

The Municipal Solid Waste Management of Thai Phuen Ethnic Group In ThaYang District, Phetchaburi Province

Anousone Norlorkham^a, Noppawan Semvimol^{a,b*}, Onanong Phewnil^{a,b}, Nirut Uppanunt^b,
Chulabut Chantheson^b, Siwanat Thaipakdee^b and Saowalak Boonmang^b

^a *Department of Environmental Science, Faculty of Environment, Kasetsart University, Bangkok, 10900*

^b *The King's Royally Initiated Laem Phak Bia Environmental Research and Development Project, Chaipattana Foundation, Thailand*

Correspondence to Miss. Noppawan Semvimol

The King's Royally Initiated Laem Phak Bia Environmental Research and Development Project,
Bangkok, 10900 Thailand Tel +6686-345-7905 E-mail: noppawan.sem@ku.th

Abstract

This study was to study solid waste management of Thai Phuan ethnic groups in Map Pla Khao Subdistrict, Tha Yang District, Phetchaburi Province. The objectives were to know the exiting of solid waste management and to find more suitable and effective waste management methods to be adapted to other ethnicities properly. The results revealed that the solid waste management existing in the Map Pla Khao areas was divided into 3 levels: the sub-district level, community level, and household level. At the subdistrict level, the subdistrict administrative organization is responsible for collecting, transporting, and disposing by private companies. From the data collection, it was found that in 2021, solid waste occurred 3 tons/day, with Waste management at the household was also not well managed. For example, infectious waste was also disposed of as general waste, waste utilization was not found. Most of the waste sources come from markets, school, restaurants, and temples. The types of waste generated are 64% organic waste, 3% recycled waste, 30% general waste, and 3% hazardous waste. It was found that the proportion of recycled waste was low because most people in the community collected recycled waste for sale or donation. Money from selling recycled waste is used to help poor families and elderly people in the community. The waste from tree trimming will be burned in the open air or buried in paddy fields. From the focus group with community leaders, cultural leaders found that the residents of the community were relatives. The main occupation was agriculture. There are groups to do activities on important days and also preserve the culture that inherits ethnicity. As a result, it was discovered that the suitable waste management strategy is to create awareness and develop an understanding of waste management by merging academic information into local people's daily lives in order to foster practical cooperation. People, community leaders, cultural leaders, and local government agencies should all work together to create the driving force. This will improve the efficiency of solid waste management and serve as a model for other ethnic groups. However, before adopting the approach, it is necessary to first understand the context of the community, as each area differs in terms of both the environment and people's attitudes and understanding of waste management and lifestyle.

Keywords: Solid Waste Management, Community Waste, Thai Phuen Ethnic Group, Driving Force

1. Introduction

Solid waste is a problem that affects other country around the world, including Thailand, which faces problems with solid waste management due to an increase in population, economic expansion, the expansion of communities and changing lifestyle behaviors in the urban society. Solid waste source come from communities, industry, and agriculture. When not properly managed, it becomes a problem of environmental pollution such as solid waste problems, air pollution problems, and accumulation in the soil which affect the health and quality of community life (Eakkarat and Nittaya, 2018). The amount of municipal solid waste occurs significantly differently due to a lack of knowledge and understanding about waste management among residents in that community

The amount of waste generated varies with the population number. In addition, village/ community and social characteristics such as rural communities, urban communities, and semi-rural communities also affect the amount of waste, which tends to be more severe and expand into rural communities (Chaiwichit, 2016) Waste management operations that mainly focus on management at the destination. An inefficient management system for sorting, collection, transport and disposal, that including the waste recycling. The appropriate disposal sites were still limited and insufficient space. This results in the amount of residual waste that is not properly disposal, causing the amount of residual waste to continuously increase.

Phetchaburi Province encountered a problem with the waste management operation. In Phetchaburi Province, it is an area with a diversity of races and races living together, each of which is a distinctive feature of the province that has been inherited since ancient times, comprising Thai Song Dam, Thai Phuan, and Karen people. Yong is the minority who lives in Phetchaburi province the most, with each minority having a different culture and way of life according to each tribe. Especially in the area of Map Pla Khao Subdistrict, Tha Yang District, most of the people living in the area are Thai Phuan people living in most areas in Phetchaburi Province. (Phetchaburi Province, 2020) to take action in their own households by sorting out the recycled waste for sale or separating organic waste for uses such as feeding animals, composting, and disposing of the remaining solid waste by burning or disposing of in public places which was not technically for solid waste disposal

In Phetchaburi Province, it is an area with a diversity of ethnic group which living together, each of which is a distinctive feature of the province that has been inherited since ancient times such as Thai Song Dam, Thai Phuan, and Karen people which are the most ethnic group in Phetchaburi province. Each group having a different culture and lifestyle according to each nature, especially in the Map Pla Khao subdistrict, Tha Yang district, most of the people living in the area are Thai Phuan (Phetchaburi Province, 2020).

