

บทบาทในการจัดการขยะโดยชุมชน กรณีศึกษาชุมชนในเขตเทศบาลมหาสารคาม*

ดิฐา แสงวัฒนะชัย**

คณะสถาปัตยกรรมศาสตร์ ผังเมืองและนฤมิตศิลป์
มหาวิทยาลัยมหาสารคาม
Email: dita.s@msu.ac.th

พลกฤษณ์ จิตรโตร์***

คณะสิ่งแวดล้อมและทรัพยากรศาสตร์
มหาวิทยาลัยมหาสารคาม

* บทความนี้เป็นส่วนหนึ่งของการวิจัยเรื่อง “การศึกษารูปแบบการจัดการวางจรรยาบรรณชุมชนแบบครอบคลุมโดยใช้แนวคิดการพึ่งพากัน ของระบบนิเวศเมืองเพื่อนำไปสู่การจัดการขยะที่ยั่งยืน: กรณีศึกษาเทศบาลเมืองมหาสารคาม” ได้รับการสนับสนุนงบประมาณประจำปี 2562 จากสำนักงานกองทุนสนับสนุนการวิจัย (ปัจจุบันคือสำนักงานคณะกรรมการส่งเสริมวิทยาศาสตร์ วิจัยและนวัตกรรม-สทว.)

** ผู้ช่วยศาสตราจารย์ ดร. สังกัดคณะสถาปัตยกรรมศาสตร์ ผังเมืองและนฤมิตศิลป์ มหาวิทยาลัยมหาสารคาม

*** ผู้ช่วยศาสตราจารย์ ดร. สังกัดคณะสิ่งแวดล้อมและทรัพยากรศาสตร์ มหาวิทยาลัยมหาสารคาม

บทคัดย่อ

ปัจจุบันชุมชนเมืองในเขตเทศบาลเมืองมหาสารคาม มีการขยายตัวอย่างรวดเร็ว ส่งผลให้ปริมาณขยะเพิ่มขึ้นจนอยู่ในภาวะวิกฤต ทำให้เทศบาลต้องเตรียมความพร้อมในการร่วมมือกับเอกชนจัดสร้างโรงไฟฟ้าพลังงานขยะ บทความนี้มีวัตถุประสงค์เพื่อ 1) ศึกษาทัศนคติในการคัดแยกขยะของชุมชน 2) ศึกษาบทบาทในการจัดการขยะของชุมชน และ 3) เสนอแนวทางการจัดการขยะที่สามารถนำมาหมุนเวียนและสร้างมูลค่าได้จากชุมชนแก่หน่วยงานที่เกี่ยวข้อง เพื่อให้สอดคล้องกับระบบการจัดการขยะที่จะเกิดขึ้นในอนาคต โดยใช้วิธีทางสถิติจากกลุ่มเป้าหมายที่มาจากการคัดเลือกแบบเจาะจง 4 ชุมชน ซึ่งมีที่ตั้งอยู่ในย่านที่มีความแตกต่างกันภายในเขตเทศบาลเมืองมหาสารคาม เครื่องมือในการศึกษาประกอบด้วยแบบสอบถามและจัดประชุมกลุ่มย่อย

ผลการศึกษาพบว่า ทัศนคติในการคัดแยกขยะชาวชุมชนส่วนใหญ่เห็นด้วยกับการคัดแยกขยะทุกรูปแบบ มีการคัดแยกขยะเพื่อนำกลับมาใช้ประโยชน์และขาย และมีการจัดการขยะในบ้านเรือนและชุมชนเพื่อรอเทศบาลและเอกชนมาเก็บขน ปัญหาสำคัญคือ ขยะที่ไม่ได้รับการแยกอย่างถูกวิธีที่มีประชาชนจากที่อื่นนำมาทิ้ง โดยแนวคิดในการนำขยะไปหมุนเวียนและสร้างมูลค่า ภาครัฐจะต้องมีการสร้างความร่วมมือกับเอกชนทั้งผู้รับซื้อขยะรีไซเคิล ผู้ผลิตเชื้อเพลิง ผู้ผลิตปุ๋ยหมัก เกษตรกรผู้เพาะปลูกและเลี้ยงสัตว์ ตลอดจนโรงงานอุตสาหกรรมที่เกี่ยวข้อง โดยสร้างระบบและกลไกที่ทำให้เกิดการหมุนเวียนของขยะระหว่างกันได้ การศึกษานี้เป็นการสร้างกรอบแนวคิดเสนอแนะต่อองค์กรที่เกี่ยวข้อง เพื่อนำไปกำหนดวิธีการจัดการขยะรีไซเคิลที่สร้างมูลค่าและรายได้ให้กับชุมชนต่อไป

คำสำคัญ: การจัดการขยะโดยชุมชน, ขยะรีไซเคิล, บทบาทในการจัดการขยะ, การจัดการขยะ, การพึ่งพากัน, เศรษฐกิจหมุนเวียน, ทัศนคติในการคัดแยกขยะ

The Community Roles in Waste Management: A Case Study of Communities in Maha Sarakham Municipality*

Dita Sangvatanachai**

Faculty of Architecture, Urban Design, and Creative Arts,

Maharakham University

Email: dita.s@msu.ac.th

Ponlakit Jitto***

Faculty of Environment and Resource Studies,

Maharakham University

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** Assistant Professor Dr., Faculty of Architecture, Urban Design and Creative Arts, Maharakham University

*** Assistant Professor Dr., Faculty of Environment and Resource Studies, Maharakham University

Abstract

The communities in Maha Sarakham Municipality are expanding rapidly, resulting in a tremendously increasing amount of garbage rising to a critical point. The Municipality must therefore collaborate with the private sector to construct a waste power plant. This article aimed at 1) studying the communities' attitudes toward solid waste sorting, 2) studying the communities' roles in solid waste management, and 3) recommending relevant organizations the concept of management of recyclable wastes and value-adding. The overall goal is to respond to the future quantity of waste. The statistical method was applied, and the study was conducted on four targeted communities. The purposive sampling method and criterion-based selection were performed at the meeting with the Office of Public Health and Environment, Maha Sarakham Municipality, to obtain the sample group. The four communities situate in different districts within Maha Sarakham Municipality. The research tools included questionnaires and focus group meetings.

