2020). However, the people in the community showed how important it was to raise people's awareness of how to better handle the waste that the community produced. This would help them understand and have a clear conscience about how to handle community waste properly. Effective waste management can result in a better quality of life for the people themselves, their families, and the community. These observations led the researchers to conduct the study on the attitudes of the community members towards the participatory management of community solid waste in the Khaoroopchang Municipality in Songkhla, aiming to explore and compare the people's attitudes towards the communities' participatory solid waste management.

2. RESEARCH OBJECTIVE

This research aimed at exploring and comparing attitudes of members of communities towards the participatory management of the community solid waste in the Khaoroopchang Municipality in Songkhla Province.

The research question in this study was whether people of different age ranges, education backgrounds, occupations, household incomes, and accommodation types show different attitudes towards the participatory management of community solid waste. If yes, how were they different?

3. RESEARCH SCOPE

3.1 Population and sample

The population in this study was 7,702 people in three communities in Khaoroopchang Municipality: Bang Dan community, Ban Khao Kaew community, and Ban Ke Ha community. These three communities were included in this study mainly because of certain characteristics of the communities. According to preliminary observations and interviews with community members, all three communities have the capacity in a variety of ways. Thus, the three communities were chosen, and their members were represented by all.

The sample in this study included 400 people in those three communities in the Khaoroopchang Municipality who were selected through Simple Random Sampling and the size of the sample was suggested by the Taro Yamane formula [2].

4. RESEARCH METHODOLOGY

This study focused on the attitudes towards participatory waste management in the communities. It was designed as a quantitative method via a questionnaire. It is appropriate to seek the details of data collection and analysis. It gives tools for evaluating ideas, planning research, and changing things about population and sampling.

4.1 Variables

The variables of this study were mentioned as follows:

The independent variables examined in this study were gender, age range, occupation, income, education, and types of accommodation.

The dependent variables examined in this study were the attitudes towards the participatory waste management in the communities.

4.2 Research instruments

The instrument used for data collection in this study was a set of questionnaires aiming to explore the attitudes of groups of participants and then compare attitudes across groups of members of communities in the Khaoroopchang Municipality in 2020. A 5-item Likert scale was used to evaluate each of these questions (1 = severely disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = highly agree).

According to Wanichbuncha [3], the criteria for translation of the mean scores are as follows.

4.51-5.00	Very high
3.51-4.50	High
2.51-3.50	Moderate
1.51-2.50	Less
0.00-1.50	Minimal

For validity, the comments were given by the experts and the draft of the questionnaire was improved accordingly. The obtained IOC was 0.763-1.000, and the Cronbach's Alpha coefficient was 0.755, which signifies that the instrument has a good level of reliability [4].

4.3 Data collection

This study was survey research. To collect the data, the questionnaire was distributed to the members of three communities in the Khaoroopchang Municipality. The data collection procedures are as follows.

4.4 Pilot study

The pilot study was conducted to collect data from 30 participants to evaluate the validity and reliability of the questionnaire before employment in the main study.

4.5 Main study

The quantitative data for the main study were collected from 400 community members using questionnaires. The community leaders were contacted and were willing to help out with the questionnaire distribution to each community member. The returned questionnaires were examined to determine whether the relevant responses were completed appropriately by the participants. After the checking procedure was complete, all the participants' responses were collected for further analysis. The distribution ratio of the questionnaire in the three communities was shown in Table 1.

Table 1. Distribution ratio of the questionnaire

Community	Number	Percentage
Bang Dan community	168	42
Ban Khao Kaew community	156	39
Ban Ke Ha community	76	19
total	**400**	**100**

4.6 Data analysis statistics

Descriptive Statistics and Inferential Statistics were applied in the data analysis.

1. Descriptive statistics were adopted to analyze demographic data and the participants' attitudes towards the participatory waste management, which were frequency, percentage, average, and standard deviation.

2. Inferential statistics such as t-test, One-Way ANOVA, and the pairwise comparison of LSD were used to compare the attitudes towards participatory waste management between groups of people in three communities.

5. FINDINGS

5.1 Respondents' data

The overall personal information of the participants was as follows.

