

**RELATIONSHIP BETWEEN COMMUNITY AWARENESS AND PARTICIPATION IN
WASTE MANAGEMENT: A CASE STUDY OF BANG RAK NOI SUB-DISTRICT
COMMUNITY, MUEANG DISTRICT, NONTHABURI PROVINCE**

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Abstract

This research aims to 1) study the level of awareness and participation of the community in waste management in the Bang Rak Noi sub-district, Mueang district, Nonthaburi province, 2) examine the relationship between awareness and community participation in waste management in the same area, and 3) propose guidelines for developing awareness and community participation in managing household waste in the community. The research is quantitative in nature, using a survey tool. The population consists of residents in the community under the jurisdiction of the Bang Rak Noi sub-district administration, totaling 30,785 people, with a sample size of 395 individuals. The research findings indicate a statistically significant positive correlation ($r = 0.714$, $p < 0.01$) between awareness and participation factors overall. In every aspect, awareness factors are positively correlated with participation factors at a statistically significant level of 0.01. Specifically, the strongest correlation is found between community awareness and community participation in waste management ($r = 0.742$, $p < 0.01$). The next highest correlation is between community awareness and support for community waste management projects ($r = 0.668$, $p < 0.01$). The least correlated aspects are household waste separation and the evaluation of community waste management projects ($r = 0.345$, $p < 0.01$).

Keywords: awareness, participation, waste management, environmental management

Introduction

Currently, communities in Thailand are facing environmental management issues, with the most prominent being the management of household waste generated from daily living. The initial challenge in household waste management lies in the collection, separation, and appropriate disposal of waste to facilitate the community service organizations in further disposal. While the process of household waste management is not inherently complex, the diversity in awareness and community participation in waste management varies across communities. Beyond individual households, the larger challenge lies in community-wide waste management. Therefore, aside from raising awareness on waste management, community participation is crucial for effective waste management and maintaining a clean environment. In Thailand, over 25.70 million tons of waste are generated annually, with 8.80 million tons of recyclable waste, 9.80 million tons of properly disposed waste, and 7.10 million tons of improperly disposed waste, leaving 9.91 million tons of residual waste (Department of Pollution Control, 2023). Thailand is also one of the world's leading importers of plastic waste, contributing to a significant national waste problem.

In the specific case of Bang Rak Noi sub-district, there were 150 tons of waste generated in 2022, with inadequate facilities for community waste disposal. Consequently, a portion of the waste, approximately 5.03 tons, is improperly disposed of due to limitations in waste collection infrastructure. The issue in the Bang Rak Noi sub-district community, Mueang district, Nonthaburi province, is observed in improper waste disposal practices. This includes the accumulation and scattered disposal of waste in the community, dumping waste in public areas such as along roads, near temples, and around homes and general stores. Although designated areas are allocated for waste disposal, there is a lack of sufficient waste bins with tightly sealed lids in the community. Additionally, the waiting time for waste collection by the sub-district's waste collection trucks is often excessively long. The sub-district faces challenges in waste management due to budget constraints, limiting the purchase of waste collection trucks to transport waste to designated disposal sites managed by the provincial administration. Consequently, waste collection in the community occurs only twice a week. In the current situation, the community predominantly utilizes plastic and foam materials, which are challenging to biodegrade. These non-biodegradable materials, including plastics and foams, lead to improper waste disposal practices such as open dumping, burning, or dumping in waterways. These inadequate waste disposal methods result in environmental pollution, adversely impacting public health, creating unpleasant odors, and contributing to air and water pollution. Therefore, there is an urgent need for proper waste management practices to minimize environmental impact and enhance the overall living conditions in the community.

To address these challenges, the research aims to investigate the awareness and community participation in waste management in the Bang Rak Noi sub-district, Mueang district, Nonthaburi province. The goal is to provide insights that can promote more effective waste management practices in the community.

Research Objectives:

1. To study the level of awareness and community participation in waste management among the residents of Bang Rak Noi sub-district, Mueang district, Nonthaburi province.
2. To examine the relationship between awareness and community participation in waste management among the residents of Bang Rak Noi sub-district, Mueang district, Nonthaburi province.
3. To propose recommendations for the development of community involvement in the management of organic waste through increased awareness.