The results showed that people generally agreed with all approaches to solid waste sorting, i.e., sorting for reuse and selling and managing household and community wastes before collection by the Municipality or private businesses. The major problem is that solid wastes are not adequately sorted because people in other areas dump their garbage at the studied sites. To manage the recyclable wastes

and value-adding, the government should collaborate with private enterprises—including recyclable waste buyers, fuel manufacturers, compost manufacturers, crop and livestock farmers, and related industries. A system and mechanism should be established for a circular economy among the mentioned businesses. This study would provide a framework of ideas to recommend to relevant organizations for setting garbage management and recycling that creates value and income for the communities.

Keywords: Community-based waste management (CBM), Recyclable wastes, Roles in waste management, Solid waste management (SWM), Symbiosis, Circular economy, Waste sorting attitudes

Introduction

Solid wastes at the source are difficult to measure as municipal wastes, except by performing intensive studies at the household level. Measurement depends on the mode of collection by the local authorities and whether or not the waste is disposed of in the official system (UN Department of Economic and Social Affairs, 2004). As it happens, quantities of solid wastes circulated under other systems besides being disposed of by the Municipality. These solid wastes can be sold by the community people for their earnings, whereas specific quantities have not been appropriately disposed of.

Solid waste management (SWM) involves collecting, treating, and disposing of solid materials discarded because they have served their purposes or are no longer useful. Improper disposal of municipal solid wastes can create unsanitary conditions, and these conditions, in turn, can lead to pollution in the environment (Nathanson, 2020). Solid waste management has become a significant concern both to the natural environment and society, particularly in developing countries. Municipalities in developing nations face problems managing solid waste because they continue to rely on a ‘collect, transport, and throw-away’ approach. Conventional waste management systems have been criticized for their ‘one-size-fits-all’ approach, which does not account for the fact that each city and its neighborhoods have a unique waste management requirement (Eriksson & Bisailon, 2011 as cited in

Sinthumule & Mkumbuzi, 2019). Managing waste properly is essential for building sustainable and livable cities, but it remains challenging for many developing countries and cities. Effective waste management is expensive, often comprising 20%–50% of municipal budgets. Operating this essential municipal service requires integrated systems that are efficient, sustainable, and socially supported (The World Bank, 2019). Investments in solid waste management include the construction or upgrading of waste infrastructure, waste management planning and programming, disposal of solid waste, improvements of the waste management capacity, and decommissioning of existing solid waste assets. (Government of Canada, 2015). Thus, the management of solid wastes should begin at the community level.

Community-based solid waste management projects are activities carried out by members of communities to clean up their neighborhoods and earn an income from solid waste. Examples are the collection of solid wastes, the sale of recyclables, and recycling and composting activities (Anschütz, 1996). Community-based waste management permits the compilation of wastes according to types, such as organic wastes or decomposable wastes, recyclable wastes that can be transformed and reused, hazardous wastes that require proper disposal, and general inorganic wastes not worth undergoing recycling. The informal sector's recycling system often comprises several categories of collectors who collect recyclable wastes from

households, street-side public dumpsters, and municipal landfills. It also includes intermediaries who buy recyclable wastes from the collectors and sort, clean and sell them to small-scale enterprises that recycle the wastes. (United Nations Economic and Social Council, 2006). However, many other categories of waste do not enter the selling system where the values rise.

In this study, the concepts from related studies have been compiled on community waste management, circular economy, and urban ecological symbiosis both in Thailand and abroad. For example, Sutacha (2016) conducted a study on the form and creation of a learning network for participatory waste management, the case of the Ban Ba Kham community and the Housing Community of Khon Kaen Municipality. The study emphasized the community context, the community's experiences in organizational administration, the changing situation, and the participatory waste management approach of the community under the co-learning network. Likewise, Phuangbubpha (2015) studied the development of the extension model for participatory waste management in the area of Wang Phang Sub-district Municipality, Wiang Nonglong District, Lampoon Province, in which the community designed the model for self-management of waste. Here, the community acquired the skills that became the model for the community's participatory self-management of waste. The outcome was successful from the collection of wastes and transportation for

disposal; until the strategy was constructed for further extension of participatory self-management of waste. In addition, this study was interested in the process of garbage collection from communities by the respective municipality. For instance, the Community-based Solid Waste Management: The Case of Sai Son Commune, Quoc Oai District, Hanoi, managed waste by mobilizing community members to participate in the management. The study also addressed the administrative structure and analyses of environmental, social, financial, and governance issues (Hoa & Mai, 2016).

