



Household Recycling Behaviours and Attitudes toward Waste Bank Project: Mahasarakham Municipality

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Abstract

This study investigated factors influencing household recycling behaviour and the possibility of household participation in a community-based recycling bank project. The research examines two communities in Mahasarakham municipality, where there are differences in conditions and waste recycling management. The study demonstrated that demographic attributes and socio-economic factors play a little role in waste separation and recycling behaviour at household level. Meanwhile, environmental knowledge and attitudes contribute to the perceptions of people, their awareness, and participation to the community-based recycling project. Participation process was usually lacking in the project planning procedure and did not contribute enough time and resource to educate participants

Keywords: contextual factors, recycling behaviour, waste bank

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1.0 Introduction

In the past, waste was reused or recycled for agricultural and farming purposes. The modern lifestyles and mass consuming patterns tended to shorten the material life cycle and made daily separation a necessary routine. The practices of recycling have been transformed together with the waste recovery industry to catch up with the consumption process. At the same time, it developed an exchange value in the market economy realm despite of its repulsive nature. In cities within most Third World countries, solid waste management approach in developing countries should be shifted toward “waste as resource or income generator” approach (Singhirunnusorn and Sahachaisaeree, 2008). To encourage household recycling behaviour, campaigning activities should be integrated into a project at community- based level. In return, waste separation and recycling could also provide economic opportunities for poor families to generate supplementary income to meet their basic needs.

In 1997, the first “garbage for egg” project was initiated in Klong Toey Slum, Bangkok. The project was proclaimed among the first community- based recycling projects in Thailand (Kladnuenklum, 2003). Following this community participation approach, the solid waste recycling bank projects were introduced to a number of communities and schools within Bangkok and nationwide. In recent years, solid waste recycling bank projects have been also recognized by local authorities in provincial Thailand. Taking the cooperation of community into account, the waste recycling bank is assumed to stimulate the solid waste management in the aspects of source segregation, recovery of recyclable materials, and storage material prior to the collection (Visvanathan, 2006). By neglecting differences in local context, the similar scheme applied to communities nationwide could only provide a small number of sustainable recycling projects.

This study thus aims to investigate contextual factors influencing household recycling behaviour and the possibility of household participation in the community-based recycling bank. The research examines the cases of two communities in Mahasarakham municipality, where there are differences in communities’ attributes (i.e. social, economic) and solid waste recycling management.

2.0 Literature Review

A body of literature regarding recycling behaviour and solid waste management approach in the context of developing countries has been reviewed prior to the research design. The following section presents four major components: recycling behaviour; urban solid waste recycling system in developing countries; community based waste management; and solid waste bank approach.

2.1 Recycling Behaviour

Environmental knowledge and attitudes of households should be examined in order to understand their behaviour and how to encourage the waste separation and recycle at waste generating sources. Knowledge of people on environment in general and waste

management in particular has long been recognised among the most crucial factors influencing household recycling (Nixon and Saphores, 2009 referred to De Yong, 1989; Burn and Osakamp 1986). Most recyclers are more likely to get one or more sources of information for example friends, newspaper, television, etc. Various sources of recycling knowledge coming from public education and information through public campaigns are expectedly showing a positive correlation with recycling rate (Nixon and Saphores, 2009).

In terms of *environmental psychology*, researchers found the link between pro-environmental attitudes and recycling behaviour. A number of theories attempted to explain the recycling activities as pro-environmental behaviours (PEB) including Schwartz's Norm Activation model (1970, 1977); the theory of Reason Action (Fishbein and Ajzen 1975, Ajzen and Fishbein 1980); and the theory of Planned Behaviour (Ajzen 1991) (see more in Mannetti et al, 2004). The theory of Planned Behaviour assumes that "attitudes have a causal impact on behaviours through the mediation of behavioural intention (Ajzen, 1988, 1991, 1996; Ajzen & Madden, 1986; Godin & Kok, 1996). This intention is determined by attitudes towards the behaviour, subjective norms, and perceived behavioural control (Mannetti et al, 2004). People might also get motivated to recycle and their behaviour can be regulated by an adequate manipulation of rewards and punishments (Mannetti et al, 2004 referred to Porter, Leeming, & Dwyer, 1995). Some studies found that the psychological variables related to the influences social norm and peer pressure are useful for predicting recycling behaviour. The proposed model basing on the Theory of Reason Action highlights that the demographic, situational and psychological factors could be also responsible for recycling behaviour. (Nixon and Saphores, 2009).

