

Creation of participatory solid waste and hazardous waste management mechanisms by integrating social and cultural costs House-Wat-School (Bowon) at Nong Saeng Subdistrict Administrative Organization Nong Saeng Subdistrict, Wapi Pathum District, Maha Sarakham Province

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Abstract - Nong Saeng Subdistrict Administrative Organization, Wapi Pathum District, Maha Sarakham Province. It is another area of the country that has problems with solid waste management. and guidelines for managing solid waste problems at the end of the subdistrict administrative organization at present that have not been able to solve the problem. This study aims to study methods for waste management and hazardous waste disposal at the source by allowing the public to see how leaders from three sectors, namely home, temple, and school (Bowon), drive and contribute to solving problems at the source. In this study, a Deming cycle process was used, consisting of Plan (P), Do (D), Check (C), and Act (A). The researcher went to the community area to study information about the area's solid and hazardous waste management. And share the information that has been understood with people in the community, including community leaders, religious leaders, and schools. To discuss and determine guidelines for the management of solid waste and hazardous waste that are suitable for the community based on the community's own referendum. The results of the discussion resulted in a solution to the solid waste problem at the source: 1) A guideline for household waste management with the 3Rs and hazardous waste management was established; 2) a community recycling fund operating committee was formed. One month after the referendum, the researcher surveyed community operations and found

that 80% of households separated waste according to the 3Rs principles, namely reduce, reuse, and recycle. There is also a separation of hazardous waste for the SAO to collect and dispose of. A group was formed to establish a waste fund. and set up a recycling market that would travel to various villages. In addition, it was found that people earn from the sale of recycled waste 100-500 baht per month. As for the community schools, it was found that waste and hazardous waste were separated scientifically. It was also found that students and teachers brought their own water glasses instead of getting plastic bags from the store. The researcher also found that during the beginning of the operation, in addition to relying on propulsion from the bowon mechanism, it also requires external propulsion such as university resources that will enhance both knowledge and insight and budget from government agencies or private sectors. To drive the operation to be fast and create a strong group of communities.

Keywords: House, temple, school, participatory management, solid waste, community hazardous waste

1. Origin and importance

According to a report from the (Environmental Quality Surveillance Division, 2020), the amount of solid waste in Maha Sarakham Province has been increasing steadily. In 2020, there will be 677.5 tons of solid waste generated per day, with approximately 4 percent coming from and in the part of the Nong Saeng SAO. It was found that there was a waste generation rate of over 3.6 tons per day, with only 3.31 tons of waste collected within the area per day, and each day there was more than 0.29 tons of residual waste per day. The collected solid waste will be disposed of at the Wapi Pathum Municipal Landfill. However, the large volume of waste causes the landfill space to quickly fill up. Also, there is a shortage of budgets. causing an inability to properly manage waste, resulting in problems and complaints in addition, from the study of Putkham (2020), it was found that household waste also contained hazardous waste. Therefore, when disposing of it with general waste, there will be a risk of spreading toxic substances to the environment. In addition, the operation of the local administration organization does not have a systematic procedure for hazardous waste management. causing people to dispose of their waste. The burning of agricultural land poses a risk to public health. Researchers conducting a preliminary survey found that people still lack an understanding of how to separate and collect hazardous waste. This could result in health risks. The focus is on solving the waste problem at the destination, and by focusing on the government to manage in the present, we are not successful. The United Nations Environment Program (UNEP, 2015) has recommended the priorities of a hierarchy of waste management by focusing on source reduction of waste management, followed by waste reduction and reuse, conversion of solid waste for utilization, and minimization of the treatment and disposal processes. It can be seen that the solid waste management recommendations of the United Nations Environment Program are Implement a variety of methods but keep the management at the source as the heart of the management method.