Thailand has made remarkable progress in social and economic development, moving from a low-income to an upper-income country in less than a generation. The economy overgrew at an average annual rate of 7.5% from 1960-1996 and around 4-5% during the Asian financial crisis from 1999-2019. The economic development in Thailand has resulted in the enlargement of the middle-income class, an expansion of the urban community, and an increase in domestic consumption, leading to the rapid growth of waste generation (The World Bank Thailand, 2022). The 2021 statistics showed that 24.98 million tons of waste were produced in Thailand, where 8.61 million tons were sorted at the source to be reused, 9.68 million tons were disposed of adequately, and roughly 6.69 million tons were not correctly managed (Department of Pollution Control, 2021). In addition, the proportions of properly disposed of and reused wastes

only showed a little increasing trend. The cause is from lack of efficiency in sorting the input and a lack of readiness of local administrative organizations in the collection (Department of Pollution Control, 2018). Reusing and recycling wastes and transforming them into energy or value-adding have not been studied, and no precise approaches have been set. Community solid waste management at present is still problematic due to improper management.

In Thailand, community-based waste management (CBM) is used as a set of tools for the decision of authorities in the Municipality, households, and communities. Overall, it is used to improve household waste management. CMB comprises six steps: 1) managing sellable wastes, 2) making compost from organic wastes, 3) managing garbage bins in the community, 4) having roads free of garbage bins, 5) collecting garbage more frequently, and 6) charging a fee for garbage collection. The CBM concept is based on integrating, motivating households and communities, and economizing costs in decreasing waste and proper management. CBM is an integrating concept targeting only a specific waste producer group. It aims at reducing waste at the source, including households in the community, to mitigate the problem and reduce costs in other parts of garbage management. There are 4 significant groups of people with responsible roles in CBM: 1) the decision-making authority (the Mayor and members of the Municipality Council), 2) Municipality officers

(Director and officers), 3) community people, and 4) the private sector (Department of Environmental Quality Promotion, 2019).

Maha Sarakham Municipality comprises 30 communities and some 50,000 population (Maha Sarakham Municipality, 2020). It is the center of education in the Northeast and is thus named “Takasila Nakhon,” from being a cluster of schools from primary to higher education levels (Academic and Planning Division, 2019). Two universities are situated in this Municipality: Mahasarakham University and Rajabhat Maha Sarakham University. In Maha Sarakham Municipality, the garbage accounts for roughly 61,925 tons per year, with the most significant proportion (63%) being food scraps, followed by 18% of plastics, 13% of paper scraps, and 6% of other items. The Municipality disposes of garbage using landfills and compost making (compiled from Sripokhangkul & Aj-Sri, 2017). This amount of waste in the Municipality has not been appropriately disposed of based on the technical principle. At the disposal venue of the Municipality, 77.44 tons/day of garbage was dumped by 12 local administrative organizations and relevant workplaces. The waste from Maha Sarakham Municipality is 46.57 tons/day, followed by 11.19 tons/day left by Tha Khonyang Sub-district Municipality and 5.16 tons/day from Kham Riang Sub-district Municipality. The amount from the two sub-districts is understandable, for Mahasarakham University campuses are situated, producing 3.29 tons of garbage daily. It has been noted

that the other university in the Muang District Municipality, Rajabhat University Maha Sarakham, only produces 0.97 tons per day (Department of Pollution Control, 2019). Nevertheless, it can be seen that a tremendous amount of waste is produced in the areas of municipalities where university campuses are situated.

Thus, the quantity of waste and garbage has increased to a critical level, necessitating the Municipality to plan to cooperate with the private sector to establish a waste power plant. The planning includes policy and regulations on power generation from wastes, quantity, and types of wastes in each area, information related to electricity demand, the capacity of distribution lines to accommodate power generated from wastes, study cases, relevant laws and regulations, and different technologies applied in generating electricity from wastes. Collaboration with all sectors concerned must also be built (Thailand Environment Institute, 2019). Apart from the strength and roles in developing the power system of the Municipality, participation and the roles of the private sector and people must be sought. All must understand the concept of recycling various types of wastes into raw materials and energy, and finally, revenues that will return to the locality and people, which is by the principle of the circular economy.

This article is part of the research study on the overall community waste management model based on the symbiosis concept of an urban ecological system that would lead to sustainable

waste management, a case study of Maha Sarakham Municipality. The study has been allocated the 2019 budget support from the Thailand Research Fund (at present, the Office of Thailand Science Research and Innovation Promotion Council (TSRI)). The case study aimed to produce a Waste Flow Management Cycle on the part of those with roles in community recyclable waste management. The outcomes will be recommended to the municipalities. The result would lead to recommendations that connect to or integrate with the management of the responsible local organizations. This article is part of the main research study. It aimed at producing a conceptual framework of the waste management approach that enables the circulation of waste and value-adding by the community.

Research Objectives

The objectives of this research are:

- 1) Study the communities' attitudes towards solid waste sorting in Maha Sarakham Municipality
- 2) Study the roles in solid waste management of communities in Maha Sarakham Municipality
- 3) Recommending a management concept for recyclable wastes and value-adding to relevant communities and organizations.

Research Scope

1) *Content scope* – This study emphasized the study of community people’s attitudes towards waste sorting, the approaches used in communities’ waste sorting, the flow of waste management that allows recycling and value adding, and recommendations for waste management to relevant organizations for the future.

2) *Area scope* – 4 communities in Maha Sarakham Municipality, as shown in Figure 1.

