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Promoting People's Participation in Solid Waste Management in Myanmar

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Abstract: The purpose of this study was to explore implementation strategies for fostering people's participation in solid waste management in Myanmar. To achieve this, an action research employing mixed methods was conducted in Bagan City, within the twenty months period. Household attitudes and behavior was collected through questionnaire surveys. In-depth interview, group discussion, organizational and community meetings and observation were conducted to address problem situations, explore strategies to fix the problems and assess the outcomes. The results of the study showed that the current participatory approach, which mainly focuses on raising awareness or imparting environmental education, is not adequate to maximize the people's participation in Myanmar due to the persistence of institutional and social constraints. This study discovered that promoting people's participation in its ultimate form is more effective when (1) the municipality develops the knowledge and skills to fulfill the new role of service partner; (2) the people understand (rather than merely being aware of the problems) the harmful effects of their behavior and realize their roles and responsibilities; (3) the people are empowered with knowledge and skill and (4) motivation and interaction exist among all parties.

Key words: Solid waste management, people's participation, empowerment, capacity building, awareness raising

INTRODUCTION

Most cities in the developing world face a high level of environmental pollution, partly due to inadequate provision of basic services like waste collection and water supply (United Nations Centre for Human Settlements (Habitate), 2001). Myanmar, being a developing country, is no exception to that observation. Economic development, rapid urbanization and changes in consumption patterns have contributed to an increase in the quantity and complexity of the solid waste generated. The resulting effect is unlimited waste generation, leading to greater demand for Solid Waste Management (SWM) services. However, overwhelmed municipalities with limited human, technical and financial capabilities have little capacity to address this issue. Only the residents of the downtown areas benefit from waste collection service, whereas a significant portion of the population remains unserved. Complacently overlooking the s hortcomings of the municipalities in delivering

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waste management services results in indiscriminate dumping of solid waste on streets and in public places and river beds, causing extensive pollution and posing a risk to human health. It is therefore imperative to search for alternatives to traditional service delivery mechanisms to keep the cities clean and healthy.

The modality of synergetic operations in an integrated approach to urban service delivery has often been proposed as a possible solution to the waste management problem (Ahmed and Ali, 2004; Ali *et al*., 1999; Baud and Post, 2001; Rakodi, 1999). In this context, the participatory management approach, where roles and responsibilities regarding SWM are shared among the municipality and citizens, is one of the most frequently suggested methods and its merits and problems are well-documented (Joseph, 2006; Papageorgiou, 2006; United Nations Environment Program, 2005; Zia and Devadas, 2007). Under this approach, people can play an active role and can contribute significantly to service delivery. There are a number of successful case studies of people's participation in SWM in developing countries (Anand, 1999; Bernardo, 2008; Mongkolchaiarunya, 2005; Ogu, 2000; Poerbo, 1991; Rathi, 2006; Sujauddin *et al*., 2008). The people's behavior is regarded as a major barrier to the successful implementation of SWM (Evison and Read, 2001); therefore, many studies have focused on raising awareness or imparting environmental education as a classical method to foster people's participation. However, these kinds of studies have not been performed in the Myanmar context and their successful application seems doubtful.

In Myanmar, the trend of people's participation in SWM recently started with an initiative by the Bagan municipality. However, its extent is very limited and only a handful of municipalities across the country are currently on this track. More importantly, the participatory management exercised in those municipalities appears to be a manipulative form and appears to have no clear understanding of what constitutes meaningful participation. The people are asked for their cooperation in particular activities, such as occasional city cleanups, but they have no legitimate function or power. The decision-making regarding the planning and implementation is carried out by the municipalities alone and there is no room for the general public, whose voices and opinions are not listened to or considered. As a result, this method cannot achieve the stated goal of adequate provision of SWM service and instead has become a frustrating process for the people as well as the municipalities themselves.

On the other hand, some social factors, such as attitude and self-confidence, may also contribute to public apathy. It is common in Myanmar society that people have indifferent attitudes toward keeping public spaces clean and lack interest in taking part in the drive for SWM. A long-standing view of almost the entire populace is that they are responsible for keeping their home clean, but their immediate environment and public places, like streets and drains, are the responsibility of the municipality. They even believe that the practice of indiscriminate littering is acceptable, because it offers employment for someone else. These attitudes lead to a lack of respect for tacit rules of socially responsible behavior. Moreover, the people's lack of self-confidence in their abilities to exercise control over their own actions or community initiatives seems to be a further limitation. Since the people of Myanmar have long been excluded from the management process of community development, they are not currently in a position to play a key role in SWM. People feel strongly that they are incapable because they have no knowledge, skills or experiences. As a result, they are hesitant to cooperate with the municipalities and generally ignore their own roles in improving the situation. That is to say, changes in people's attitude, behavior and empowerment are essential.