In Thailand, the management at the source mainly requires the cooperation of the polluters or local people. Fine (2001) explains the involvement. It is a process in which people or stakeholders have the opportunity to express their views. Exchange information and opinions. To seek alternatives and make decisions concerning suitable and mutually acceptable projects. All parties involved should be involved in the process from inception to monitoring and evaluation to ensure mutual understanding and adjustments to the project. This will benefit all parties. On the part of the United Nations (2009), the meaning of participation is defined as creating opportunities for all members of the community and members of society at large to participate in helping and influencing the process of development activities as well as equally benefiting from the results of development. In their parts, Thawilvadee and the group Burikul *et al.* (2014) gave the meaning of participation as it is a process that embraces the concerns, needs, and values of the public. In the decision-making process of the public and private sectors It is a two-way communication and an interaction aimed at making better decisions, supported by the public. It may mean a decision-making process and a collaborative process arising from building consensus among the people, the government, and other sectors involved in the project. The creation of public participation can be divided into 5 levels: 1. Access to information 2. Public hearing 3. Involvement 4. Cooperation 5. Empowerment of the people.

However, creating public participation based on the government may cause problems in the participation process. This is due to the Thai government generally top-down governance, which results in low participation, such as access to information or listening to opinions. And usually, it does not allow the public to participate in decision-making, taking action and participating in work monitoring. Which eventually resulted in conflicts between the people and the government. At present, the “bowon” mechanism has been used to enhance the mechanism of public participation. As the temple is the center of mind in carrying out activities that are beneficial to the community, the “home” or the community will cooperate with the “temple” with significant support from the “school or government” jointly operating. The relationship between temples, homes, and schools is thus the source of spiritual capital and cultural capital in Thai society from the past to the present (Jeena & Borwornsantisuk, 2018). Religion and faith in leaders in homes, temples, and schools. Parents, relatives, abbots, clergy, village philosophers, and community leaders can link activities in the community in both economic and social dimensions. Society and culture create the strength of a society that works together as a group, as a team, sharing knowledge, sharing ideas, and participating in work co-responsible both officially and unofficially so that the work can achieve the goals as specified (Komanothai, 2017).

For that reason, the researcher is therefore interested in studying the use of mechanisms for homes, temples, and schools Srasom (2017) in enhancing public participation in municipal solid and hazardous waste management. by studying the process of participation by Boron To the implementation of solid waste and hazardous waste management in 2 steps: 1) Participation in the preparation stage 2) Operational

stage the researcher will follow up and evaluate the performance. as well as studying the problems and obstacles that arise in the participation process of Boron To the community's solid waste and hazardous waste management. To bring the study's findings to a wider audience for further improvement, correction, and development.

2. Objectives

1. To study the context of solid waste and hazardous waste management in Nong Saeng Subdistrict Administrative Organization, Wapi Pathum District, Maha Sarakham Province.

2. To study the process of participation of houses, temples, and schools (Bovon) in the management of solid waste and hazardous waste.

3. Period of operation

From January 2019 until October 2019

4. Target group

Village No. 10, Ban Pho, and Village No. 16, Ban Pho, Nong Saeng Subdistrict Administrative Organization, Wapi Pathum District, Maha Sarakham Province, which are adjacent villages, with Village No. 10 having a population of 497 people and 140 households, respectively, and Village No. 16 has a population of 720 people and 210 households.

5. Implementation/activities/assessment

The participatory implementation plan according to the PDCA process (as shown in Figure 1) has the following implementation details:

The preparation phase (Plan) is the study of the context of local society and culture. to select villages, temples, and pilot schools by consulting with local administrative organizations and community leaders to select a pilot village. composition study, quantification of the characteristics of waste generated in the pilot community, and encouragement of the formation of groups or committees for waste management at both the SAO and village levels.

The "Do" phase is a period in which social and cultural contexts are introduced to the problem of waste management and hazardous waste in the community. relevant laws to exchange knowledge with villages, temples, and schools, SAO agencies, and the Office of Resources and the Environment of Maha Sarakham Province to brainstorm

ideas to find ways to operate and have the community reach consensus. Create a corporate culture that supports each other in solving problems that arise.