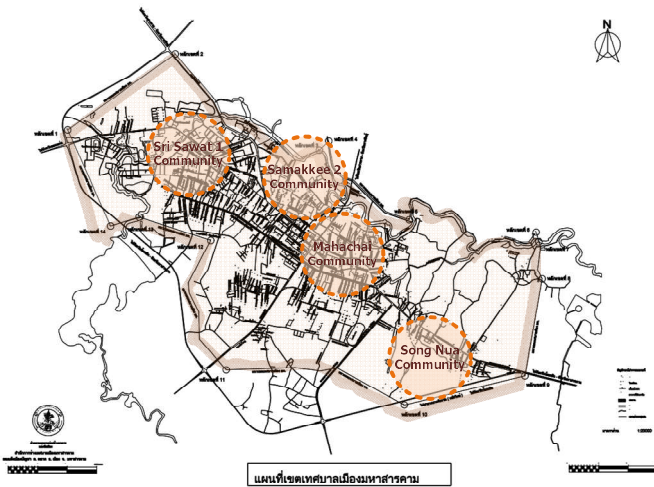


Figure 1 Scope of the study area and locations of the communities.

Research Methodology

The following steps were taken:

1) Compiling secondary information from relevant documents and research for producing the study framework and research process.

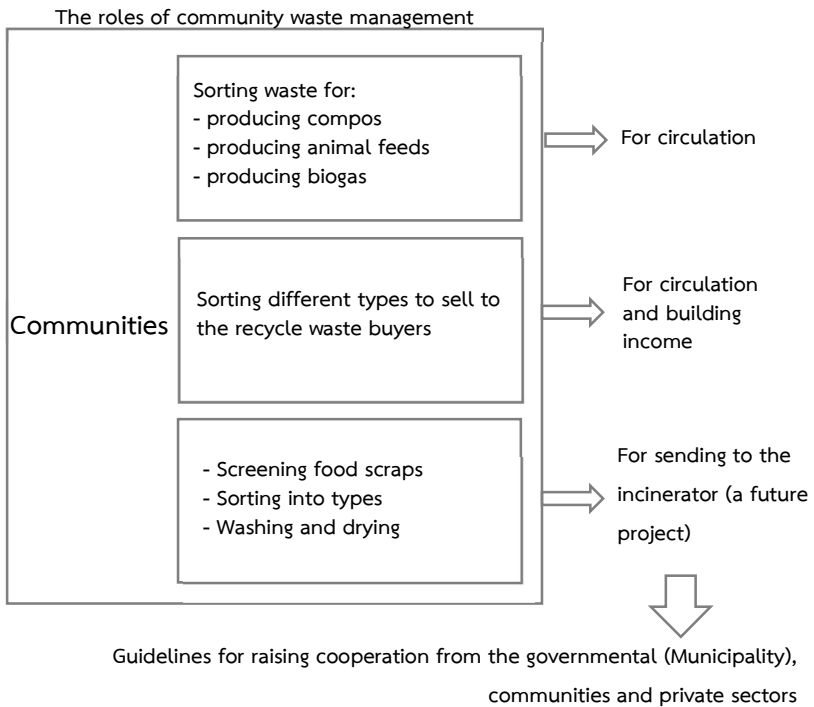


Figure 2 Conceptual Framework.

2) Studying the group with the roles in waste management. The sample group was obtained by the Purposive Sampling Method and criterion-based selection. Key informants who would provide the best and most accurate information had been specified in a meeting with the Office of Public Health and Environment, Maha Sarakham, in which instructions were given for selecting the purposive sampling, as the communities are significant and have problems from wastes that arise from latent populations and different activities. The following communities were selected: Sri Sawat Community, the community in the study area where a big-sized mall is situated; Samakkee 2 Community, a community near an entertainment center; Mahachai Community, a community in the area of the Municipal market and the old city center; and Song Nua, a community in the residential area close to the ring road, where future city expansion is anticipated.

3) Administering the questionnaire and focus group meeting, observation, and photographs. The questionnaire comprises questions on attitudes toward waste sorting, the roles in solid waste management, waste sorting, participation in waste sorting, and the waiting period for the Municipality's collection. 4 sample communities suggested by the Municipality were studied, each at different locations, as follows:

1st Community: Song Nua Community, located to the Southeast of the Municipality.

2nd Community: Samakkee 2 Community, located in the community and entertainment zone North of the Municipality.

3rd Community: Mahachai Community, located in the commercial zone in the middle of the town.

4th Community: Sri Sawat 1 Community, located in the commercial and academic institution zone Northwest of the Municipality.

4) Analyzing the questionnaire data based on descriptive analysis into percentages. The sample group at the small group discussion was selected from the total number of participants in the meeting, comprising 44 informants from Song Nua Community, 29 informants from Mahachai Community, 48 informants from Samakkee 2 Community, and 38 informants from Sri Sawat 1 Community.

5) Making a waste management model for recyclable wastes and value-adding for relevant organizations.

Research Results

1) Communities' attitudes towards waste sorting

The attitudes towards waste sorting in Song Nua Community were surveyed in focus group meetings and by administering questionnaires to 44 people. All agreed on the sorting of sellable wastes from hazardous wastes to sell to the recyclable-waste buyers.

Most agreed with sorting big-sized wastes such as cabinets, beds, or tables for recycling (95.45%), sorting decomposable wastes for making compost (93.18%), making animal feeds (93.18%), producing biogas for power generation (86.36%), sorting paper to sell to a paper recycling factory (84.09%), sorting metal to sell to a smelter (70.45%), and sorting construction material wastes for producing floor tiles (70.45%). However, even though some (43.18%) agreed with sorting combustible wastes such as paper, plastics, or cloth to sell to a power plant, some did not agree (25.00%), while 31.82% did not show their opinion due to a lack of knowledge and understanding of the technology.