Research Hypothesis

There is a correlation between awareness factors and community participation factors in the management of organic waste in the community

Literature Review

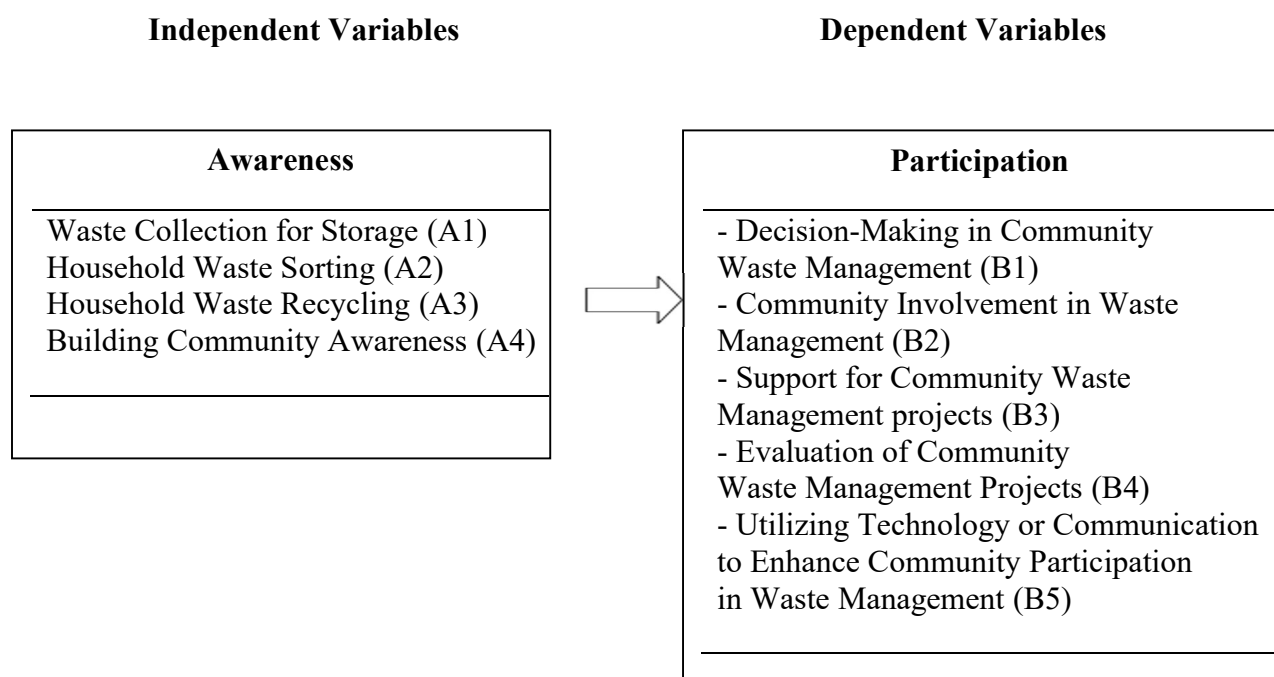
Feelings within the realm of volunteerism for the community or a sense of responsibility toward the community involve civic participation, civic responsibility, and civic engagement. These are social assets that foster trust and collaboration among individuals, contributing to the strength of the community (Hua, C.W. & Wan, K.E., 2011; Wongmajarapinya et al., 2024). Civic consciousness is valuable as it instills a sense of responsibility and cooperation, leading to a resilient community. Awareness in community waste management is crucial as it initiates understanding and acknowledgment of issues related to waste management. It stimulates beneficial behaviors towards the environment and the community as a whole. Key components include generating and disseminating information about the quantity of waste generated in the community, waste management methods, and the resulting impacts. Recording statistical data on waste management is essential to understand the community context. This data should be presented to the community for increased awareness and knowledge about waste management. Activities such as training sessions for waste management skills and segregation should be organized. Effective communication within the community is essential, utilizing online platforms, websites, social media, and other mediums to share information on waste management. Community-building activities should be promoted to enhance awareness. Collaborating with organizations involved in waste management can further promote awareness in the community. Awareness is a crucial factor that enables people to understand and follow environmentally friendly practices. Clear information and community awareness help instill sustainable waste management practices. Providing precise information and creating awareness within the community can encourage environmentally friendly behaviors.

