Research Article

Public participation in household waste management: A case study of Chum Phae Subdistrict Administrative Organization, Khon Kaen Province*

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Abstract

This research aims to study household solid waste management among local residents, to compare the differences in household solid waste management practices, and to explore recommendations for improving such management. A quantitative research method was employed. The research instrument used was a questionnaire, with a sample group of 376 individuals. Data were analyzed using a statistical software package.

The research results found that: 1. The overall household waste management of people in Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province was at a moderate level (mean = 2.83). 2. The comparative results of household waste management of people in terms of waste disposal, waste reduction, waste separation and waste utilization, including all 4 aspects, showed that classification by gender and income were not different. Classification by age and education level were significantly different at a statistical level of 0 . 0 5 . 3 . Recommendations on household waste management can be summarized into 4 issues: 1) Waste separation before waste disposal, 2) Refraining from using certain containers or packaging, 3) Reducing waste, and 4) Maintaining cleanliness of households and communities. Additional opinions on waste management of Chum Phae Subdistrict Administrative Organization can be summarized into 4 issues: 1) Waste collection by officials 2) Providing standard trash cans and 3) Organizing projects/activities related to encouraging people to maintain the cleanliness of their homes and communities and 4) Chum Phae Subdistrict Administrative Organization The agency should provide a place to dispose of trash that meets the standards.

Keywords: Public Participation, Household Waste Management, Local Governance, Chum Phae Subdistrict, Community-Based Waste Management

Citation

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Introduction

The garbage problem in Thailand is considered a major problem that has been with Thai society for a long time. In the past, people's lives were not complicated. There was not much material development. Therefore, garbage from households became a minor problem. Even if garbage was dumped outside the house or in rivers and canals, it could decompose and be destroyed quickly. However, due to the growth of communities, the expansion of cities, and the development of industries in various aspects, the garbage problem has started from households, communities, and has expanded to society. Garbage is created from human behavior, which we no longer need to use. In addition, garbage disposal by various methods without proper knowledge and understanding has caused various impacts on the environment, such as air pollution, polluted water, and soil deterioration, which has an impact on public health because of the contamination of germs from garbage due to the spread of germs to people through the air, water, and food (Thawin, 2015).

Waste management and disposal problems are another problem that many local administrative organizations are facing, whether it is the problem of incomplete collection, residual waste, improper waste disposal methods, or lack of land for waste disposal. These problems have been accumulating for a long time and are caused by many factors, such as the rapid increase in the amount of waste, which is a result of the increase in population and the improved economic situation, which causes people to spend more on products and increase the amount of waste produced, budget constraints, and local personnel, which are not sufficient to invest and improve the waste collection and disposal system to be effective (Watcharothai, 2013).

At present, Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province has a total area of 16.51 square kilometers / approximately 10,318 rai. Most of the area is lowland with the Chien River flowing through and a dam for water storage for agriculture. According to the population registration data, the total population is 6,272 people, 3,088 males and 3,184 females, 1,880 households, and 11 villages under its responsibility (Four-year local development plan (2018-2021) Chum Phae Subdistrict Administrative Organization, 2017: 6). Chum Phae Subdistrict Administrative Organization is an economic area, resulting in a large number of residents and passersby. The current problem is the problem of waste management because the area of responsibility is extensive, including businesses such as tourist attractions and gas stations that support a large number of people traveling every day. In the waste that the Subdistrict Administrative Organization has, there is only 1 garbage collection truck and 4 personnel responsible for working in the area, which is considered very few for the number of residents. With the amount of waste generated each day There are approximately 2-4 tons of waste per day. For the waste management model, waste bins are placed along the main roads at intervals and waste collection trucks are dispatched to collect waste from 6:30 a.m. to 4:30 p.m. Monday to Saturday, according to the waste collection schedule. Each village is collected one day per week, which causes the problem of rotten waste. Waste disposal sites are not yet sanitary, causing a great deal of suffering for the people. The population is increasing every year, and so is the amount of waste. This causes the problem of inadequate and insufficient waste collection, resulting in rotten waste, fuel consumption, insufficient waste disposal sites, and a large budget for waste collection each year. The executives have recognized this problem and have developed a waste management policy, which is

a national agenda to reduce waste at the source, by allowing the people to participate in waste management together, starting from waste disposal, reducing the amount of waste in their own homes, sorting waste, and making use of waste by selling waste to generate additional income for their families, which are important practices that should be able to effectively reduce the amount of waste in the community.