From the environmental psychology perspective, many researches have focused on the gap between *environmental values* and *environmental action*, also known as "value-action gap". The gap is dependent on both individual's attitudes and external factors (Nixon and Saphores, 2009 referred to Blake 1999, p. =>7). Three set of barriers were identified to explain this gap including individuality, responsibility, and practicality. The individual barriers, such as laziness or lack of interest, can sometimes outweigh environmental concerns. The people's perceptions regarding the role of institutions could influence susceptibility of responsible institution addressing environmental problems. Finally, practicality barriers including the lack of time or storage space for recyclable materials, could limit information or personal physical limitations to recycle (Nixon and Saphores, 2009).

In addition to the influences of attitude and knowledge, *convenience* also plays a significant role in determining the recycling behaviour and likelihood to participate in recycling programmes. People are more likely to recycle if they have convenient to access, even a group of people with low concern for environment (Nixon and Saphores, 2009 referred to Derksen and Gartrell, 1993).

Socio-economic and demographic factors: a number of researches on recycling behaviour have showed mixed results on the influences of socio-economic and demographic characteristics (Nixon and Saphores, 2009). Many studies demonstrated relationships among these factors and the engagement in recycling practices. It was found that in general females are more likely to recycle than males. Larger households with higher number of family member and square footage tend to have higher recycling rates. Higher-income households

showed the higher numbers of recycling rates. The level of formal education and knowledge about recycling were found to be positively associated with recycling behaviour (see more in Nixon and Saphores, 2009).

2.2 Urban Solid Waste Recycling System in Developing Countries

Waste has been reused or recycled for agricultural and farming purposes for centuries. The practices of recycling have been transformed together with the waste recovery industry to catch up with the consumption process. At the same time, it developed an exchange value in the market economy realm despite of its repulsive nature.

In cities within most Third World countries, policies for urban solid waste management are mainly focused on increasing the waste disposal efficiency by either advanced technologies or other expensive means. Policies as such could by no mean reduce the cost of waste disposal/ management nor protect the healthy urban environment. Instead, waste management should be gearing towards the “waste as resource” and “waste as income generator” approach, and incorporated recycling activities at household units as the major function of the urban waste management system. Besides serving the purpose of decreasing the amount of daily waste disposal, utilizing waste as resources for local production could generate income and benefit for the urban poor who collect recoverable materials from dumpsites, along city streets and other public places in exchange for income (Singhirunnusorn and Sahachaisaeree, 2008).

2.3 Community-Based Waste Management

The community-based waste management approach is based upon the cooperative concept. The goal of this approach is to making the changes in the communal solid waste management, in terms of source segregation, recovery of recyclable materials, and storage prior to collection (Visvanathan, 2006). Based on this approach, a community project can create the sense of belonging and engage all community members to participate.

In many projects, the community organization has been established in a form of Co-operative (co-op). The small group of members is selected to do the management and administration tasks. The successful projects were reported such as the community-based composting projects from slums in Bangladesh; the community composting and recycling schemes in Borommatrilokanat 21 community in Phisanulok province, Thailand; and the “garbage for eggs” project in Klong Toey slum in Bangkok (Visvanathan, 2006). Those projects proved to reduce significant littering of waste and to improve community solid waste management, health problems of the slums, and cleaner living environment.