Summary stage (check) after allowing people in the area to work for a while. The person in charge of the project and partners will monitor and verify. find problems in operation, make a public questionnaire, and bring the information to the village community forum, temple, and school to find ways to improve solid and hazardous waste management processes, including taking lessons from the implementation of this study. Data collection from questionnaires and interviews with related persons totaling 140 households was calculated by Yamane's equation (Yamane, 1967).

$$n = \frac{N}{1 + Ne^2}$$

e = Error (0.05) Confidence Level (95%)

N = Population size

n = Sample size

The Improving Actions Stage (Act: A) is a process to bring survey results and observations of community performance to community leaders for discussion. to review past operations to identify problems during operations and find ways to improve measures or guidelines for continuous improvement and development.

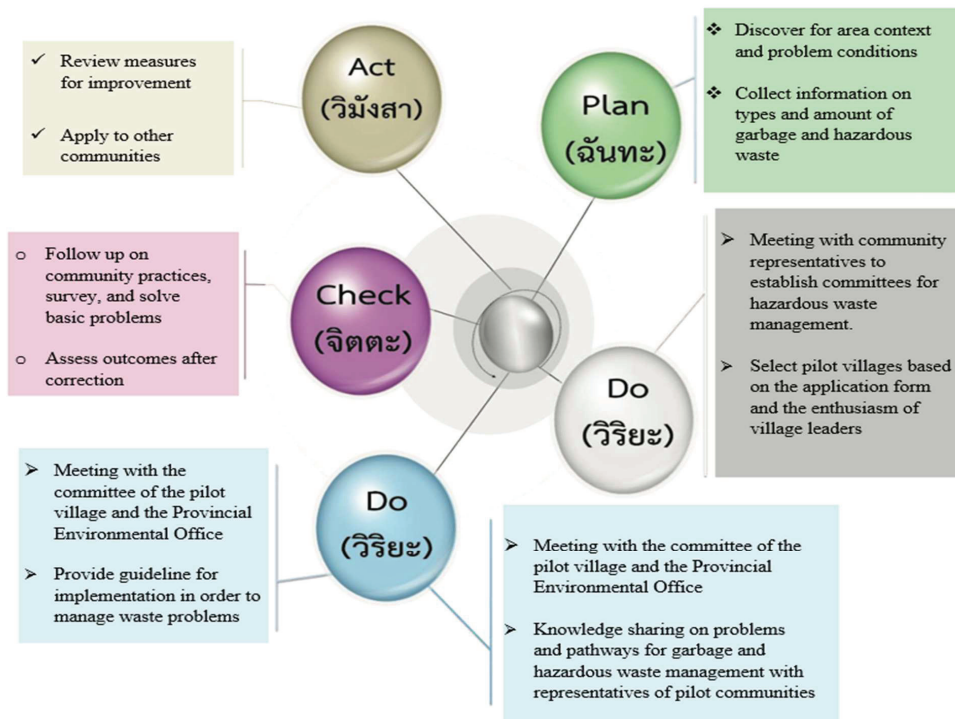


Figure 1. Participatory implementation plan according to the PDCA process

Performance and key points from the implementation of the project/activity

In the preparation stage (Plan), researchers, community leaders, and the SAO have considered selecting the 2 villages with the most people submitting applications to participate in the project, namely Moo 10 and Moo 20 Ban Pho. The operator has also selected Ban Pho Community School, Songhong Wittaya, and Wat Ban Pho to participate in the project.