Therefore, the model of community waste management of the Thai Phuan ethnic group in the area of Map Pla Khao subdistrict, Tha Yang district, Phetchaburi province was studied. In order to know the existing of solid waste management and to finding a suitable solid waste management technic for the Thai Phuan ethnic group and other areas. The results obtained from this study can also be used to plan waste management in Phetchaburi Province in the future.

2. Materials and methods

Collect data via interview form to collect information on local waste management from the Subdistrict Administrative Organization. Visit the site for in-depth interviews involving community leaders on household waste management in Map Pla Khao subdistrict, Tha Yang district, Phetchaburi province and utilize the data to conduct a content analysis and provide the descriptive content analysis results.

3. Results and discussion

3.1 The study area

Map Pla Khao sub-district is located in Tha Yang district, Phetchaburi province, has an approximately area about 16.44 square kilometers or 10,277 rai with a population of 4,072 people, total of 1,215 households. Most occupation of the population is agriculture, farmer, gardening, general labor, and employment by private sector. The most land use area was an agricultural community.

3.2 The amount of waste in the study area

The solid waste in the Map Pla Khao subdistrict, most of the waste generated at the source comes from households, markets, educational institutions, restaurants, and religious establishments. The amount of waste generated in these areas is about 3000 kg/day, consisting of 64% organic waste, 3% recycled waste, 30% general waste and 3% of hazardous waste. The organic waste was the most common waste, next was general, recycled, and hazardous waste respectively.

The activity that generates the most organic waste is cooking, eating food and followed by general waste from daily use (Kanokrat and Laddawan,2019). Paiboon (2012) found that the most common organic wastes were food wastes, rice, snack. The general waste found plastic bags and the most recyclable waste was plastic bottles, glass bottles, cartons boxes, paper. The most common hazardous waste was toilet waste and sanitary cleaner packaging. It was found that each year the amount of waste collected for disposal was less than the amount of waste that occurs each day as follows:



Figure 1: The amount of solid waste generated and disposal at landfill in each year at Map Pla Khao subdistrict

Source: Pollution Control Department (2019) and Map Pla Khao Subdistrict Administrative Organization (2021)

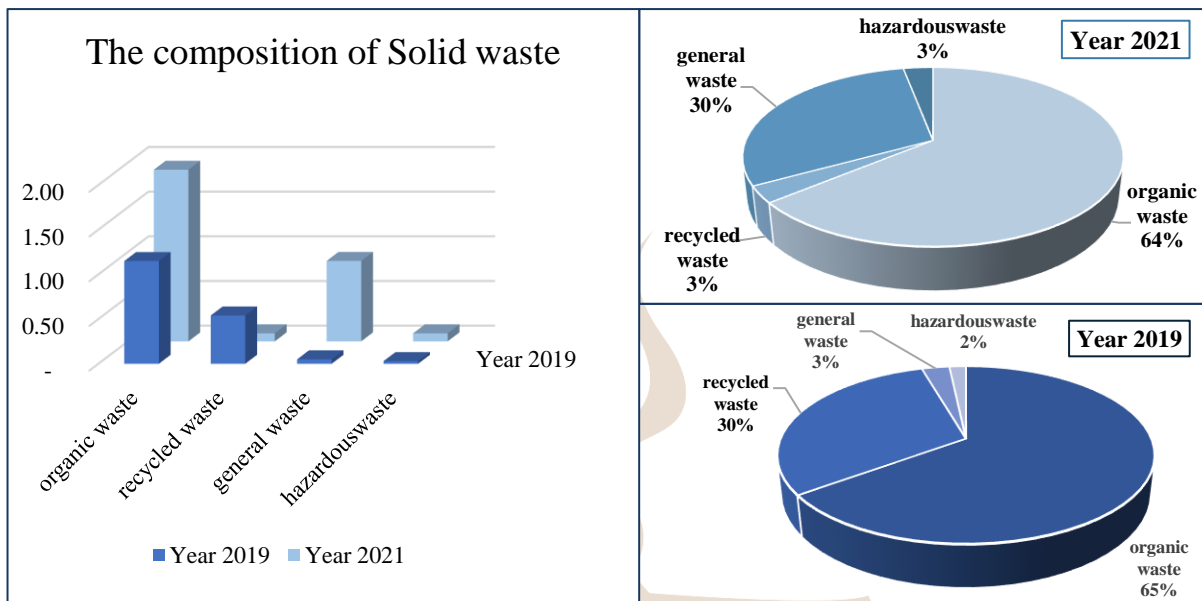


Figure 2: The composition of solid waste generated during 2019 - 2021 in Map Pla Khao subdistrict