Therefore, the researcher as an officer working in Chum Phae Subdistrict Administrative Organization and the location of Mahamakut Buddhist University, Srilanchang Campus, Chum Phae Classroom, has seen the problem of waste management that is becoming more and more problematic. Therefore, he is interested in the waste management behavior of the people in Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province. How will the people cooperate and comply with the waste management together in a situation where the local area is not yet ready to provide comprehensive waste management services? And what can be done to reduce the amount of waste in Chum Phae Subdistrict Administrative Organization? So that executives and other interested agencies can use it as a guideline to determine the waste management policy for maximum efficiency. So that Chum Phae Subdistrict Administrative Organization will be a clean, livable city, free from waste and toxic pollution.

Objective

1. To study the behavior of household waste management of people in Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province
2. To compare the behavior of household waste management of people in Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province
3. To study the guidelines and suggestions on the behavior of household waste management of people in Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province

Literature review

Public participation is a fundamental element in effective household waste management, particularly in decentralized administrative systems. The success of waste management at the local level depends not only on policy and infrastructure but also on the extent of community involvement in the planning, implementation, and monitoring processes (Arnstein, 1969; United Nations, 2015).

1. The Role of Public Participation in Waste Management

Public participation refers to the involvement of individuals and community groups in decision-making processes that affect their lives and environment. According to Arnstein's (1969) "Ladder of Citizen Participation," real participation ranges from token consultation to full citizen control. In the context of waste management, participation may include waste segregation, recycling, composting, and engagement in awareness campaigns.

Several studies have affirmed that community engagement leads to better compliance with waste policies and fosters long-term environmental stewardship (Zurbrugg et al., 2012; Sujauddin, Huda, & Hoque, 2008). In Thailand, the Office of the National Economic and Social Development Council (NESDC) has promoted

participatory development as a key strategy in local environmental governance, including waste management (NESDC, 2021).

2. Household Waste Management and Local Governance in Thailand

Household waste, if not properly managed, poses threats to public health and the environment. The Pollution Control Department (PCD) of Thailand reported that in 2020, the country generated more than 27 million tons of solid waste, with a significant portion originating from households (PCD, 2021). Local administrative organizations such as Subdistrict Administrative Organizations (SAOs) are tasked with managing this waste under the Public Health Act B.E. 2535 and related ministerial regulations.

Studies by Troschinetz and Mihelcic (2009) and Pongpat (2017) suggest that decentralized waste management policies often face challenges due to limited technical capacity, funding constraints, and low public awareness. However, when the public is involved through education and participatory planning, SAOs are more likely to succeed in waste reduction initiatives.

3. Barriers and Enablers to Public Participation

Barriers to public participation in waste management include lack of awareness, cultural attitudes toward waste, absence of incentives, and insufficient public trust in local authorities (Moqsud, Rahman, & Mahmud, 2011). Conversely, enablers include community leadership, environmental education, and collaboration with local schools, temples, or civil society organizations (Manomaivibool & Vassanadumrongdee, 2012).

In the northeastern region of Thailand, including Khon Kaen Province, several case studies have shown that grassroots involvement, especially through village committees and women's groups, can play a significant role in promoting household waste segregation and recycling (Sinthupundaja, 2019).

4. Participation Mechanisms and Practical Models

Successful models of participatory waste management often involve a mix of top-down and bottom-up approaches. For example, the "3Rs" (Reduce, Reuse, Recycle) campaign has been effective when integrated with local school programs and religious institutions (JICA & PCD, 2017). Furthermore, participatory budgeting and community waste banks provide financial and social incentives for waste management at the household level.

In the case of Chum Phae Subdistrict, mechanisms such as public forums, health volunteer networks, and village-level environmental groups may serve as platforms for engaging citizens in sustainable waste practices.