When we got to the village, temples, and pilot school, the researcher went to the area with the staff of the SAO to conduct a survey of the species. Composition and quantity of waste and hazardous waste Including allowing students to interview residents of all three villages as well as the abbot, who serves as a religious leader in the area, to find the context and condition of waste and hazardous waste management problems. In the survey of species Composition and quantity of waste and hazardous waste It uses the principle of dividing solid waste into 4 equal parts (Quartering) first and then randomly sorting waste for analysis. Results from surveys on types, components, and quantities of waste and hazardous waste It was found that in the municipal solid waste there were food scraps, paper, plastic, glass, metal, hazardous waste, and others; if considered in proportion, there would be 41 % of food waste, while plastic was found at 29.4 %, followed by other types of waste, respectively, as shown in Figure 2. It can be seen that the elements of waste that can be recycled or sold are in small quantities. This may be because people have sorted and sold them at the source before disposing of them as community waste. While hazardous waste was mixed at 0.2 %, it showed that most people separated hazardous waste from general waste. While hazardous waste was mixed at 0.2 %, it showed that most people separated hazardous waste from general waste. However, based on a survey of some people, there is still a lack of understanding of how to properly separate hazardous waste. It was also found that general waste was dumped into hazardous waste bins. According to public inquiries, it was found that it was caused by youths dumping general waste. Therefore, waste, and hazardous waste management operations must be educated. In addition to understanding the public, we also need to give understanding to youth through the Bowon network.

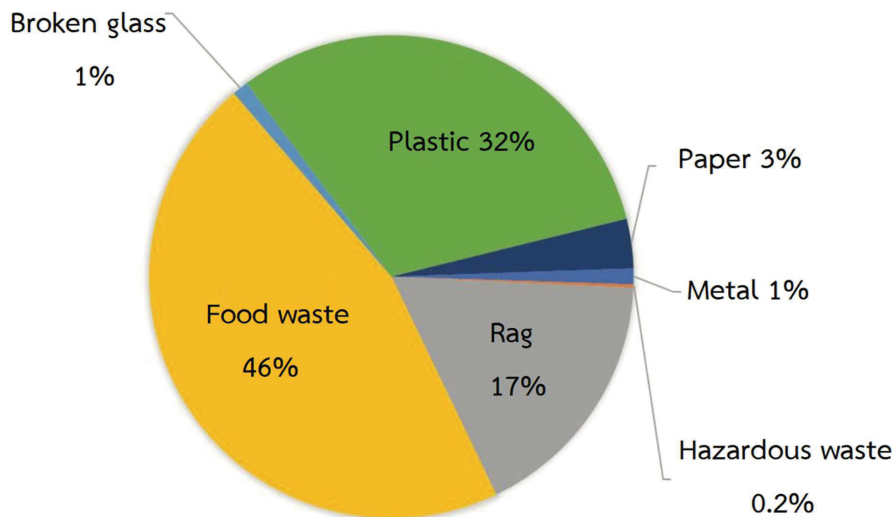


Figure 2. Composition and percentage of garbage and hazardous waste

At the operational stage (Do), an exchange forum is created to find ways to manage waste in the community (as shown in Figure 3). The researcher has brought policy information from the state, including academic theory. Including data that can be analyzed from the workplace proposed to attendees, which consisted of the model community representatives from both villages, the director of the school, SAO executives, and the abbot of Wat Ban Pho Including representatives from the Office of Resources and Environment in Maha Sarakham Province Consider finding alternative solutions to the waste and hazardous waste problems. in the community and exchange knowledge with people in the community. Make people in the community understand, realize, and be ready to change their behavior. In which the community that attended the meeting had a referendum to join hands to solve the problem at its root cause and academically correct the guidelines for doing this are as follows: for solving the root cause Or reducing waste at the source can be achieved through people-based operations that use the 3Rs principle for waste so that recyclable waste can be separated and sold. Along with reducing and increasing the reuse of packaging to reduce the amount of waste that will occur. The problem-solving part at the end of the cause There are two approaches: for food waste, it may be used to make fertilizer or liquid fertilizer. for that hazardous waste There is a common opinion that in each household, hazardous waste must be separated from general waste. Then bring the hazardous waste collected in each household to the collection point in the village, where the SAO will collect it and send it to the province for disposal.