Generally speaking, the participatory management paradigm for SWM has spread successfully in other countries, as can be seen from the empirical evidence, whereas

Myanmar's efforts have been futile. It is, therefore, important to study this issue to determine realistic strategies to foster people's participation in its ultimate form (i.e., partnership) for better SWM service delivery in Myanmar. This article is an attempt to: (1) identify the obstacles to people's participation; (2) address how the obstacles could be overcome and (3) assess the outcomes of such efforts.

MATERIALS AND METHODS

The study was conducted in Bagan City, a World Heritage listed archeological city located in the Mandalay Division in Myanmar. The city consists of an archeological city and two towns comprised of nine wards (administrative areas) and its landscape is dominated by thousands of ancient pagodas and monuments. Bagan is home to approximately 70,000 people living in 11,138 households and is a popular tourist spot for about 10,000 daily visitors. Bagan is the city where the participatory management approach to SWM originated and is therefore considered as the best representative among the handful of municipalities in Myanmar that have exercised such an approach. Despite its failure, it is considered to be an initiative that may pave the way for future collaboration. The lessons learned from the past experience and the existing network will lay the groundwork to develop appropriate strategies for promoting people's participation in SWM in the future. Moreover, as an ancient archaeological city, the cleanliness of the city and its environment should be given first priority.

The authors used a mixed methodology in conducting the action research, employing in-depth interviews, group discussion, organizational and community meetings, structured questionnaires and observation. Interviews were held with a total of 20 key informants, including municipal officials, ward leaders, elders and women representatives. Responses from 289 randomly selected households were collected using questionnaires. Of these, the mean scores of 45 respondents for awareness, self-esteem and self efficacy were pre- and post-tested to identify improvements. Diverse groups of people, including municipal staff, ward leaders, civil service members, religious figures, NGOs, students and residents from the nine wards across the city, participated in problem identification, planning, implementation and evaluation. A series of group discussions were held with 60 participants with different objectives. Direct observations were used to document the actual conditions and practices to corroborate the responses from the interviews, group discussions, meetings and questionnaires. These complementary means of data collection resulted in a rich, triangulated data set. The content, percentage, measures of central tendency and t-test analysis were used for an examination and discussion. The data were collected from October 2007 to May 2009.

RESULTS

Evidence of Manipulative Participation

Bagan municipality is mandated to provide municipal services to its residents. An Executive Officer, who is a government appointee, heads the municipality, but the direct responsibility for SWM is placed in the Conservancy Section. At present, the section employs 43 workers on a regular basis and there are 7 waste collection vehicles for hauling solid waste. The average generation of solid waste in Bagan was estimated at about 40 tons per day. Among the different types of solid waste, household waste represented 60% of the overall waste stream. The municipality was able to collect only 40% of the total generated

Fig. 1: (a) Uncollected waste in public space, (b) uncollected waste in river bed. Source: Photographed by the researcher in the observation of the study

waste. The collection service was available mainly in the downtown area, while households in the other areas resorted to open dumping in streets, public spaces, or bodies of water. Heaps of waste on the streets and wandering animals spreading it around were common, even in historically important areas of Bagan's archaeological city (Fig. 1a, b). Besides being a public health hazard, this caused severe problems of flooding and pollution. As a result, the demand for efficient waste collection service is increasing.

In response to this challenge, the municipality has, since 2004, shifted from a traditional top-down waste management system to a participatory system. Under this approach, there was a call for the people, via public awareness programs, to participate in keeping public areas around the city clean and disposing of waste properly. About 63.3% of the surveyed respondents reported that they initially participated in the ward cleaning drives, but later they avoided such collective working because they had gone through disappointing experiences with the municipality.

People were invited to participate in particular activities, but they lacked the power to ensure that their views would be heeded by the decision makers. For instance, the municipality once prepared an operational plan that left nothing for the people to discuss or decide. In addition, the municipality was aloof from the people and there was no motivation

for the people to play their expected roles. This situation is analogous to Rowe and Frewer's (2000) one-way flow of information from decision-makers to stakeholders and Arnstein's (1969) manipulative form of participation. As a result, people's participation had been short lived and the problems of SWM remain.