Methodology

This research was conducted in Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province. The quantitative research method was used. The research instrument was a questionnaire created by the researcher from studying documents and related research. The population consisted of 6 ,2 7 2 people in Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province. The sample group consisted of 376 people. The method used was to calculate the sample size using Taro Yamane's method. The data was analyzed using a computer program for statistics, which was analyzed in order by analyzing the personal factors of the respondents by distributing the frequency and percentage. The analysis of the solid waste management of the people in Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province was

done by using the mean ( ) and standard deviation (S.D.). Inferential statistics included t-test and One-Way ANOVA or F-test. If there was a statistically significant difference The differences of the mean values of each pair will be tested using the Scheffé method and the public's suggestions on solid waste management in Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province will be analyzed using content analysis and then sorted by frequency (Yanan Mongkhun, 2013).

Results

The analysis of basic personal data of the respondents found that the majority of the respondents were male, 225 people, or 59.84 percent, and female, 151 people, or 40.16 percent. Most were aged 36-45 years, 139 people, or 36.97 percent. Next, they were over 45 years old, 123 people, or 32.71 percent. The fewest were aged 15-25 years, 38 people, or 10.11 percent. Most had a bachelor's degree, 223 people, or 59.31 percent. Next, they had an education lower than a bachelor's degree, 147 people, or 39.10 percent. The fewest had an education higher than a bachelor's degree, 6 people, or 1.60 percent. Most of them had an income of more than 15,000 baht, 159 people, or 42.29 percent. Next, they had an income of 10,001-15,000 baht, 100 people, accounting for 26.60 percent, and the least had an income of less than 5,000 baht, 51 people, accounting for 13.56 percent.

1 . Analysis of household waste management behavior levels found that household waste management behavior in Chum Phae Subdistrict Administrative Organization was at a moderate level overall (mean = 2.83). Households had waste management behavior in terms of waste separation more than other aspects (mean = 3.38), followed by waste reduction, waste utilization, and waste disposal, respectively. When classifying household waste management behavior by aspect, it was found that household waste management behavior in terms of waste disposal was at a low level (mean = 1.99). Collecting waste, putting it in a bag, tying the bag, and throwing it in the trash can prepared by Chum Phae Subdistrict Administrative Organization was something that households did more than other aspects (mean = 3.78). Household waste management behavior in terms of waste reduction At a moderate level (mean = 3.25) by choosing to buy products in refillable packaging, such as dishwashing liquid, shower cream, etc., instead of buying products in new containers, is something that households do more than other items (mean = 3.62). Household waste management behavior in terms of waste separation is at a moderate level (mean = 3.38) by separating degradable waste, such as food scraps, from other types of waste, is something that households do more than other items (mean = 3.54). And household waste management behavior in terms of waste utilization is at a moderate level (mean = 2.79) by choosing to buy and use products that are designed to be reusable multiple times, is something that households do more than other items (mean = 3.56).

2. Compare household waste management behavior by testing the difference in means between more than 2 groups using the F-test to compare the difference between independent variables with the dependent. It was found that households in the sample groups with different genders had household waste management behavior in terms of waste disposal that was significantly different at a statistical level of .05 and had household waste management behavior in terms of reducing the amount of waste. In terms of waste separation and waste utilization, there was no difference. The sample

households with different levels of education had household waste management behaviors and waste utilization that were statistically significant at the .05 level. There was no difference in household waste management behaviors in terms of waste disposal, waste reduction, and waste separation. The sample households with different total incomes had no difference in household waste management behaviors in terms of waste disposal, waste reduction, waste separation, and waste utilization.

3. Recommendations on waste management Data was analyzed using content analysis and presented in a narrative format. Additional ideas on household waste management were summarized into 4 issues: 1) Waste separation before disposal; 2) Refuse to use certain containers or packaging; 3) Waste reduction; and 4) Maintaining cleanliness in the household and community. Additional ideas on waste management by Chum Phae Subdistrict Administrative Organization were summarized into 3 issues: 1) Principles: 1) Waste collection by officials; 2) Providing standard trash cans and 3) Organizing projects/activities related to encouraging people to maintain the cleanliness of their homes and communities.