In the community, the representative of the community waste fund committee, Moo 18 Ban Nong Kuchai, has presented waste management methods that have been so successful that every household has 100% waste separation. There is also a waste fund set up. And there is a purchase of recyclable waste at the village for the people in Villages 10 and 20 Ban Pho to learn. In this regard, the project operator has presented

guidelines for managing the remaining general waste. For the 18th group as well, which attracted the attention of the community waste management committee. At the same time, the Office of Natural Resources and Environment, Maha Sarakham Province, has suggested guidelines for obtaining support from the environment fund in case Moo 18 needs funds to be used to further manage the remaining plastic waste in the village. also proposed to the Nong Saeng SAO a project on source waste management to request funding. In this regard, SAO executives, the abbot of Wat Ban Pho, and environmental representatives from the Office of Resources and the Environment in Maha Sarakham Province joined forces to open a recycling market with the committee of the waste fund, Moo 18, to buy recycled waste from Moo 10 and Moo 20. In addition, the project also visited the area around Ban Pho Song Hong Witthaya Community School. To increase awareness of waste reduction and handling of hazardous materials. These youths will be the support of the community in the future (as shown in Figures 3 and 4).



Figure 3. Organizing a forum with the community to find ways to manage solid waste and hazardous waste.



Figure 4. Waste purchase in the community, educate, and understanding of garbage and hazardous waste management for youths of Ban Pho Song Hong Witthaya Community School

In the process of summarizing the results (Check), from the field visits, it was found that the villagers and the school had proceeded after the community survey, as shown in Figure 5, with waste separation using net bags distributed by the SAO. The researcher conducted a questionnaire on 140 households, and the results were as follows: 85% of the four types of waste in the 10th group were separated. In addition, 25% of the villagers had a way of reducing plastic waste. As for the 20th group, 67.8% of all four types of waste were separated. In addition, 35.7% of the villagers also had waste reduction at source (3Rs), which is considered a way of life in reducing plastic waste (as shown in Figure 6). At present, the Nong Saeng SAO has created a recycling market. There is a waste management project committee from Village No. 18 to buy recyclable waste in the village, using the temple as a trading center. According to the survey, more than 87 percent of the villagers who separated their recyclable waste for sale per month earned an income of 100-500 baht, depending on the amount of waste available (as in Figure 7). has been implemented (Figure 8).



Figure 5. A survey of waste and hazardous waste management operations for the community, according to the Bowon

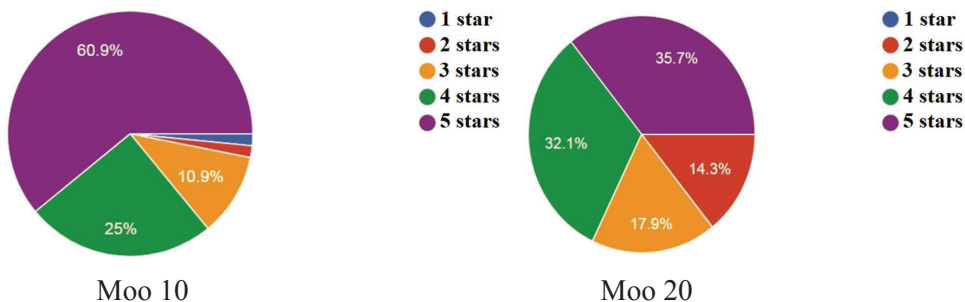


Figure 6. Survey results of waste separation and livelihoods that reduce the use of plastic bags, where the 1-3 digits indicate that the 3Rs principle has been applied. The 4 digits mean that hazardous waste is separated, and the 5 digits mean reducing the use of plastic.