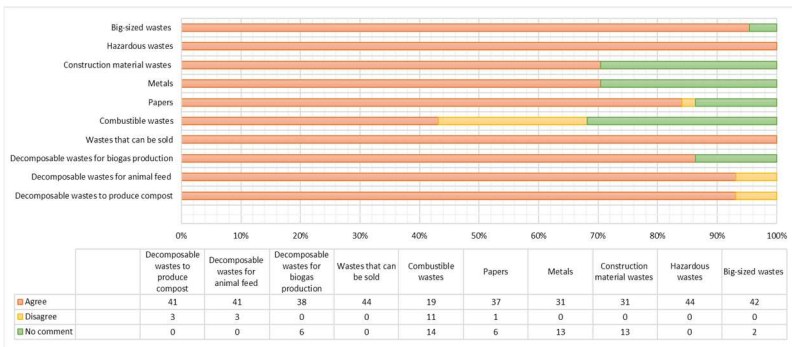


Figure 3 People's attitudes towards waste sorting into types.

The survey on waste sorting conducted with the other 3 communities, Manachai (29 participants), Samakkee (48 participants), and Srisawat (38 participants), showed that all agreed with all types of waste sorting. However, some participants from Samakkee 2 Community

did not give their opinion on metal sorting for a smelter (18.75%) and sorting construction materials for making floor tiles (18.75%) since they sort metal for selling and use construction material wastes for their own landfilling rather than waiting for the Municipality to collect to the factory.

2) Communities' roles in waste management

Communities' waste sorting approaches

From the survey of the approaches taken in waste sorting and the length of time in collecting wastes at Song Nua Community, it was found that, in general, people compile their wastes at home. All informants who answered the questionnaire reported that they gathered the sellable wastes such as cans, plastic bottles, glass bottles, paper to send to a paper recycle factory, and metal scraps to send to a smelter for selling on their own. Meanwhile, they sort out some solid wastes and place them at the Municipality's assigned point. These wastes include food scraps (79.55% make compost for their use, and 20.45% collect and place them at the Municipality's point). For the combustible wastes such as paper, plastics, plastic bags, cloth, rubber, etc., 43.18% stack these at home, and 56.82% place them at the Municipality's assigned spot. The construction material wastes are collected for landfilling at home (86.36%), while 13.64% stack them at the place designated by the Municipality. For hazardous wastes that

require a particular disposal method, all communities take them to the Municipality's assigned location. For big-sized wastes, 54.55% reported that they never discard these but use them to make kindling, while 45.45% contact the Municipality for collection.

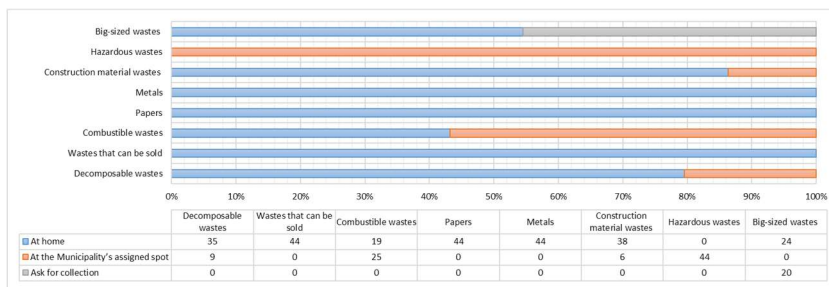


Figure 4 Waste sorting approaches of Song Nua Community.

At Mahachai Community, all wastes are collected at people's households, including decomposable wastes such as food scraps and combustible wastes such as paper, plastics, plastic bags, cloth, rubber, and paper that they can sell to a paper recycling factory. For hazardous wastes to be disposed explicitly of, 27.59% sort them at home, and 72.41% take them to the Municipality's assigned point. The construction material wastes that can be sold to a floor tile factory are sorted at home (79.31%) or are kept for their landfill (20.69%). Metal scraps that can be sold at a smelter are sorted at home (93.10%) and placed at the Municipality's assigned spot (6.90%). For sellable wastes such as cans, plastics, and glass bottles, 93.10% sort them at home for selling, and 6.90% take them to the Municipality's assigned spot.

For big-sized wastes, 55.17% never discard these but keep them for making kindling, while 44.83% ask the Municipality for collection.

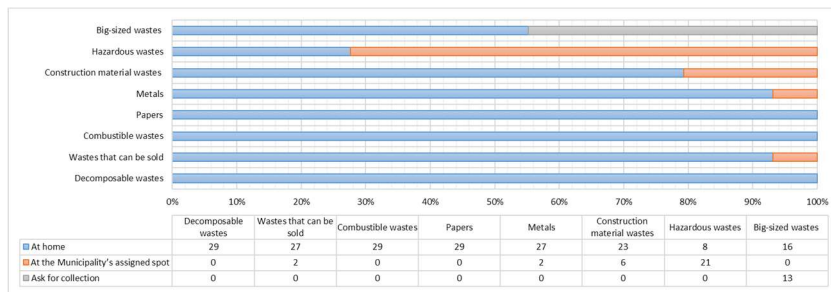


Figure 5 Waste sorting approaches at Mahachai Community.

The survey conducted on waste sorting in Samakkee 2 Community showed that the community sort sellable wastes such as cans, plastics, and glass bottles and stack them at home. Some take nearly all types of waste to the Municipality’s assigned spot. These include hazardous wastes for a specific disposal method (81.25%), combustible wastes such as paper, plastic bags, cloth, and rubber (25.00%), paper scraps to be sold to a paper recycling factory (20.83%), wastes from construction materials to be sold to a floor tile factory (18.75%), metal scraps to be sold to a smelting factory (18.75%), and decomposable wastes such as food scraps (6.25%). For bulky wastes, some community people compile them at home to make kindling (37.50%) and contact the Municipality to collect the rest (62.50%).