Gender: The majority of respondents were female (65.3%), while 34.7% were male.

Age: Most of the respondents were older than 60 years (35.3%), followed by the age between 41-50 years old (15.3%), and 51-60 years old (17.8%).

Family size: Most of the respondents lived in families of 3–4 members (49.0%), followed by 1-2 members (23.8%) and 5-6 members (23.3%).

Education: Most of them had diplomas (68.75%), followed by bachelor's degrees (27.3%), and postgraduate (3.95%).

Occupation: The majority of respondents were in other occupations (26%), followed by trade (23.8%), and labor (19.5%)

Household Income: A third of the participants' income ranges from 5,000-10,000 Baht per month (33.3%), followed by 10,001-15,000 Baht (25%), and less than 5,000 Baht (17.8%).

Accommodation types: It was found that 50% of the participants lived in a house with a surrounding area, followed by a row house/townhouse (38.3%), and a rental room/apartment (7%).

5.2 Attitudes towards the participatory waste management

The results in Table 2 revealed that the participants' overall attitudes towards the participatory waste management were at a high level (Mean = 4.14). For each item, it found that "It is everyone's responsibility to deal with the community waste problem" was emphasized in the highest score (Mean = 4.51), followed by "It is good to reduce garbage by using natural materials instead of plastics and using a cloth bag to market instead of a plastic bag" (Mean=4.14), and "It's good to use the waste of plastics, paper, metal, and grass in new production processes" (Mean=4.10). Thus, attitudes towards the participatory waste management occurred at a high level for all items.

Attitudes of different groups of community members in the Khaoroopchang municipality towards the participatory waste management of the communities were compared and it was found that participants of different genders did not show any differences in attitudes towards participatory waste management. It implies that people are constantly gaining knowledge of waste management. As a result, both female and male participants had good attitudes towards waste management. The results are presented in Table 3.

The comparison of attitudes towards the participatory waste management of the community members showed that the community members of different age ranges, education backgrounds, occupations, household incomes, and accommodation types showed different attitudes towards the participatory waste management at the significant levels of .01, .001, .001, .001 and .05, respectively as shown in Table 4.

Table 2. Attitudes towards the participatory waste management (n=400)

Attitudes towards the participatory waste management	Mean	S.D.	Levels
1. Sorting solid waste can help reduce the final garbage effectively.	4.06	.82	High
2. It is good to reduce garbage by using natural materials instead of plastics and using a cloth bag to market instead of a plastic bag.	4.14	.81	High
3. You think that reducing consumption, buying only necessary items, and choosing last-long use items can reduce the garbage and it's a good act.	4.05	.81	High
4. You think that it's most important to start reducing garbage by oneself, followed by maximally recycling the garbage, and disposing of what is left.	4.08	.86	High
5. You think that it's good to reuse things such as plastic bags, give away the used clothes, use the used clothes for other purposes such as a dish towel and a mop, use two-sided papers, and create new things from the waste materials.	4.06	.91	High
6. It's good to use the waste of plastics, paper, metal, and grass in new production processes.	4.10	.85	High
7. It is everyone's responsibility to deal with the community waste problem.	4.51*	.71	Very High
Total	**4.14**	**.62**	**High**

Source: Respondent data processed, 2020

Table 3. Attitudes of the participants of different genders

	Gender	N	Mean	S.D.	t
Attitudes towards participatory waste management	Male	139	3.9998	.54251	-1.0668
	Female	261	4.0612	.55178	

Source: Respondent data processed, 2020

Table 4. Attitudes of the community members of different age ranges, educational backgrounds, occupations, household incomes, and accommodation types

Personal factors	Source of variance	SS	df	MS	F	Sig.
Age	Between groups	6.368	5	1.274	4.411	.001
	Within group	113.751	394	.289		
Education Backgrounds	Between groups	9.216	5	1.843	6.548	.000
	Within group	110.903	394	.281		
Occupations	Between groups	9.216	5	1.843	6.548	.000
	Within group	110.903	394	.281		
Household incomes	Between groups	6.115	4	1.529	5.296	.000
	Within group	114.004	395	.289		
Accommodation Types	Between groups	3.850	4	.963	3.270	.012
	Within group	116.268	395	.294		

$p \leq 0.05$ **Source:** Respondent data processed, 2020

The comparison of attitudes of community members across characteristics was made, and the result of the LSD Post Hoc Test showed that the community members who had different age ranges, education backgrounds, occupations, household incomes, and lived in different accommodation types showed different attitudes towards the participatory waste management at the significant levels of .01, .001, .001, .001 and .05, respectively.