Obstacles to People's Participation in SWM

Following the survey, a series of meetings, group discussions and key informant interviews were conducted to identify the obstacles against linking the municipality and the people for the purpose of delivering better SWM service. The responses showed that four significant barriers prevent such a partnership. These included:

- A lack of knowledge and skills of the municipal personnel to conceptualize and build partnerships with the people
- The limited awareness and indifferent attitudes of people toward their responsibilities
- The low self-confidence among women and the poor, which makes them hesitant to take part in SWM activities because they feel inferior and unskilled
- The lack of motivation or information, as people generally do not know what management exercises are happening and how they can get involved

The management style of the municipality left little room for innovation. There was no opportunity for the staff to acquire new skills and they did not normally receive any exposure to innovations taking place within or outside the country. The municipality official stated in the interview that they had difficulty facilitating the participation process as they did not have the necessary knowledge and skills or any opportunity to learn from innovations elsewhere. The result is that the municipality is gripped by an inertia that prevents any departure from the traditional path of isolation from the people. As a result, they cannot easily reach out to create a partnership with the people.

Public awareness is important in improving SWM service, but it was found to be very limited in Bagan. The responses showed that many people were aware of the solid waste problems that affect them, but the majority did not realize the harmful effects of their disposal behavior and did not have a sense of personal responsibility. They were almost totally unaware that the crisis situation was basically caused by their behaviors; instead, they saw themselves as the victims of that crisis. This agrees with the survey findings, which show that 61.6% of the respondents were aware of the solid waste problems, of which 71% often disposed of their waste on the streets or in public spaces as they did not believe that their disposal practices would cause or exacerbate environmental pollution. In addition, 89% also held the traditional view that keeping the city clean is a duty of the municipality, while they are responsible for their home. This attitude resulted in public apathy to take part in the drive for SWM. That is to say, changes in people's attitude and behavior are essential.

There is also a problem with holding low self-confidence among the poor and women. In Myanmar culture, women are primarily responsible for the cleanliness of the house and family hygiene. Thus, they can be viewed as the waste managers at the household level and their participation in the entire management process is crucial. However, women felt reluctant to participate in community decisions due to severe cultural constraints and prejudices. They were very hesitant to share ideas in public and to cooperate with the municipality. It was found in the survey that about 65% of the women respondents did not feel confident in their ability to take action or play a key role in SWM because they believed that they lacked knowledge, managerial skills or experiences. This finding indicates that there is a need to work toward empowering the people to participate actively in SWM.

Communication and information are paramount to stimulate people to participate in all forms of SWM activities. Ideologically, people need access to information about what SWM activity is being implemented and how they can get involved. Despite its significance, the responses indicated that the municipality failed to distribute the message and to communicate with and motivate the people to improve their capacity and behaviors. All of the participants in the group discussions revealed that a significant portion of the population had little access to information regarding SWM. There was no direct communication between the municipality and the people. Again, the survey data also indicated that very few (10.4%) of the respondents had occasional access to the information. Needless to say, a lack of communication contributes to public apathy and leads to a collapse of participatory practices.

Developing Capacity of the Municipal Personnel

An intensive two-week training course on integrated solid waste management was organized for the municipal personnel. Ten inter-divisional staff members responsible for dealing with solid waste were recruited to develop knowledge, skills and techniques to effectively address the challenges. The training provided basic knowledge on SWM principles, participatory management concepts and principles and strategies for facilitating participation and introduced sound alternative solutions for SWM. It therefore included a series of theoretical lessons and practical tasks. The researcher and a senior official from the central government who had received training in this field overseas taught and coached the participants in the training.

At the end of the training, the participants were assigned to draft a participatory solid waste management plan for Bagan. The outputs of the planning exercises provided convincing evidence of how the participants could apply the lessons learned from the training to their work. The draft plans were used as basic ideas from which to create final action plans with all concerned parties. On the following day, the participants became extension workers who mobilized and facilitated the people to participate in SWM. The study determined that the training benefit was quite high as it catalyzed the participants to assist with the genuine process of transformation of SWM from traditional practice to participatory endeavor.