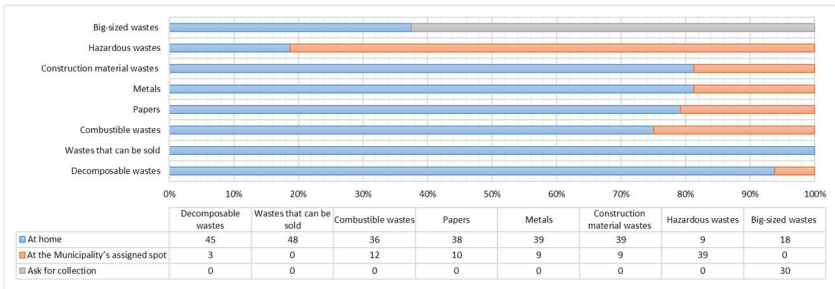


Figure 6 Waste sorting approaches at Samakkee 2 Community.

At Srisawat 1 Community, it was found that all community people sort decomposable wastes such as food scraps, sellable wastes, combustible wastes, paper scraps to be sold to a paper recycling factory, and metal scraps to be sold to a smelting factory. Some wastes are kept for selling at home. Some keep construction material wastes for landfilling. For big-sized wastes, 50% store them at home to make kindling and 50% ask the Municipality to collect them. All community people sort and place hazardous wastes at the Municipality’s assigned spot.

Cooperation in waste sorting of the communities

From the survey of the cooperation in waste sorting of the communities, it was found that all are happy to cooperate in sorting sellable wastes into types, sorting paper scraps to send to a paper recycling factory, and sorting metal scraps to send to a smelting factory. They also do not mind drying them before disposal. For some flammable wastes, some are not pleased to drain water,

dry, or wash before discarding (25.45%). They are not happy to drain water from food remains before discarding them (15.91%), giving the reason as a waste of time in washing and no place for drying; however, they remove as much water as possible.

Some community people stack the wastes at home, while some take them to the Municipality's assigned spot. At Mahachai Community, the waste compiled at home includes decomposable waste such as food, combustible, and paper scraps to be sent to a paper recycling factory. Hazardous wastes requiring a specific disposal method are sorted and kept at home (27.59%) or taken to the Municipality's place (72.41%); wastes from construction materials are kept at home for landfilling (79.31%) and taken to the Municipality's place (20.69%); metal scraps that can be sold to a smelting factory are stacked at home (93.10%) or taken to the Municipality's point (6.90%). Sellable wastes, including cans and bottles, are sorted for selling (93.10%), while some (6.90%) take them to the Municipality's assigned spot. For bulky wastes, 55.17% said they never discard these but keep them to make kindling, while 44.83% contact the Municipality for pick-up.

The survey at Samakkee 2 Community showed that all community people are pleased to sort sellable wastes, while some do not agree with sorting decomposable wastes such as food waste. It was found that 25% drain water before discarding foods, 20.83% do not want to sort paper scraps before sending them to the factory, 20.83%

equally are not happy to sort metal scraps and dry them before sending them to a smelter, and 4.17% are not pleased to sort combustible wastes. The reason they gave was that it is a waste of time.

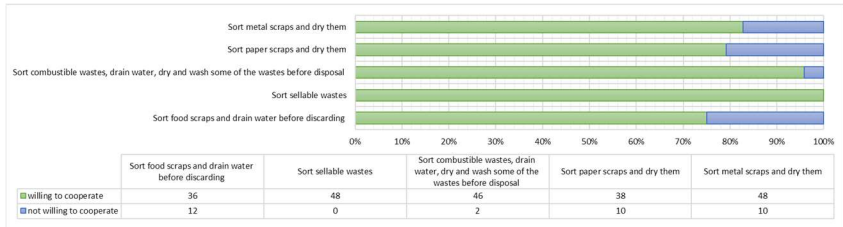


Figure 7 Cooperation in waste sorting of Samakkee 2 Community.

The survey conducted at Srisawat 1 Community also demonstrated that every household is happy to sort metal and paper scraps and dry them. They are pleased to sort sellable wastes into types. However, some are not happy to sort combustible wastes, drain water, dry, and wash some of the wastes before disposal (42.11%). Some do not want to sort food scraps and drain water before discarding them (15.79%), for it wastes their time.

The waiting period before collection by the Municipality

From the survey of the waiting time before collection by the Municipality at Song Nua Community, it was found that the decomposable and combustible wastes are collected in 1 night (52.27%), while other wastes take 1 day to 1-3 months depending on the case. For example, hazardous wastes undergo a particular method, accumulating wastes from construction materials before discarding them.

Some types, such as metal scraps, are kept at home and bought by an agent (31.00%), bulky wastes are partly kept for making kindling (11.36%), and wastes from construction materials are kept for landfilling (50.00%).