Participation in work or activities generates a sense of ownership, leading participants to willingly comply with and commit to the processes. Addressing community issues through participatory processes requires following specific steps. Individuals engaging in activities must possess a

foundational attitude toward participation. Cohen and Uphoff (1981) discuss community participation, highlighting four dimensions: 1) participation in decision-making involves involvement in decisions from the initial stages, planning decisions, to implementation decisions; 2) participation in implementation focuses on contributing to project components, such as resource assistance, work management, and coordination; 3) participation in benefit reception requires considering the distribution of benefits within the group and the overall project benefits, encompassing positive and negative outcomes for individuals and society; 4) participation in project evaluation involves creating opportunities for all community members to contribute to and influence the activity's progress.

In the context of community development, Bureepakdee (2002) stated that the degree of community participation can be categorized into three types: 1) marginal participation arises from imbalanced power relationships; 2) partial participation results from state policy without considering community needs; 3) full participation involves equal involvement at every stage of development, aligning with community development principles. To address current issues, local authorities, relying on the authority of the Public Health Act B.E. 2535, Article 18, are responsible for waste management within their jurisdiction. The study aims to investigate community participation in waste management in the Bang Rak Noi sub-district, Mueang district, Nonthaburi province.

Research Framework



Research Methodology

The research on community participation in waste management in the area of Bang Rak Noi Sub-District, Muang District, Nonthaburi Province, is conducted using a quantitative approach. The research methodology involves the following steps:

1. Documentary Research: Utilizing documentary research to investigate academic literature, scholarly documents, and other relevant materials to gather reference information. The focus is on acquiring reliable and valid findings. Document types include academic papers, books, literature, government documents, laws, and related researches.

2. Quantitative Research: Employing a questionnaire as a research tool to gather quantitative data. The questionnaire will be distributed and collected electronically through Google Forms. The link to the questionnaire will be sent to the relevant personnel of the Bang Rak Noi Sub-district Administration for integration into their website.

Population and Samples

The target population for this study includes the residents in the community within the jurisdiction of the Bang Rak Noi Sub-district Administration, with a total population of 30,785 individuals. The sample group selected for the study comprises 399 individuals. The sample size determination follows Taro Yamane's formula (Yamane, Taro. 1973.), and considering a confidence level of 95%, the calculated sample size is 395 individuals. Convenience sampling method will be employed for selecting the sample.

Research Instrument

The research team utilized a questionnaire derived from operational definitions based on the theoretical concepts of awareness and participation. The questionnaire underwent content validity and reliability checks. The tool was then distributed to the sample group using Google Forms, with the link shared on the website of the Bang Rak Noi Sub-district Administration. Community leaders further distributed the questionnaire through the community's social media applications. Data collection took place from October 2022 to December 2022, with a total of 402 respondents. After eliminating incomplete data from 5 individuals, the final sample size for the research comprises 397 individuals.

Data Analysis

The statistical tools used for analysis include: 1) Descriptive Statistics: Frequency distribution, Percentage, Mean (\bar{x}), Standard Deviation; 2) Inferential Statistics: Pearson Product Moment Correlation Coefficient.

Research Results

A total of 395 respondents completed the questionnaire. The gender distribution was as follows: 82 males, 306 females, and 7 individuals identified as other genders. The age distribution included 8 respondents aged between 20-30 years old, 28 aged between 31-40 years old, 46 aged between 41-50 years old, 124 aged between 51-60 years old, and 189 respondents aged over 60 years old. Regarding education, 262 respondents had education below a bachelor's degree, 119 held a bachelor's degree, and 14 had education beyond a bachelor's degree. In terms of monthly income, 215 respondents earned less than 20,000 Baht, 112 earned between 20,001-30,000 Baht, 14 earned between 30,001-40,000 Baht, 26 earned between 40,001-50,000 Baht, and 28 had an income exceeding 50,000 Baht.