Raising Public Awareness for Attitude and Behavior Change

The success of SWM strongly depends on people's behavior. Responsible behavior or changes in waste disposal practices can best be made when people understand the issue. Thus, a well-tuned awareness raising campaign was launched to build people's environmental consciousness, to inform them of the impacts of their indiscriminate waste disposal practices and to broaden their understanding of their responsibilities. At the onset, leaflets were distributed among households, shop owners and office workers, mini-billboards were displayed in busy places in the city and daily (later on weekly) public announcements were made by loudspeaker across the city. Meanwhile, awareness-raising articles were published in newspapers and local journals, which increased the visibility of SWM issues at the local as well as national levels.

Women are very important stakeholders in SWM because they are primarily responsible for the family hygiene and household waste management on a day-to-day basis. In this context, special attention was given to reaching out to women's groups and their awareness was raised to a great extent through local women's associations, which gave talking points and literature to their members at social gatherings and occasional meetings. This effort made

sure that every individual understood the solid waste issue, that this understanding reached their consciousness and that they were sensitized to their roles and responsibilities.

Because children are effective communicators and the ultimate beneficiaries of a better tomorrow, it is very important to place an emphasis on educating them to make them aware of the importance of a clean environment and proper waste disposal. Therefore, awareness-building lectures were given to schoolchildren during a school assembly. Posters, photos and published articles were exhibited in schools to grab their attention and develop a comprehensive understanding among the students. The school lecture not only created awareness within the new generation, but also indirectly increased parents' awareness of the solid waste issues as children took the information home and discussed it with their parents.

The people of Bagan believe strongly in their religion and customs and thus religious figures can play a significant role in changing people's behavior. Keeping this in mind, the awareness raising activity was intensified by presenting the solid waste issue at religious functions. Buddha's teachings and his doctrines regarding good solid waste handling practices were delivered by senior monks on each holy day. It was found that the legacy of the noble religious belief has significantly improved public awareness and the recommendations from revered monks to keep surroundings clean, avoid littering and manage waste went a long way toward improving the situation in urban areas of Bagan.

Building Community Empowerment

A key precondition for successfully developing people's participation is for marginal people to have the power (ability) to participate in, negotiate with, influence, control or take action for SWM. Thus, a community empowerment measure was conducted and special attention was paid to the poor and women, who are socially marginalized in Myanmar. This measure aimed to build the knowledge, skills and self-confidence necessary to participate actively in the entire management process as well as to instill a sense of self-reliance and forward thinking. The practical approach to community empowerment in this study consisted of three steps: (1) support individual empowerment (self-esteem), (2) enhance personal development (knowledge and skills) and then (3) promote collective action.

At the initial stage, a social comparison method, including both upward and downward comparisons, was used to encourage the participants to enhance their self-image, to develop an internal locus of control and to construct good relationships between themselves and the environment (outsiders). The women were initially shy, hesitant and silent. They hardly spoke or made contributions. However, when they were strongly encouraged, they spoke openly and presented their views more freely. Their ultimate levels of self-esteem were reached when the participants assessed their own abilities and virtues by comparing themselves to others who are doing slightly better in some way and those who are performing poorly. This optimistic sense of self-esteem, in turn, led to improving their relationships with others. As the session progressed, they began to perceive that they could be influential in the process of SWM and could intervene in some issues.

The participants were empowered to some extent by the self-esteem building, but the most important limitation still existed; that is, they lacked knowledge and skills relevant to SWM. Therefore, public lectures on the basic principles of SWM and guidance for good management practices were provided on every weekend during a four-month period. Later, in view of the importance of educating all members of the ward, the lectures were given to a representative of every household. The lecture sessions not only imparted scientific knowledge, but also gave each participant a chance to practice proper solid waste handling.

Together with the public lectures, SWM manual booklets, in which the concepts of waste reduction, reuse, recycling, rejection, storage, disposal methods and home composting methods were explained, were distributed to each house. Once the spark of personal ability was ignited through the development of knowledge and skills, the participants were able to participate or take initiative to make changes on their own.

Long-term success of the participatory management approach requires institutionally embedded participation (Reed, 2008). Such local organization should be a representative structure serving the common interest (Hardoy *et al*., 2001). In addition, in view of the need for a platform for stakeholder interaction, a Ward Waste Management Committee (WWMC) was formed in each of the nine wards. The committee consisted of a Convener and four members, two of whom were women, who were enthusiastic and could devote more time to voluntary activities. Headed by the ward leader in his capacity as the Convener, the committee was responsible for the overall administration and execution of SWM at the ward level, for motivating and supporting the people and for serving as a bridge between the municipality and the people. It was found that selecting the ward leader as the Convener gave the organization credibility and more support from the local authorities. The inclusion of women in the committee ensured the active participation of the marginal groups and their input in the development planning and implementation process.