The people of different age ranges had significantly different attitudes towards the participatory waste management of the community ($p < 0.01$). The community members less than 20 years old showed different attitudes towards the participatory waste management from those who were 51-60 years old and those who were above 60 years old. The community members who were 21-30 years old held different attitudes from those who were 31-40 years old, 51-60 years old, and above 60 years old. The community members who were 41-50 years old had different attitudes from those who were 51-60 years old and above 60 years old. It implied that age ranges had an effect on t attitudes towards the participatory waste management of the community.

The analysis of the community members' education showed that there were significantly different attitudes towards the participatory waste management of the community among the community members with different levels of education ($p < 0.01$). The primary school grade 4 graduates, the secondary school grade 3 finishers, the secondary school grade 6 finishers, and vocational college finishers had different attitudes from those who were graduates of Bachelor's degrees. It implies that education influences attitudes towards the participatory waste management of the community.

The community members with different occupations also showed significantly different attitudes towards the participatory waste management in the community ($p < 0.01$). The analysis showed that farmers, sellers, and laborers had different attitudes from those who worked in government and semi-government sections. It implies that occupations influence attitudes towards the participatory waste management of the community.

The community members receiving different household incomes showed significantly different attitudes towards the participatory waste management of the community ($p < 0.01$). The members with a household income of fewer than 5,000 Baht (Thai currency) had different attitudes from those who earned an income of 20,001 Bath. Those who earned 5,001-10,000 Baht showed different attitudes from those with household incomes of 10,001-15,000 Baht, 15,001-20,000 Baht, and higher than 20,001 Baht. It implies that household incomes influence attitudes towards the participatory waste management of the community.

These findings were in line with those of Namjaitrong [5] who found from the LSD pair-comparison that people in a village (Kra Tum Lom) in Sam Phran district, in Nakhon Pathom Province who had different age ranges, education backgrounds, occupations, and monthly income, different culture, experience, attitudes, values, and goals showed different behaviors in community waste management at the significant level of .05. The findings were also consistent with the analysis of Nomnamsap [6] in which the people's opinions about the efficiency of community waste management in Nakhon Pathom Municipality in Nakhon Pathom Province were examined. It was found that people of different age ranges, education levels, occupations, and overall income showed different opinions towards the efficiency of community waste management at a significant level of 0.05.

Thus, the findings concluded that age ranges, education backgrounds, occupations, and income have effects on different attitudes towards the participatory waste management in the community.

6. DISCUSSION

It was found in this study that senior citizens and people after retirement were the interesting groups of people the community should pay attention to as they were the biggest group of participants in the communities. This conclusion is in accordance with that of Saengthong [7], who advocates that Thai society is now entering a situation where there is a gradually higher proportion of the aging population. In the next 10-20 years, it is expected that Thai society will become a complete aging society. Generally, people may hold the opinion that this group of people is dependent and their health is deteriorating. In fact, they are a group of people who are capable of many things. It is important to see values in the senior citizen as they have a contribution to society and have valuable life experiences; they have been exposed to all experiences for more than half of their lives, completed works, have gained knowledge of history, traditions, culture, religious activities, and ceremonies. They can be part of the society as "local wisdom gurus". Moreover, having senior citizens participate in social activities can certainly provide benefits to their health preventing them from depression.

It was found in this study that the community members' attitudes towards participatory waste management were positively high. This is possible because they viewed that it is everyone's responsibility to deal with community waste. It is suggested from the findings that the starting point is to create positive attitudes of the community members to successfully tackle the issue of community waste management. As attitudes both positive and negative can be changeable accordingly to gaining experiences, it is important to cultivate positive attitudes towards the participatory waste management continuously for the community members. The cultivation can start from the family which is the smallest unit in the society and expand to work connectively with larger organizations in governmental and private sectors, such as educational institutes, the municipality, temples, community network partners, and community leaders, who come to take part collaboratively in creating the positive attitudes towards the participatory waste management. It is also important that the members of the three communities work together. The communities which have different strengths and weaknesses can collaborate and make positive impacts on community waste management.