Table 1 Means and Standard Deviation of the Awareness Factors (n=395)

4 Aspects of Awareness	\bar{x}	S.D.	Level	Rank
Waste Collection for Storage (A1)	3.30	1.234	Moderate	2
Household Waste Sorting (A2)	3.35	0.948	Moderate	1
Household Waste Recycling (A3)	2.92	1.086	Moderate	4
Building Community Awareness (A4)	3.23	1.059	Moderate	3
Overall	3.20	0.874	Moderate	

From Table 1, the overall level of awareness is at a moderate level ($\bar{x} = 3.20$, S.D. = 0.874). In terms of specific factors, awareness regarding household waste separation (A2) is ranked the first ($\bar{x} = 3.35$, S.D. = 0.948). Waste collection for storage purposes (A1) is ranked the second ($\bar{x} = 3.30$, S.D. = 1.234). Community awareness building (A4) is ranked the third ($\bar{x} = 3.23$, S.D. = 1.059), and waste recycling in households (A3) is ranked the fourth ($\bar{x} = 2.92$, S.D. = 1.086), in descending order.

Table 2 Means and Standard Deviation of the Participation Factors (n=395)

5 Aspects of Participation	\bar{x}	S.D.	Level	Rank
Decision-Making in Community Waste Management (B1)	3.07	1.007	Moderate	4
Community Involvement in Waste Management (B2)	3.19	1.066	Moderate	1
Support for Community Waste Management projects (B3)	3.15	1.145	Moderate	2
Evaluation of Community Waste Management Projects (B4)	2.79	1.175	Moderate	5
Utilizing Technology or Communication to Enhance Community Participation in Waste Management (B5)	3.10	1.090	Moderate	3

Overall	3.06	0.912	Moderate
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From Table 2, the overall level of participation is at a moderate level ($\bar{x} = 3.06$, S.D. = 0.912). All factors related to community participation are at a moderate level. In specific factors, community involvement in waste management decisions (B2) is ranked the first ($\bar{x} = 3.19$, S.D. = 1.066). Support for community waste management projects (B4) is ranked the second ($\bar{x} = 3.15$, S.D. = 1.145). The use of technology or communication to enhance community participation in waste management (B5) is ranked the third ($\bar{x} = 3.10$, S.D. = 1.090). Community involvement in waste management decision-making (B1) is ranked the fourth ($\bar{x} = 3.07$, S.D. = 1.007). Evaluation of community waste management projects (B4) is ranked the fifth ($\bar{x} = 2.79$, S.D. = 1.175), in descending order.

Table 3 Correlation Coefficient (r) between awareness and participation factors

Correlations											
	A1	A2	A3	A4	B1	B2	B3	B4	B5	A	B
A1	1										
A2	.586**	1									
A3	.462**	.597**	1								
A4	.534**	.519**	.530**	1							
B1	.486**	.387**	.356**	.521**	1						
B2	.425**	.490**	.520**	.742**	.550**	1					
B3	.546**	.377**	.497**	.668**	.504**	.713**	1				
B4	.464**	.345**	.481**	.552**	.679**	.639**	.662**	1			
B5	.483**	.354**	.350**	.507**	.544**	.553**	.583**	.690**	1		
A	.817**	.821**	.796**	.797**	.545**	.669**	.652**	.574**	.529**	1	
B	.578**	.468**	.532**	.719**	.781**	.831**	.839**	.888**	.812**	.714**	1

** Correlation is significant at the 0.01 level (2-tailed). (n=395)

From Table 3, the relationship between factors related to awareness and participation shows a significant positive correlation at a high level statistically ($r = 0.714$, $p < 0.01$). All factors related to awareness have a statistically significant positive correlation with factors related to participation at the 0.01 level. Specifically, the factors with the strongest correlation are building community awareness (A4) with community involvement in waste management (B2) ($r = 0.742$, $p < 0.01$). Following closely is the correlation between building community awareness (A4) and support for community waste management projects (B3) ($r = 0.668$, $p < 0.01$). The factors with the least correlation are household waste separation (A2) and evaluation of community waste management projects (B4) ($r = 0.345$, $p < 0.01$). Thus, the set hypotheses are accepted.