2.4 Solid Waste Recycling Bank Approach

Recycling activities in Thailand are mainly undertaken by different groups of informal sector including foragers, dump scavengers, itinerant junk buyers, and municipal refuse workers (Singhirunnusorn and Sahachaisaeree, 2008). Waste recycling from informal sector besides local authority is crucial to the Third World's urban environment. It enhances the efficiency of recovering process, reduces the burden of disposal cost, and helps avoid the unnecessary

and unhealthy disposal technologies.

Household waste separation and recycling activities can be considered as another form of informal practices that could generate supplementary income for urban poor or economically underprivileged groups. To encourage waste separation and recycling at sources such as at home, school, and business, the solid waste recycling bank projects have become recognizable among local authorities in Thailand. Starting from the waste exchange project in Klong Toey slum, Bangkok, the recycling bank approach has been developed on the basis of public participation. Instead of exchanging recyclable materials with eggs or other consumer products, the recycling bank pay the recyclers in cash or credit depending on the administration procedure.

Resembling the bank system, a group of bank committee is set up to manage the administrative and operational tasks. At the beginning of establishment, the participants who sell materials will normally get credit on their account. Materials will be sold to recycling network whether formal or informal sectors. When the bank gets sufficient cash /ow, the participants could consequently received money in exchange for their materials. For some projects in provincial areas, the bank would be set up as a saving co-operative. Every participant is the share holder and will get a year- end divided from the bank profit. The operational methods and incentive strategies are different from place to place.

Finally, a study framework is established by means of the variables found in the review. Fig. 1 demonstrates the relevant variables and interrelation linkages, upon which the study framework is based.



Figure 1: Study Framework

3.0 Methodology

The study primarily focused on a fieldwork approach in order to examine the empirical data from the selected communities and observe the waste management in the case communities. To explore the present recycling situations and local social-economic situations, the research conducted a questionnaire survey with 151 sample respondents, who were residing in two communities—namely, Song-Nue and Ban-Maad. Data tabulation and statistical analysis are accomplished to established based line ramifications.

The study aimed to compare the recycling attitude and behaviour of people living in the Song-Nue, where the community-based recycling bank project has been operated since 2003, and the Ban-Maad community with no recycling bank project. In addition, to understand the temporal dimension of the situations with regard to recycling activities, in-depth interview and field observation were conducted to collect qualitative information from community leaders and residents.

4.0 Results and Discussion

4.1 Participation in Community-Based Solid Waste Recycling Bank

The Mahasarakham municipality initiated the Song-Nue community-based recycling bank projects in 2003. To start the project, the municipality financially supported the initial fund for the bank operation. The municipality did also buy materials separated by the participants and later sell them to private agents. The project started with the money seed of 10,000 baht (320 USD) for buying materials from members. The recyclers could select to either receive cash for exchange or deposit credits into their accounts. Members could get divided from the bank profit by the end of each year and may also request for a small amount of loan for the daily use and in case of emergency. At present, the Song-Nue community organization independently operates the recycling bank with minimal support from the municipality. The bank is now selling their materials directly to buyers, who pick up the materials at the premise. The bank is operated by community members and opens to buy material everyday.

Data from the field survey showed that most of respondents living in Song-Nue community, approximately 96 percent, were aware of the community waste recycling bank. However, about 63 percent were participating in the project. Most people stated that time availability was the main reason for non-participation in the program. Members were not selling material everyday. They typically collected recyclable materials at home and sold them to the bank twice a month. The participating households would get an amount of 100 to 200 Baht (3-6 USD) per visit. Plastics, glasses, and papers were among the most recycled materials found in the community.

4.2 Recycling Knowledge, Attitude, and Behaviour

The study examined the *knowledge* of target groups based on three categories including the basic knowledge about (1) household solid waste; (2) solid waste collection and recycling; and (3) solid waste disposal. Fourteen questions had been asked to examine the basic knowledge of respondents in the two communities. Fig. 2 shows that respondents in these two communities had somewhat high basic knowledge about solid waste and its collection, recycling, and disposal in general. People in Ban-Maad community, however, show a higher percent of correct answers in the last two categories.