The collaborative participation between the community organizations, such as the establishment of a memorandum of understanding (MOU) between the educational institutes and the Khaoroopchang Municipality, can contribute to the expansion and application of the members' existing knowledge. The communities should operate the community waste management using the 5Rs of the civil state, including reducing, reusing, repairing, recycling, and rejecting things. Experts should be invited to deliver the knowledge of the advantages and disadvantages of waste management, creating people's awareness of problems that can cause by waste and igniting their motivation to protect the environment and their communities through activities, such as a waste bank project,

sorting waste, and creating added values to waste materials. The community leaders should eagerly drive the activities in the communities using volunteer work from the members; the leaders can be role models for them in doing social activities such as the establishment of a waste bank, offering to recycle waste to temples, and making bio-compost for use in the communities.

The building of learning resources in the communities is also of great benefit, such as a learning resource for sandalwood flower making from community waste, and a learning resource for artificial flowers from seabass scales. The communities can expand their body of knowledge on how to manage community waste through collaboration with organizations (i.e. the academic service projects for society from education institutes) and the organization of knowledge management events, such as the knowledge management in making appliances and decorations from the community waste, and the making of environmentally friendly biomass stove. The environment-saving innovations for society are created in the community. For instance, people in villages (e.g. Baan Bang Dan, Baan Khao Kaew, and Baan Karn Ke Ha) created a tool for collecting and releasing wet waste into the ground from a household gallon water bottle. This innovation allows them to collect organic waste for composition and release the compost directly to the farming areas, which can serve as a bio-fertilizer for their plants.

These findings are consistent with those of Treethanya [8] who argued that the people of the community showed a positively high level of attitudes towards participatory waste management in a community in Nakhon Chai Si District, Nakhon Pathom Province, Thailand. It was suggested that the best way to establish positive attitudes towards the participatory waste management is to start firstly within the family, followed by the notion that appropriate waste management can contribute to addressing global warming issues. These establishments of attitudes were supported by Allport's theory of attitudes, which defines attitude as the mental status of a person resulting from his/her experiences that are crucial to determining the person's reactions towards other people, things, and situations. Both the person's positive and negative experiences can influence the ways the person feels about matters. The people's positive attitudes towards waste management can be influenced by the actions of the people that they admired people as regards addressing waste management concerns. Also, their behaviors concerning waste management can be shaped by the knowledge of the advantages of effective waste management and vice versa.

To work effectively with different sectors in the community, it is necessary for every member of the community to work collaboratively, especially during the COVID-19 pandemic. The Internet and social media appear to be crucial communication channels; community members can use them to connect with organizations and reach a wide range of useful resources for community waste management. Also, the Khaoroopchang Municipality has supported community waste management including the continuous provisions of training in waste management.

The people of different age ranges, education, career, and household income had different attitudes towards waste management at the significant level of .01. On the other hand, the people who live in different types of accommodation showed different attitudes at the significant level of .05. These can be explained by the fact that age, education, occupation, and income are the fundamental aspects intertwiningly shaping people's behaviors and awareness of their roles, duties, and responsibilities, which can influence their decision in participating in community waste management. Below are the following findings as regards the above statements.

The most common age range of the people in the community was higher than 60 years old. They retired from work but still saw values in themselves; they were eager to participate in activities including taking part in group exercises in the communities such as Norabics (the combination of "aerobics" using Norah dance positions) and joining a group working as community health volunteers to help other people in the communities.

The biggest proportion of the people in the communities were employees in companies or factories, followed by selling as a career in the communities and the inherited mixed crop-livestock farming as their extra job. Their way of life can be described as a semi-urban-sufficient style.