Source: Map Pla Khao Subdistrict Administrative Organization (2021)

In 2021, the amount of solid waste generated was about 3 tons/day and the SAO can collect and transport to disposal at landfill area. The amount was less than in the past, probably because of the COVID19 situation with the lockdown or limit activities. The main source of solid waste such as household, schools, markets, restaurants and religious places was a temporary closure during this period. The composition of solid waste generated are shown as follows:

Organic waste was discovered to be the most typically created waste in the Map Pla Khao area in 2019, followed by the recycle waste. Organic waste had doubled in 2021, followed by general waste and hazardous waste. Despite the fact that the amount of recycled waste has reduced, hazardous waste has increased due to the COVID 19 pandemic situation. According to the Map Pla Khao Subdistrict Administrative Organization, the average waste generation rate was 0.76 kg/person/day in 2021, based on the forecasted amount of waste of 3 tons/day. The amount of waste generated on the floors of the Thai Phuan ethnic group was found to be lower than average of Thailand rate.

3.3 Solid waste management guidelines for Thai Phuan ethnic group

1) Household solid waste management level

Most Thai Phuan families have separated recycled waste such as plastic bottles and glass bottles for sale or collect for donate to the Map Pla Khao Subdistrict Administrative Organization. SAO collected the recycle waste received from donations for sale, then use this money to help poor families or the elderly in the community. The waste that cannot be donated or sell will be disposed of in the bin and some will burn in the open air such as branches, old bed, etc. Some waste manages by buried in their own rice fields because some households manage their own waste. In the past, it was found that the waste management in the area has not encountered any problems that affect the community.

Waste management in the Thai Phuan household has been co-operated by participating in waste management by collecting waste before disposing of at the bin. It was found that the amount of waste generated daily can be disposed all or transform to landfill. The creating

activities or campaigns to raise awareness and understanding about solid waste management are still not many. Most people are encouraged to participate in environmental conservation activities by planting trees and improving the landscape to make people know how to protect natural resources and environment (Mab Pla Khao Subdistrict Administrative Organization, 2021).

However, if the area has good practice in solid waste management by reduce community solid waste from the source as household. It will be able to reduce waste problem in the community by practiced with the 3 R principles, which are the basic principles of waste management and waste reduction. Awareness is raised and make understanding of the people in the community. SAO should provide opportunities for people in the community to participate in decision-making, help to develop and solve problems, including having good leaders and good teams to drive efficient solid waste management operations (Wongwat, 2020). It was found that behavior control by community leaders is the most important variable for induce ethnics group in community have a greater positive change in recycling behavior (Lakhan and Calvin, 2014) when compared to promoting and training environmental education by SAO or another partner.

2) Community solid waste management level

Solid waste Management in Map Pla Khao Subdistrict Community, SAO will set up 1 bin/household to collect garbage each day. It was found that mostly bins were not separating waste at the home, such as recyclable waste and infectious waste. In this season was the period of the outbreak of Covid 19 therefore causing more infectious waste than in the past. The organic waste was sorted and used as food for animals such as chickens, pigs, dogs and cats. In the areas of Map Pla Khao community 1-4, there will be a cycle for collecting and transporting garbage 1 time/week. The community leaders and other organizations have disseminated basic knowledge of waste separation to the villagers via the village broadcasting tower.

3) Sub-district solid waste management level

The SAO has responsible for waste management in collecting, transporting, and disposing at private disposal sites. SAO has distributed bins to every household. The transport capacity was around 3 tons/day, waste transport cycles to the disposal site 14 times/week. By using a rear-loading garbage truck that can contain 5 cubic meters, the usage rate is 2 trips/day. SAO services for solid waste collection to 1,213 households. Waste disposal operations will be hired by the private sector for disposal. At a sanitary landfill site, plastic waste was sorted for sale and fuel production by sorting in the final stage before being disposed of at the landfill. The waste disposal was located in Khao Yai Subdistrict, Cha-am District, Phetchaburi Province, with an area of 44 rai, started used in 2017.