Discussion

The analysis of the demographic data revealed that the majority of respondents were male, aged 36–45 years, held a bachelor's degree, and had a monthly income over 15,000 baht. These characteristics are consistent with findings in similar studies which suggest that education and age are key determinants of environmental behavior (Sujauddin, Huda, & Hoque, 2008). Individuals with higher education levels often possess greater awareness of environmental issues and are more inclined to adopt sustainable practices (Manomaivibool & Vassanadumrongdee, 2012).

1. Household Waste Management Behavior

The overall level of household waste management behavior in Chum Phae was found to be moderate (mean = 2.83), reflecting room for improvement in several dimensions. Among the four aspects assessed—**waste separation, waste reduction, waste utilization, and waste disposal**—waste separation scored the highest (mean = 3.38), which aligns with research that identifies separation as the most commonly adopted behavior due to its visibility and ease of practice (Zurbrugg et al., 2012). Most households reported separating degradable food waste, a behavior linked to local cultural practices and the availability of designated bins.

Conversely, waste disposal behavior was rated lowest (mean = 1.99), suggesting challenges in final-stage management, such as collection systems, disposal infrastructure, or lack of motivation. This finding supports Pongpat (2017), who found that weak infrastructure and irregular collection services in northeastern Thailand contribute to poor disposal behavior. Interestingly, the highest specific score (mean = 3.78) related to putting tied waste bags into designated bins, indicating that while disposal infrastructure is underutilized overall, certain actions are habitual.

Households also showed moderate engagement in **waste reduction** (mean = 3.25) and **waste utilization** (mean = 2.79), such as buying refillable products or reusing containers. These behaviors demonstrate a degree of environmental consciousness but

may be limited by convenience, access to alternative products, or lack of financial incentives (Troschinetz & Mihelcic, 2009).

2. Comparison of Behavior by Demographic Variables

The analysis using F-tests revealed statistically significant differences in waste management behavior based on **gender and education level**, but not on **income**. Specifically:

-Gender influenced behavior in **waste disposal**, with males and females responding differently. This may reflect gendered divisions of domestic labor, where women typically manage household hygiene and waste (Moqsud, Rahman, & Mahmud, 2011).

-Education level significantly affected **waste utilization**, consistent with studies that link education to greater environmental literacy (Arnstein, 1969; Manomaivibool & Vassanadumrongdee, 2012).

-No significant differences were observed across income groups, suggesting that **economic status alone does not determine** waste behavior. This contradicts assumptions that higher income leads to better environmental practices and supports Zurbrugg et al. (2012), who argue that social norms and community initiatives often matter more than income in driving waste behavior.

3. Qualitative Insights and Community Recommendations

Content analysis of open-ended responses revealed four primary themes:

3.1 Waste separation before disposal

3.2 Refusing unnecessary packaging

3.3 Reducing overall waste generation

3.4 Maintaining household and community cleanliness

These responses are consistent with Thailand's 3Rs strategy (Reduce, Reuse, Recycle), which emphasizes public participation and awareness (JICA & PCD, 2017). Moreover, feedback directed toward the Chum Phae Subdistrict Administrative Organization focused on operational improvements: enhancing collection frequency, providing standardized bins, and organizing awareness activities. These suggestions are aligned with prior findings that recommend empowering local governments and communities to co-manage waste systems (UNDP, 2015; NESDC, 2021).

Overall, the study highlights both individual behavioral patterns and systemic gaps in local waste management. Encouragingly, the community appears willing to engage, provided institutional support is strengthened.