Initially, there was a view that existing local institutions can assume management responsibilities. However, it was found that most existing local structures are government-affiliated institutions with negative reputations. Moreover, as the community management structure was intended to be representative and accountable, existing local structures were not qualified. The result of the formation of the new organization was a growing willingness among the people to interact and collaborate with the municipality and WWMC. Therefore, a few months later, concerned persons, mostly youths and housewives, became involved in assisting the committee and facilitating community waste management actions. These groups were called Waste Care Groups and each group consisted of 10 to 15 people. At last count, there were two to three Waste Care Groups in each ward of Bagan.

Mobilizing the People

As McDonald and Ball (1998) pointed out, any forms of waste management need to be adequately communicated and encouraged to the public so that residents' behaviors and habits can be changed for the better. Bearing this in mind, once participatory management was in place, WWMC, Waste Care Groups and the municipality conducted house-to-house motivational visits during weekends and public holiday periods. The visits encouraged and assessed the performances of the households and, if necessary, gave advice or clearer instructions on what to do and how. There was strong evidence that the walking to talking strategy creates a desire among the people to cooperate more actively and enables the service providers to understand in greater depth the people's opinions and feedback. This finding supports the work of Reams and Ray (1993), as they noted that general information was ineffective in changing behavior. Direct and personal contact is a more effective method of gaining commitments to participate then indirect and impersonal efforts.

As a part of the motivational process, a clean house competition was conducted twice per year. Its objectives were to encourage waste minimization, reuse, recycling and composting and to increase awareness of good SWM practices. The residents were informed of the competition one month in advance through public announcement channels. The premises of the registered competitors were monitored by an independent judging panel and

photographic evidence was taken to identify improvements or shortfalls in SWM practices. Following the judging, the winners were invited to the town hall for the awards presentation, where the first, second and third prize winners were presented with a cash prize and a certificate to mark their success. Approximately 184 houses across the city participated in the first competition and the number is expected to increase in future competitions.

Ward-Based Integrated Solid Waste Management Scheme

This scheme is the outcome of the intervention programs mentioned above and a concerted effort by the municipality and the people to deliver better waste collection service to all segments of the population and keep the ward clean for improvement of the urban environment. It has been implemented in each of the nine wards in Bagan. Under this arrangement, households take action to reduce waste generation, avoid the use of polythene plastic bags and reuse and recycle their waste as much as possible. Through pit or barrel-type composting methods, kitchen and garden waste is composted and used throughout home gardens and vegetable patches. Waste that needs to be disposed of is properly stored in available containers at home. Under the management of WWMC, the primary waste collectors collect waste from every household daily. The collected waste is then transported to communal collection points or pre-designated places for secondary collection. There, the municipal waste collection vehicles load the waste and transport it to the final waste disposal sites. This secondary collection is the responsibility of the municipality.

In any form of community-based initiative, a great deal of support is generally required to enhance the local ability to develop programs, particularly during the initial stages, when sufficient resources and enthusiasm have not yet been generated. For this reason, the municipality provided modified pushcarts and waste collection equipment according to the particular needs of the wards. It contributed specially designed compost barrels to the low-income households for home compositing. In addition, the local authority donated portable plastic dustbins and they themselves motivated their staffs and families to participate in SWM. This showed that the attitudes of the municipality and local authority toward the people have changed and they are advancing the participation process. It would appear that tremendous support from the municipality and local authority has increased the people's trust in the scheme and enhanced their confidence in their participation.

Changes as the Outcomes of the Interventions

A significant improvement was found in the people's awareness level. There was a common understanding among the people about the state of SWM, the causes of its state and their roles and responsibilities. Together, the attitude of the people was also developed. Today, they still hold the common view of SWM as a responsibility of the municipality, but they also realize their own responsibility as they are principal waste producers. One woman said, Everyone should take or share responsibility for management of solid waste because these problems have been created by all.

Positive changes were also discerned in terms of behavioral patterns. The people now have disciplined waste disposal habits and they no longer dispose of their waste in public spaces. There was great interest among the residents in keeping their immediate environment clean (Fig. 2). The following statement from a housewife indicates strong support: Previously, I often threw my household's garbage on the streets. Now I do not. My house has a plastic dustbin and I dispose of it in a collection pushcart. This corroborates very well with the quantitative findings. The respondents' mean awareness scores before and after the intervention clearly indicate improvement, with t-value of -6.704 (Table 1).