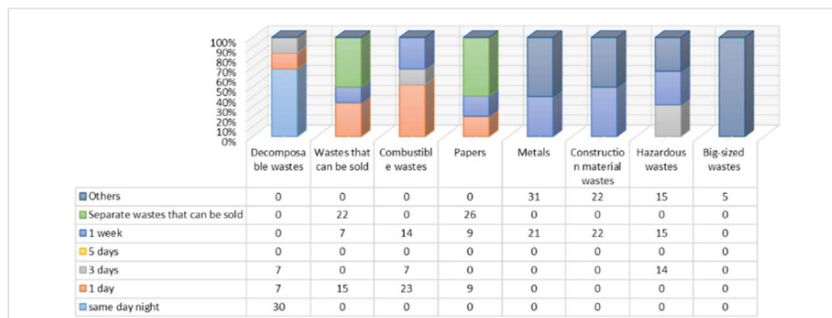


Figure 8 Waiting period for Municipality’s collection at Song Nua Community.

The survey at Mahachai Community showed that wastes collected in just 1 night are decomposable. Wastes collected within 1 day include paper scraps to be sent to a paper recycling factory (48.28%) and combustible wastes (37.93%). Other wastes are collected from 1 day to 1 month, depending on the case. Big-sized wastes, metal scraps, and hazardous wastes may take 1 to 3 months before collection, whereas some wastes are not discarded, such as bulky wastes that they keep to make kindling and wastes from construction materials that some (72.41%) keep for their own landfilling.

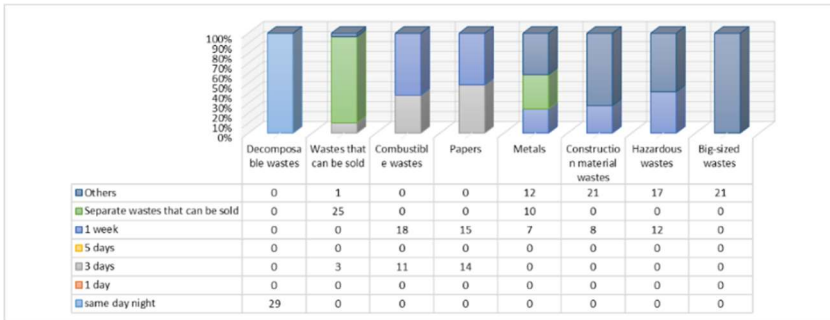


Figure 9 Waiting period before Municipality’s collection at Mahachai Community.

The survey of the waiting period before the Municipality’s collection at Samakkee 2 Community showed that the wastes collected within 1 night are combustible wastes (83.33%), decomposable wastes (79.17%), and paper scraps (62.50%). Other wastes, such as hazardous wastes, take 1 day to 1 month to be collected. Some wastes are not discarded, such as big-sized wastes and construction materials, which are kept for making kindling and filling the land.

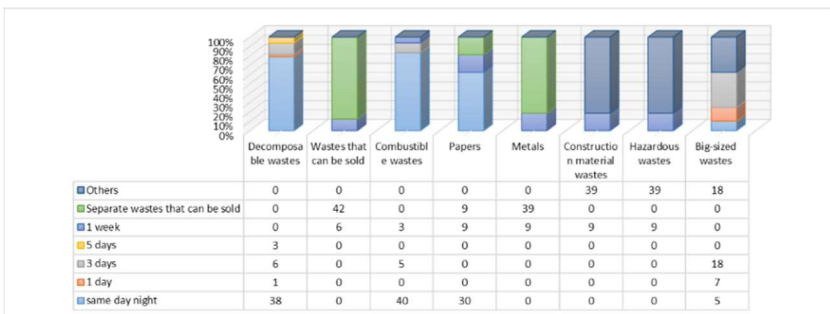


Figure 10 Waiting period for Municipality’s collection at Samakkee 2 Community

Srisawat 1 Community showed that the wastes collected within 1 night are decomposable, like food scraps. Other wastes take 1 day up to 1-3 months. For hazardous wastes, it takes up to 1 month for the Municipality to collect, while wastes from construction materials and bulky items are kept for landfilling and making kindling like in other communities.

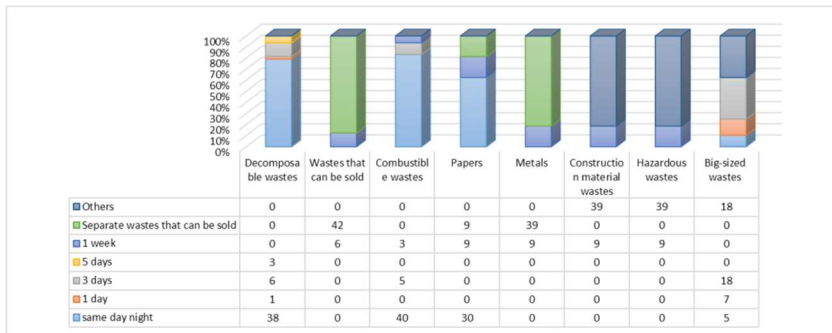


Figure 11 Waiting period for Municipality’s collection at Srisawat 1 Community.

Additional recommendations from the communities

As a whole, the 4 communities have similar additional recommendations. There is a problem with outsiders dumping their garbage in the community, increasing solid waste and the problem from the smell. According to the community, people should be trained to sort wastes and learn about the usefulness of all types of waste. The communities are happy to cooperate in this regard. The community that was found to have an outstanding role in sorting waste is Samakkee 2 Community. The Village Health Volunteers (VHVs) lead the waste sorting and have experience in many related activities,

such as sorting garbage to exchange for points. Samakkee 2 Community sorts nearly all types of waste; only a small portion is left for the Municipality's collection. Some shops regularly buy recyclable wastes, and tricycle merchants occasionally come for the same purpose.