In terms of *attitude* towards solid waste management and recycling in the communities, the study examined the level of respondents' attitudes by using the self-

evaluation form containing 15 questions within two categories¼ solid waste management (A1) and recycling (A2). Fig. 3 shows results from the survey. It was found that people living in these two communities have some comparable attitude levels. However, respondents from Ban-Maad shows slightly better attitude on solid waste management issues. They agreed that the solid waste management duty should involved people living in the community and waste separation and recycling practices are necessary and could create more income.

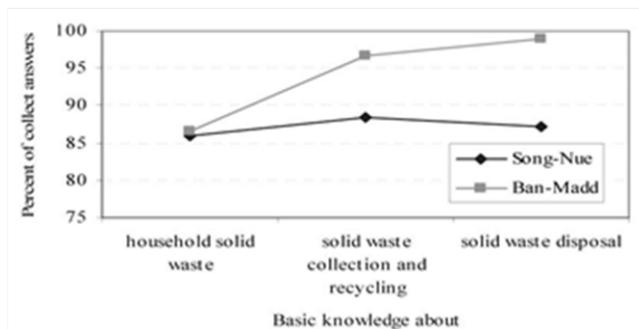


Figure2: Basic Knowledge about Solid Waste and its Collection, Recycling & Disposal

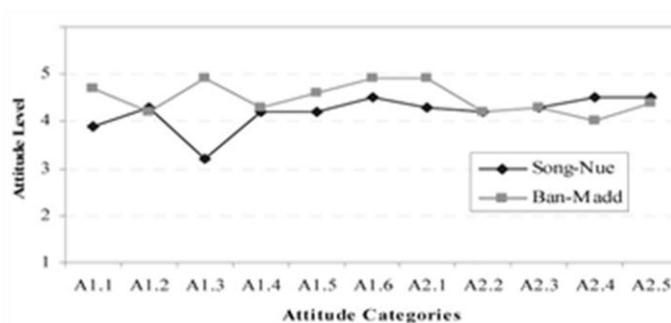


Figure 3: Attitude towards Solid Waste Management & Recycling

In terms of *recycling behaviour*, the respondents were asked to evaluate their recycling practices. Seven conditions were set for this self-evaluation process. The frequencies in behaving on each condition were recorded and presented in Fig. 4. The results shows that respondents living in Ban-Maad (without recycling bank project) show an overall higher frequencies of behaving on solid waste separation and recycling, compared to those who lived in Song-Nue community, particularly in terms of bringing reusable bag and basket for groceries shopping (B.5), reducing the use of plastic and Styrofoam packages (B.6), and reusing separated materials (B.7).

From the aforementioned results, it can be analyzed that people having the community recycling project tended to take it for granted on their recycling practices. Continuing on disseminating the information and raising awareness on environment issues are very important and become a key to the sustainable recycling bank project. The lower level of basic knowledge in Song-Nue community showed that people can be ignorance to the on-going recycling project where there is the absence of succeeding education after the initiation of recycling project.

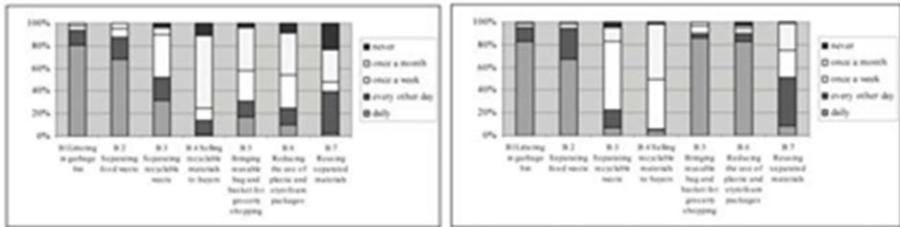


Figure 4: Recycling Behaviour in Song-Nue and Ban-Madd Communities

4.3 Demographic and Socio-Economic Attributes

Table 1 summarizes the effects of demographic factors on knowledge, attitude, and behaviour. The survey shows that the gender and educational level did not demonstrate the significant differences in the level of environmental knowledge, attitude, and recycling behaviour. However, the social status between the group of community leaders/committee and residents show the significant differences in behaviour. The leader group shows somewhat higher points on recycling behaviour.