A number of people in the communities finished vocational certificates – higher vocational diplomas. They also had a good background in solid waste management as they had attended relevant training. They were observed to participate well in organized activities. A small group of people who obtained bachelor's degrees and master's degrees worked in the government sector and educational institutes.

The average household income of the communities was 5,000-10,000 Baht (the Thai currency); the main income was from their usual jobs in companies or factories, and selling. Some people had extra farming jobs on their own lands. They seem to have a sufficient way of life, so they could take part in activities of the communities.

Their accommodation can be described as a house with a surrounding area. This allows them to have space to tackle waste from their houses. The communities are located in a spacious sub- urban area which makes it possible to place enough bins for people in the communities.

These findings were consistent with those of Uparasit et al. [9] who investigated people's household waste management behavior in San Pong Municipality, Maerim District in Chiang Mai Province. They found that people of different gender, age ranges, monthly income, and ability to receive information had different attitudes towards waste management at the significance level of .05. The findings were also in line with the analysis of Piyasakulkiat [10] wherein people's gender, age range, length of residence in the community, occupation, the number of the family members, and types of accommodation affected the people's participation in the community waste management at the significant level of .05. On the contrary, the findings of Rompaen et al. [11] were different as they found that people of different age ranges, education background, occupations, and family size showed no significant difference in attitudes towards the waste management in Nakhon Chang Mai Municipality, Chiang Mai Province.

The people's different attitudes in this study can be explained by the fact that their different ages, education, and occupations allow them to receive different kinds of information, the body of knowledge, training, and meetings. These can lead them to interact and exchange ideas with different groups of people in situations, resulting in their different attitudes towards solid waste management.

Based on the results of this study, people who lived in different types of accommodation were found to hold significantly different attitudes towards solid waste management at a level of .05. This finding did not correspond

to that of Arponpong [12] wherein the people's residential areas did not significantly affect their attitudes towards the community waste management in Nang Rong Municipality in Buriram Province. Likewise, the finding of the present study contrasted with that of Uparasit et al. [9] who revealed that there was no difference in people's waste management behavior among people who lived in different accommodation types in San Pong Municipality in Chiang Mai Province.

Different attitudes of people in different types of accommodation were supported by the possibility that different levels of attention were given to waste management by the people who lived in types of accommodation. The urban area of the communities which is more populated may not as effectively handle the waste management as the urban area may produce more waste from more people and there may not be enough space in the urban area for appropriate allocation of bins for different kinds of waste.

The analysis showed that the communities in this study have the potential and distinctive strength in collaborative participation. One factor that drives the collaboration in the communities is the active community leaders who work as role models for the community members in completing useful activities, including the establishment of the community waste bank offering valuable waste to the temples in a Buddhist merit-making ceremony, and making bio-fertilizer. Learning centers were also established to disseminate information about creating values from community waste, such as making sandalwood flowers from waste materials and artificial flowers from sea bass scales. Connection with outside organizations was established and guest speakers were sometimes invited to deliver new knowledge and work collaboratively with the community members. Young generations' environmental awareness was created through integration into their lessons in the classroom. The observations in this study were consistent with those of Sampatpong et al. [13] who stated that potent leadership is a crucial factor contributing to the collaborative working with the communities and integration of their learned experience in solving problems for the sustainable development of the communities.

7. RECOMMENDATIONS

7.1 Recommendations relating to participatory solid waste management in communities

The following guidelines can be suggested for appropriate waste management in communities in Songkhla Province. The waste materials can be effectively handled through activities including the provision of knowledge on the appropriate waste management for the community members, creating understanding about the effects of garbage problem, and encouraging the participation of the community members through competitions or forms of reinforcement to the effective practice of community waste management. It is wise to find appropriate ways to prevent unnecessary garbage-related problems resulting from the behaviors of the community behavior. For example, people should attend to and act to stop the possibility of added pollution problems coming from the use of machines to destroy the garbage. Support should be given to the process of making values for the waste materials, so people can make use of the waste in multiple ways and make money out of it, such as recycling and saving them in the waste bank.

7.2 Recommendations for future research

It can be useful for future research to encourage the communities to organize training or knowledge management events by the people in the communities to exchange ideas and ways of practice with other communities as each community has its own strength in waste management. Assistance from educational institutes can be helpful in the initial stages.