Discussion

The research findings indicate that the level of factors related to awareness in community waste management is at a moderate level. Overall, all factors related to awareness are at a moderate level. The awareness of household waste separation is at a moderate level, indicating that people in the community have knowledge and awareness of the waste separation process in their homes. The collection of waste for storage is at a moderate level, showing understanding and awareness of the beneficial collection process for waste management in the community. The creation of awareness in the community is at a moderate level, indicating stimulation of knowledge and awareness in topics related to waste management in the community. The recycling of household waste is at a moderate level, revealing that people in the community have an understanding and awareness of the recycling process to reduce the amount of waste sent for disposal. The overall level of factors related to awareness is at a moderate level, suggesting a need to increase communication and provide recommendations to the community to enhance awareness and understanding of waste management. Furthermore, it also reflects the need to create and support beneficial activities in community waste management in line with the research article by Channuwong et al. (2024), Sirathanakul et al. (2023) and Vedchamanee (2021). It was found that communities should operate under the concept of 3Rs-Eco village, where municipal officials continuously provide knowledge, raise awareness, and instill an attitude toward effective waste management in the community. Additionally, there should be a shift in the behavior of separating organic waste, support for the utilization of community organic waste, and promotion for residents to use in-house organic waste bins. This aligns with the research by Channuwong (2028), and Srisuantaeng et al. (2017), which suggested designing activities to develop knowledge and awareness in waste management with five key aspects: 1) the source of waste, 2) types and separation of waste, 3) symbols related to waste, 4) waste management principles, and 5) waste in daily life. The goal is to reduce household waste, emphasizing the importance of increasing the number of participants in these activities.

Community participation in community waste management at a moderate level indicates that the community actively engages in waste management processes. This suggests that people in the community are aware of and participate sufficiently in their own waste management. This aligns with the research conducted by Pochaka and Klongthammachart (2011), which investigated public participation in community composting and problem-solving for community compost management in Nong Waeng Sop Phra Subdistrict, Phol District, Khon Kaen Province. Using a participatory planning approach, the study found that public participation in community compost management was at a moderate level. In terms of supporting community waste management projects, the moderate level of community support for community waste management projects indicates an understanding and support from the community in waste management. The use of technology or communication to enhance community participation in waste management at a moderate level suggests that additional technological or communication tools should be employed to stimulate community involvement in waste management. This highlights the use of technology to assist in this process. Community participation in decision-making in moderate-level

community waste management reveals that communities are involved in decision-making regarding waste management processes. The evaluation of mid-level community waste management projects shows that communities actively participate in evaluating results and developing their waste management processes. The moderate level of factors related to community participation indicates the ability to develop waste management in the community in general and serves as a recommendation for future operations and development to enhance the efficiency of waste management in the community.

The relationship between awareness factors and participation factors overall reveals a statistically significant high positive correlation at the 0.01 significance level. Every aspect of awareness factor correlates significantly and positively with participation factors at the 0.01 significance level. The research results demonstrate a statistically significant high positive correlation at the 0.01 significance level between awareness factors and participation factors in community waste management as a whole, highlighting the importance of these relationships in the statistical analysis. In every aspect, awareness factors have a statistically significant high positive correlation with participation factors at the 0.01 significance level. This signifies the importance of both factors in the waste management process in the community, particularly in areas where the relationship is strongest. The research findings indicate that community awareness correlates significantly at the 0.01 significance level with participation in waste management, highlighting the most interesting relationship. Notably, the strongest correlation is found between community awareness and operational aspects of community waste management. On the other hand, the aspect with the least correlation is household waste separation, which correlates significantly at the 0.01 significance level with low evaluation of community waste management projects. This suggests the need to develop household waste separation activities and appropriately assess community waste management projects. This research provides valuable information for the development of waste management plans in communities, focusing on increasing awareness and community participation. The goal is to create sustainable and efficient operational outcomes in community waste management. This aligns with the research conducted by Aangsutho (2018), which investigated awareness and community participation in mangrove forest management in Tha Kham Sub-district, Bang Khun Thian District, Bangkok. The study found a positive correlation between awareness and community participation in mangrove forest management. The relationship was statistically significant at the 0.01 level across all dimensions, including decision-making, operational involvement, benefit acceptance, and evaluation participation, with correlation coefficients of 0.457, 0.775, 0.779, and 0.694, respectively. Additionally, it is consistent with the research conducted by Boonpech (2021) and Wongsutthirat et al. (2024) which investigated the behavior of receiving information, awareness, and participation in marine waste management issues in Ko Sichang District, Chonburi Province. The study found relationships between the behavior of receiving information about marine waste problems and the awareness of these issues, indicating a positive correlation at a high level ($r = 0.455$). Moreover, there was a positive correlation between the behavior of receiving information and the participation in marine waste management ($r = 0.534$). Furthermore, a positive correlation was identified between the awareness