New knowledge

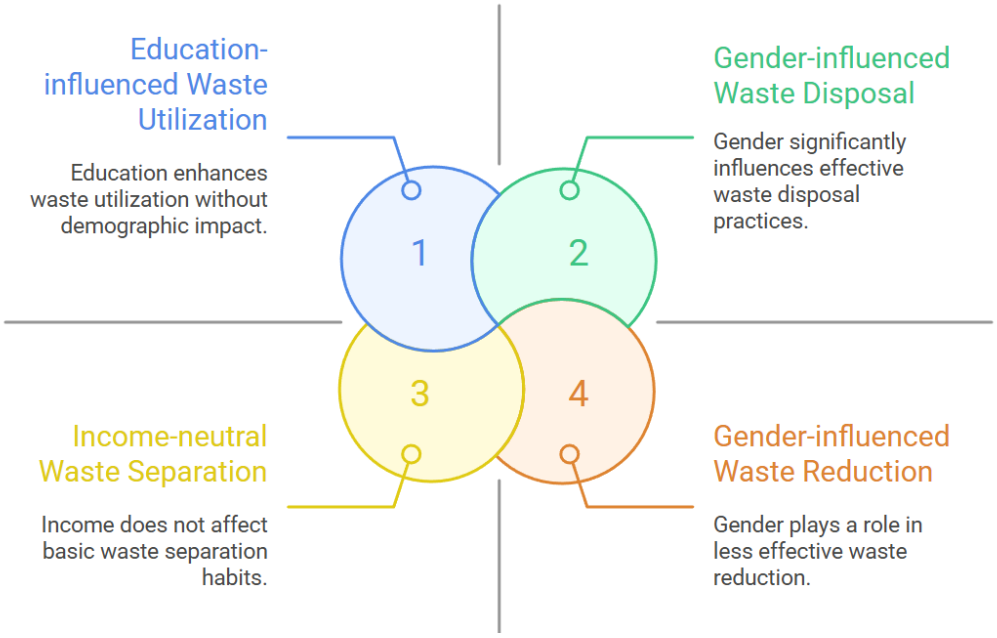

Figure 1 New knowledge, 2024

The image is a Venn diagram-style infographic presenting four key findings about demographic influences on household waste management behaviors. Each quadrant represents a specific type of waste behavior and how it's affected—or unaffected—by demographic factors such as education, gender, and income.

Visual Structure:

-The diagram is composed of four overlapping colored circles, each labeled with a number (1 to 4).

-Each circle corresponds to a specific demographic-related insight regarding waste management.

-Arrows point outward from each circle to brief explanatory texts.

Quadrant Descriptions:

1. Education-influenced Waste Utilization (Blue)

-Insight: Education improves the way households utilize waste (e.g., reuse or repurpose items), independent of other demographics.

-Interpretation: People with higher education are more likely to engage in sustainable practices such as reusing or repurposing waste materials.

2. Gender-influenced Waste Disposal (Green)

-Insight: Gender plays a significant role in determining how effectively households dispose of waste.

-Interpretation: One gender—often women, based on prior research—may be more actively involved in structured disposal practices (e.g., bagging and binning waste).

3. Income-neutral Waste Separation (Yellow)

-Insight: Income does not significantly affect how people separate their waste (e.g., biodegradable vs. non-biodegradable).

-Interpretation: Regardless of financial status, waste separation is a common behavior, potentially due to cultural habits or community-level education.

4. Gender-influenced Waste Reduction (Orange)

-Insight: Gender impacts waste reduction behavior, with one gender being less effective in minimizing waste generation.

-Interpretation: This could reflect different roles or attitudes toward consumption and packaging use between genders.

Overall Interpretation:

The diagram illustrates how demographic factors such as education and gender influence different aspects of household waste management, while income appears to have a negligible effect. It visually summarizes key research findings and provides a quick, comparative understanding of behavior patterns.

Recommendation

1. Suggestions for applying the research results

1.1 The research results from this time should be delivered to Chum Phae Subdistrict Administrative Organization, Chum Phae District, Khon Kaen Province, to be used as information for policy-making on the management, waste disposal and collection systems in households of people in the community.

1.2 The research results from this time should be given to Mahamakut Buddhist University, Srilanchang Campus, to be used as academic information.

1.3 The knowledge gained from this research should be integrated into classroom teaching.

2. Suggestions for future research

2.1 Researchers or those interested in quantitative studies should be given the opportunity to use as information, opinions, suggestions, problems and obstacles, methods for waste management, and public participation behavior in maintaining cleanliness.

2.2 Participatory action research should be conducted on guidelines for developing a waste management system, with all sectors, including government agencies, state enterprises, private companies, and the public, to participate, because the waste problem is a national problem. Everyone must participate. It is not just the duty of one person or government agency, but it is the duty of everyone in the nation to work together and be conscious of throwing away waste and separating waste. It must start with ourselves, starting with our homes. The problem of garbage overflowing in cities will disappear from our villages and our country.

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