Future research can help organize events and activities to create awareness among the younger generation to protect the environment in the communities. The event and activities should be enhanced among them and continuously followed up in steps. For example, the awareness can be brought to their classroom and integrated with the lessons in their classes to help create long-term environmental-saving awareness.

ACKNOWLEDGEMENT

This article is part of the research report on the attitudes towards community participatory waste management for sustainable development: the model community of Kharoopchang Municipality, Songkhla Province. This study was granted research funding from Thailand Science, Research and Innovation (TSRI 2020). The authors are also thankful for the continuous help from the faculty of Liberal Arts, Rajamangala University of Technology Srivijaya, and Khaoroopchang Municipality, Songkhla Province. The authors' special thanks go to the leaders and the community members of Baan Bang Dan, Baan Khao Kaew, and Baan Karn Ke Ha in Khaoroopchang Municipality for their participation in this research and permission for data collection.

REFERENCES

[1] Office of the National Economic and Social Development Board. (2017). The Twelfth National Economic and Social Development Plan (2017-2021). Retrieved from https://www.nesdc.go.th/ewt_news.php?nid=6420&filename=develop_issue.

[2] Yamane, T. (1970). Elementary Sampling Theory. Prentice Hall.

[3] Wanichbuncha, K. (2009). Statistics for research. Bangkok: Chulalongkorn University.

[4] Kaiwan, Y. (2000). Applied statistics for teachers. Thai Watana Panich [in Thai].

[5] Namjaitrong, N., Sungrugsa, N. (2019). Solid waste management behavior of communities in Krathumlom Subdistrict, Sam Phran District, Nakhon Pathom Province. NRRU Community Research Journal, 13(2): 179-190. https://doi.org/10.14456/10.14456/nrru-rdi.2019.35

[6] Nomnamsap, D. (2017). The guidelines for the management of solid waste, which case of Nakhon Pathom Municipality. Journal of Management Science, Nakhon Pathom Rajabhat University, 4(2): 151-151. https://doi.org/10.14456/jmsnpru.2017.24

[7] Saengthong, J. (2017). The (complete) aging society: The quality aging population. Rusamilae Journal, 38(1): 6-28. [in Thai].

https://so05.tcithaijo.org/index.php/rusamelae/article/view/91162.

[8] Treethanya, P. (2019). Participation in solid waste management of Ngangrai Community, Nakhon Chaisi District, Nakhon Patham Province. Saeng Isan, 16(2): 505-519. [in Thai] https://so01.tci-thaijo.org/index.php/jsi/article/view/2.16325.

[9] Uparasit, K., Na Chiangmai, N., Chawapong, W. (2015). Household behavior on solid waste management in Sunpong Municipality, Maerim District, Chiang Mai province. Journal of Graduate Research, 6(2): 163-171. https://so02.tci-thaijo.org/index.php/banditvijai/article/view/96559.

[10] Piyasakulkiat, O., Khiewphakdi, S., Yannasaro, S., Pornsiri Wattanasin, K., Priyakorn, P. (2018). The role of local wisdom scholars in community self-management. Kasem Bundit Journal, 19: 218-228. [in Thai].

[11] Rompaen, S., Terapanyo, N., Meenonthonmahasan, P., Kamdee, P., Saowaphon, B. (2010). People's attitude towards waste management in Nakhon Chiang Mai Municipality, Mueang Chiang Mai District, Chiang Mai Province, Phimoldhamma. Research Institute Journal, 5(1): 190-201. [in Thai].

[12] Arponpong, T. (2016). Factors influencing the municipality solid waste management of people in Nangrong municipality, Buriram Province (Doctoral dissertation). School of Engineering, Suranaree University of Technology.

[13] Sampatpong, W., Chanyeam, T., Tiwaratreewit, T., Putpan, P. (2019). The guideline for integrated community waste management by people's participation of Moo 12 of Khlong Ha Sub-District, Khlong Luang District, Pathum Thani Province. Journal of Management Science Review, 21(2): 23-30. [in Thai]. https://so03.tcithaijo.org/index.php/msaru/article/view/248239.