4. Conclusion

Most of the Thai Puan people are agriculturists and the amount of waste generated was approximately 3 tons/day. The composition was 64% organic waste, 3% recycled waste, 30% general waste, and 3% hazardous waste, with organic waste being the most common waste. Waste management in Thai Phuan at Map Pla Khao Subdistrict at the household level, people have separated the recycled waste that can be sold and organic waste to feed their animals. The general waste and hazardous waste were sent to the Subdistrict Administrative Organization to be disposed of at the landfill disposal site. In addition to waste management at the community level, it can be seen that the community leaders are attentive to supporting the people in the

community to focus on appropriate waste management through education support, cooperating vote for public participation, and bringing news to people in the community via the village broadcasting tower.

The solid waste management problem in the community, people have to separate waste but some parts are still not properly separated according to education level and awareness, for example, infectious waste was thrown together with general waste. In addition, some households also dispose of waste by burning them in the community. Therefore, SAO should have campaigns to raise awareness and create understanding about the importance of solid waste management and its effects. The appropriate transfer of knowledge techniques should be related to lifestyle and culture. The driving force for solid waste management was the participation of Thai Phuan people involved in solid waste management operation by reducing the amount of waste generated from their house, separating recycled waste for sale or reuse, and separating infectious waste from general wastes. This led to saving the budget for waste management of SAO and making the community environment better.

5. Acknowledgement

The King's Royally Initiative Laem Phak Bia Environmental Research and Development Project, Chaipattana Foundation provided financial support and facilitated access to personnel resources. Support was also provided by Department Environmental Science, Faculty of Environment, Kasetsart University, Bangkok and the Map Pla Khao Subdistrict Administrative Organization, Phetchaburi, Thailand.

6. References

- Apinya Chatchorfa, Grit Permtanjit, Surapon Suyaprom, 2020 [Internet]. Structural Equation Model of Waste Management Effectiveness of Local Administrative Organizations in Aag Tong Province, *Journal of MCU Social Science Review*, 9(3), 68-79.
- Chaiwichit Phonla, 2016 [Internet]. Schemes for Community Waste Management of Local Administrative Organization. Tammasat University,
- Eakkarat Loetawas and Nittaya Sintao. (2018). Solid Waste Management of Nongkapu Subdistrict Administrative Organization, Banlad District, Phetchaburi Province, in Accordance with 3R Principle. *Chandrakasem Rajabhat University Journal of Graduate School*, 14(1), 89-9.
- Kanokrat Duangpikul and Laddawan Nanplio, 2019 [Internet]. Factors Affecting Consumers' purchasing Decisions from Phoom-Praew Shop, Muang District, Nan Province Available from:
<https://so04.tci-thaijo.org/index.php/JMHR/article/download/245382/166934/>
- Lakhan, & Calvin. (2014). Exploring the relationship between municipal promotion and education investments and recycling rate performance in Ontario, Canada. *Resources, Conservation and Recycling*, 92, 222-229.
- Local Development Plan 2018 - 2022 [Internet]. Map Pla Khao Subdistrict Administrative Organization Tha Yang District Phetchaburi Province, Available from:
<http://www.mapplakhao.go.th/site/>
- Nichapa Muenphukdee, 2020. The Solid Waste Management Behavior Model of Minorities Phetchaburi Province. *Journal of Research and Development Institute Rajabhat Maha Sarakham University*, 7(1), 357-368.

- Pollutoin Control Department, 2019 [Internet]. The situation of solid waste in Thailand 2019
Available from: <http://hia.anamai.moph.go.th/download/hia/manual/book/book69.pdf>
- Phetchaburi Province, 2020 [Internet]. General information of Phetchaburi Province. Retrieved
from: <http://www.phetchaburi.go.th/phet2/CODE/main#6>
- Paiboon Jeamponk, 2012. The Study of Solid Waste Utility and Household Management at
Suanluang Sub-District, Amphawa District, Samut Songkram Province,
Available from: <http://www.ssruii.ssruii.ac.th/bitstream/ssruii/643/1/050-55.pdf>
- WongWat Boonyawat, 2020 [Internet]. Community Participatory Waste Management of
Community Prototype,"Muang Wan Community (Sam Sun Huda Mosque)",
Mahaphram Sub-district Bang Ban District, phra Nakhon Si Ayutthaya, Available
from: <https://so02.tci-thaijo.org/index.php/issmu/article/view/243842/165432>