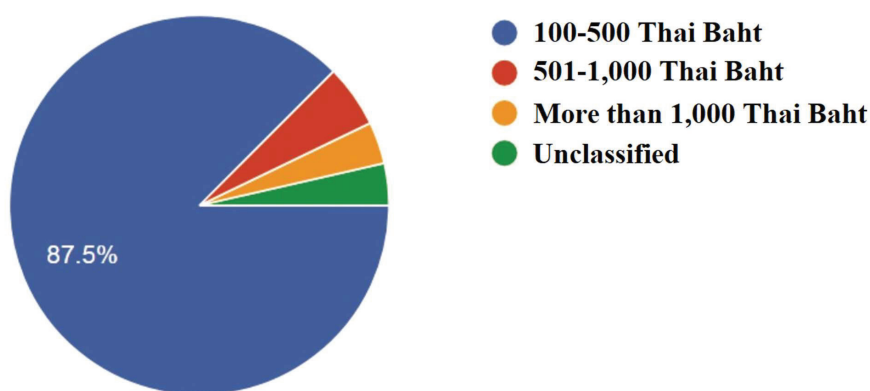


Figure 7. Revenue from sorting recycled waste for sale



Figure 8. Household waste sorting and fermentation of food scraps in the bin

Ban Pho Song Hong Withaya Community School has solved the problem by separating hazardous waste into red bins and separating recyclable waste into sieves provided by the project. The school has a problem with plastic waste and disposable plastic glasses from school sales. The researcher gave a glass of water to some of the students. Furthermore, the school has purchased and distributed glasses of water to all students. Cause students to use their own personal mugs instead of disposable plastic mugs. Therefore, there is no plastic waste problem at the school. In addition, the school has organized learning resources and organized activities to promote understanding of waste management at the source. Which the school will organize every academic year (as shown in Figure 9).



Figure 9. Use of regular plastic bottles instead of disposable plastic cups the school organizes learning activities on waste management at the source

In surveying the requirements of the people in Moo 10 and Moo 20, it was found that 50% still wanted to encourage knowledge and understanding about hazardous waste. storage and separation Including providing knowledge on how to set up a recycling market, as shown in Figure 10.

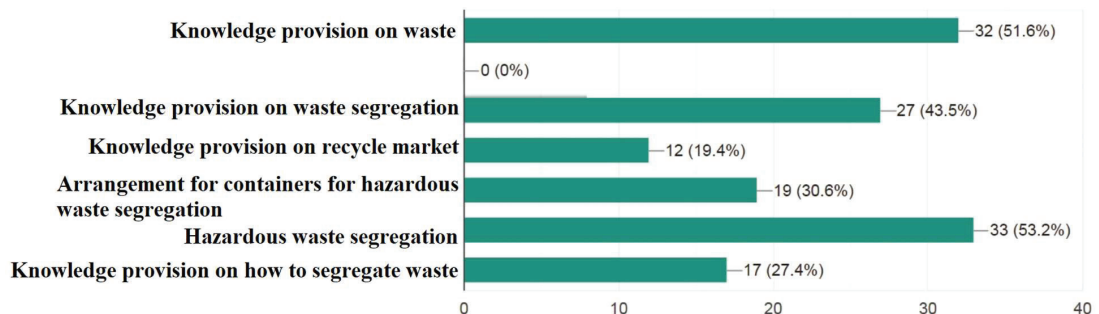


Figure 10. Results of the survey on the need for help from people in Moo 10 and Moo 20

In the review and implementation process (Act), it was found that the villagers understood the principle that the polluter is responsible. be aware of the benefits of solving waste and hazardous waste problems at the source. in future operations What the villagers want is Expanding the results of operations to other villages in the same SAO will help publicize the operational guidelines, including villagers in the pilot villages may have an idea to set up a waste fund in the future. and summarize the process of integrating social and cultural costs of house-temper-school (Bowon) to promote the process of municipal waste and hazardous waste management (as shown in Figure 11), with external agencies as promoters and pushers, namely Maha Sarakham University. Provincial Office of Natural Resources and Environment

Summary of waste management guidelines

waste management Nong Saeng SAO currently focuses on waste management at the destination, which is packing and bringing it to a landfill, which can't prevent the problem of increasing waste. When the research team applied the Bowon network approach to the community by involving the community in every step of the Deming cycle, make people understand the importance of the principle that polluters must be responsible for solving environmental problems that arise. Make people aware of the importance of addressing the waste problem at its source, which is the household. It also participated in the establishment of a waste fund. Including organizing a recycling market as well. However, creating a mechanism to manage waste and hazardous waste at this source requires both community drive and collaboration with external agencies. To create a reinforcement to drive the mechanism to develop continuously.



Figure 11. The process of integrating social and cultural costs House-Temple-School (Bowon) to promote the process of municipal waste and hazardous waste management.

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