of marine waste problems and the participation in marine waste management at a high level ($r = 0.723$).

Research Suggestions

Overall, awareness factors are at a moderate level, with every aspect of awareness factor being at a moderate level. In terms of household waste separation, the collection of waste is adequate for storage. Creating awareness in the community and household waste recycling reveal that the majority of the sample group in the community managed by the sub-district municipality of Bang Rak Noi lacks sufficient knowledge in waste management. The sub-district municipality of Bang Rak Noi should actively promote additional knowledge on household waste recycling, emphasizing clear and straightforward communication, using simple language, focusing on key points, avoiding complexity, and utilizing illustrations, videos, and informative graphics to capture interest. Tailoring the message to be suitable for the age, occupation, and interests of the target group, organizing activities aligned with the needs of each group, stimulating participation, conducting recycling tutorials, holding recycling competitions, and providing incentives and rewards for those who recycle are essential. Establishing recycling points and implementing additional regulations to support waste recycling, developing communication channels, creating websites, pages, and applications related to waste recycling, producing printed materials, pamphlets, posters about waste recycling, and building networks to coordinate with government, private, and social organizations, as well as forming clubs and groups related to waste recycling, are all recommended actions.

In general, the level of factors contributing to community participation is moderate, and every aspect of community participation factor is at a moderate level. This includes participation in community waste management, support for community waste management projects, the use of technology or communication to enhance community participation in waste management, involvement in decision-making regarding community waste management, and the evaluation of community waste management projects. It is evident that the sample group in the community managed by the sub-district municipality of Bang Rak Noi collaborates and participates in community waste management at a moderate level. The sub-district municipality of Bang Rak Noi should further develop community participation in waste management across all five aspects. This involves promoting citizen involvement in waste management, conducting campaigns to raise awareness, creating incentives, and providing support for projects. To enhance community waste management, efforts should be made to encourage public participation by providing resources, equipment, funding, and personnel for technical support, training, counseling, and monitoring and evaluation. Additionally, in terms of utilizing technology or communication, the creation of a website with information on waste management, news, activities, scheduled waste collection times, recycling points, and monitoring of waste management results is essential. Regarding decision-making involvement, a committee with representatives from the government, private sector, and the public should be established to gather opinions, suggestions, and make decisions

on community waste disposal. For project evaluation, it is crucial to establish fair indicators for waste management and involve the public in evaluating these projects.

Regarding the relationship between awareness factors and participation factors, it is found that there is a statistically significant positive correlation at a high level with a significance level of 0.01. This indicates that when there is development in awareness factors in all aspects, there is a corresponding development in participation factors. Specifically, developing awareness factors, especially in creating community awareness, can lead to a higher level of community participation in waste management. It is important to note that the aspects with a higher initial correlation between awareness and participation should be prioritized in development efforts. For instance, focusing on developing awareness in creating community awareness can simultaneously contribute to enhancing community participation in waste management. Conversely, areas with a lower initial correlation should also be addressed concurrently to ensure comprehensive improvement in community participation in waste management.

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