3) The concept of community management of recyclable wastes and value-adding

The concept of community management of recyclable wastes and value adding has been made based on the communities' capabilities to sort all wastes. The 4 communities under the study are good examples of waste management. The details of the concept are as follows:

- Wastes are sorted into recyclable, organic, general wastes, hazardous wastes, and infectious wastes. People can manage each type of waste at home or bring it to an assigned community spot. There is a sub-unit for sorting wastes in each community and a collection system.

- A collaborative system is established with the private sector to manage recyclable wastes, including paper, plastics, glass, metal, non-metal, aluminum, brass, copper, stainless, and furniture and bulky items for selling and buying.

- Collaboration can be built with the agricultural and industrial sectors to produce fuel, fertilizers, and animal feeds from organic wastes such as food scraps.

- The remaining combustible wastes can be sent to an incinerator for electricity generation. The ashes can be buried or sent to cement plants. At the point where the mixture of these wastes are stacked, and tricycle merchants can be trained to re-sort the wastes for selling specific items, such as glass or metal, directly to the buyer or a factory for recycling.

- Hazardous and infectious wastes must be sorted and properly disposed of without mixing with other wastes.

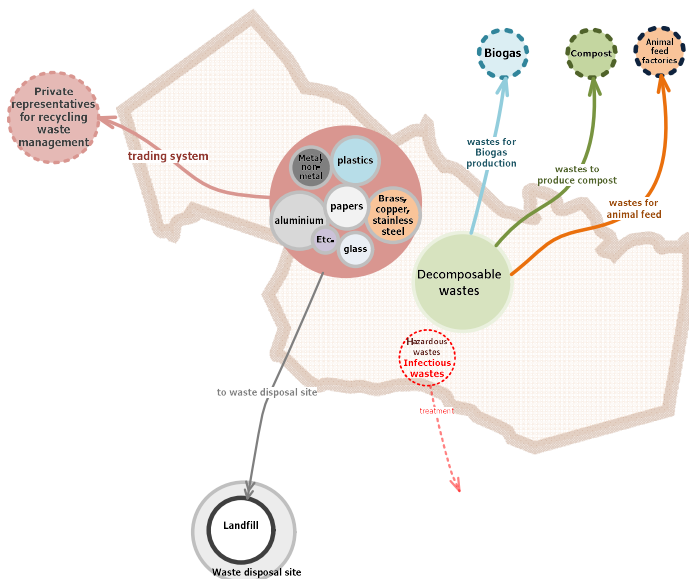


Figure 12 The former concept in managing waste.

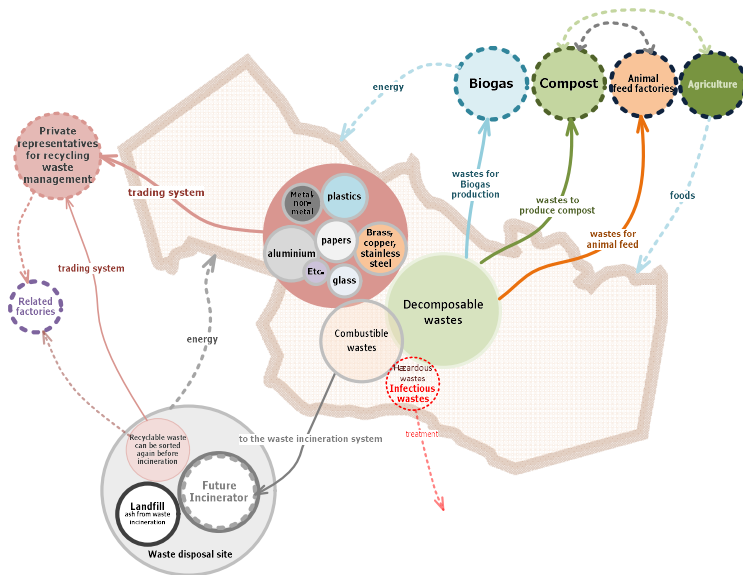


Figure 13 The new concept of managing recyclable waste with value-adding by the community.

Conclusion and Discussion

Management of waste problems in Maha Sarakham Municipality necessitates preparation by all sectors for systematic and sustainable operations. The concept of symbiosis can be relied on to understand the roles of different relevant individuals and groups. This study was on the roles of 4 communities in Maha Sarakham Municipality obtained from the Purposive Sampling Method. Their attitudes and roles in waste

sorting were investigated, and the concept of community management of recyclable wastes and value-adding was recommended.

The study showed the readiness of the 4 communities under the survey. The 4 communities, in general, agree with the sorting of waste by all approaches. The communities sort wastes for reuse and selling and manage households and community wastes while waiting for collection by the Municipality or private businesses. However, the major problem is that waste is not sorted correctly. People outside the communities also dump their garbage in the area. The government should build cooperation with the private sector, including recyclable waste buyers, fuel manufacturers, compost manufacturers, crop and livestock farmers, and related industrial factories, by constructing a system and mechanism that lead to the circulation of wastes among them.

This article indicates the benefits in the dimension of the role of waste sorter at the upstream level of the community, which involves community cooperation with the state in setting the regulations to build the point for garbage collecting, a garbage bank, a point for collecting sellable waste, coordination with the external buying agents, and collection of wet garbage for making compost in the community. The study found the readiness of the community to cooperate with the governmental sector to develop a system for symbiosis and full-cycle waste management where all sectors concerned are involved.

The other processes not mentioned in this article were studied in the main research, on recyclable wastes, organic wastes, and wastes sent to incinerators or landfill, the government's role, and the arising economic values. Further studies are recommended to cover expanding urban communities with different contexts to see the differences and their problems in waste management.

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