Table 1: Demographic Factors Influencing Knowledge, Attitude and Behaviour

Factors	Dependent variables (Mean)			
	Knowledge ^a	Attitude ^b	Behaviour ^b	
Gender	Male	10.36 (1.00)	3.53 (0.29)	2.80 (0.59)
	Female	9.99 (1.19)	3.42 (0.34)	2.63 (0.54)
Social status	Community leader	9.44 (0.73)	3.38 (0.35)	3.13 (0.39) ^c
	Residents	10.14 (1.16)	3.46 (0.33)	2.65 (0.56) ^c
Educational Level	Primary education	9.93 (1.26)	3.45 (0.28)	2.76 (0.60)
	Secondary education	10.29 (1.18)	3.49 (0.49)	2.53 (0.54)
	2-year-College	10.60 (0.70)	3.42 (0.17)	2.64 (0.44)
	Bachelor	10.24 (0.44)	3.42 (0.25)	2.65 (0.45)
	Higher than bachelor	10.50 (0.71)	3.27 (0.16)	2.43 (0.40)
Overall	10.10 (1.15)	3.45 (0.33)	2.68 (0.40)	

Note: () Standard derivation

^a Average values of know

^b Average values of scale 1 (strongly disagree/never done) to 5 (strongly agree/very often)

^c ANOVA test, the difference between groups is significant at the 0.05 level (2-tailed)

The study also examines the influences of factors: age, family size, household income, and household expense on the knowledge, attitude, and behaviour by using correlation (r) (Table 2). The results found that age, attitude, and behaviour are significantly correlated to the level of knowledge with the low correlation coefficients -0.16^* , 0.68 , and -0.226^{**} respectively. It was unexpected to find the negative correlations between knowledge and behaviour. In terms of attitude, except for the knowledge factor, the data shows that household income has a negative relation with attitude ($r=-0.242$). It also found that the recycling behaviours of residents are slightly improved with the increasing number of age. Elders showed more recycling practices than the younger ones. It was also demonstrated in the majority of studies that older residents are more likely to recycle (see detail in Nixon and Saphores, 2009).

Table 2: Correlation among Relevant Variables

Factors	Pearson Correlation (r)						
	Age	Family size	Household income	Household expense	Knowledge	Attitude	Behaviour
Age	1.000	-0.279**	-0.028	-0.072	-0.164*	-0.153	0.182*
Family size	-0.279**	1.000	0.100	0.136	-0.011	0.019	-0.122
Household income	-0.028	0.100	1.000	0.344**	-0.060	0.242**	0.101
Household expense	-0.072	0.136	0.344**	1.000	-0.008	-0.108	0.128
Knowledge	-0.164*	-0.011	-0.060	-0.008	1.000	0.268**	-0.226**
Attitude	-0.153	0.019	-0.242**	-0.108	0.268**	1.000	-0.150
Behaviour	0.182*	-0.122	0.101	0.128	-0.226**	-0.150	1.000

Note: ** Correlation is significant at the 0.01 level (2-tailed);

*Correlation is significant at the 0.05 level (2-tailed).

5.0 Conclusion

Solid waste management approach in developing countries should be shifted toward “waste as resource or income generator” approach. To encourage household behaviour to reduce waste at source through their participation, recycling activities should be integrated into a project at community-based level. Community-based solid waste management requires close consultation with community organization and full involvement from community members. As found from the study, environmental knowledge and attitudes can influence perceptions of people, their awareness and susceptibility to the community-based project. The continuous informing process and raising awareness on environmental issues and proper solid waste management are crucial keys to the success of community recycling bank project.

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