Fig. 2: People's collective activity for ward clean. Source: Photographed by the researcher in the observation of the study

Table 1: Mean scores before and after the interventions

Characteristics	Before (Mean±SD)	After (Mean±SD)	Mean difference	t-test	p-value
Awareness	8.200±2.53	10.40±1.30	- 2.20	-6.704	0.000
Self-esteem	25.82±4.79	33.24±3.32	- 7.42	-12.47	0.000
Self efficacy	24.04±5.24	32.93±2.43	- 8.88	-13.72	0.000

Source: Survey data collected in the study

Empowerment improvement was a further gratifying achievement. Having been empowered with knowledge and skills about SWM, the people became more powerful, participated decisively and influenced (to some extent) the management process. It was observed that many participants felt confident to take a role in leadership and decision making. The most important achievement and positive impact was mirrored in the formation of the WWMCs and the emergence of waste care groups across the city. As a result, the dependence of the people on the municipality has greatly decreased and they are now in a position to identify and meet most of their needs autonomously. There was also a substantial improvement in regard to the women's empowerment status.

The following statements from group discussion participants reflected how the empowerment measure enhanced their self concept and developed their capacity. Initially I was embarrassed to work with other people, especially men. Now I am not. I can share my ideas and can demand that my needs be met. I can be an influential person in decision making, a 55-year-old woman said. Another housewife said: Formerly we didn't know what to do, how to manage our waste. We thought the municipality was a bigwig who had to rule with an iron fist. But the public education program altered the situation. Without it, we would not be able to manage our waste properly and take new ways of action. This improvement is further confirmed by the quantitative findings. The t-test analysis revealed that people's empowerment in terms of self-esteem and self-efficacy was significantly improved, with t values of -12.474 and -13.725, respectively (Table 1).

Together, the participation rates in all forms of management activity increased dramatically (Table 2). Most significantly, about 62% of the respondents participated and wielded power in the management and decision making process, although none had done so before. Similarly, their participation in the meeting activity (consultation) also increased by 73.3%. These are signs that the extent of participation was promoted from manipulation to

Table 2: Changes of participation rate before and after the interventions

	Participation rate (%)		
Patterns	Before	After	Change
Sanitation behaviors			
Waste prevention	11.0	56	45
Reuse	20.0	62	41
Recycling	27.0	76	49
Home composting	16.0	62	46
On-site storage	31.0	100	69
Primary collection	0.0	78	78
Weekly clean-up drives	49.0	100	51
Contributions (cash and kinds)	56.0	69	13
Consultation	6.7	80	73
Management and decision making	0.0	62	62

Source: Survey data collected in the study

a partnership where citizens have real power to shape the decisions that affect them and to control the management process. That is to say, the actual people's participation in SWM was caused by practices to turn the ideas into cultural norms.

Finally, the environmental conditions in the city have improved dramatically by establishing a regular and effective system of solid waste collection. The waste collection efficiency increased gradually from 40% before the initiative to 82.1% after the initiative. Among beneficiaries, the low-income households received the most benefits. The wards' sanitation condition has improved and almost all waste has been removed from public spaces. About 53.3% of surveyed respondents were very satisfied with the developed SWM system and a further 35.7% were satisfied. They cited the reliability of the house-to-house collection service as the most satisfactory. However, 4.4% were still unsatisfied while the remaining 6.6% were undecided.

The WWMC and the residents received recognition and appreciation from the local authority and municipality since their performance created a national reputation for Bagan. When they deal with governmental agencies on either private or public business, they are treated in a respectful manner, not like objects belonging to the bureaucratic system. The municipality also earned a nationwide reputation as the city became popular for its zero waste. This proven success of the participatory management initiative has provided a proof-of-principle effect. The municipal authorities from adjoining cities visited Bagan and studied the project, then formulated ward-based solid waste management schemes in their respective areas.

DISCUSSION

Participatory management approach is considered as an alternative to traditional waste management system in which the municipality and the people assume co-responsibility and co-management for the delivery of better SWM service. Therefore, participation cannot operate in a vacuum and the cooperation between all parties is crucial. Mere manipulation or welcoming people to get involved in SWM with no legitimate function or power is no guarantee that optimal benefits or set objectives of this arrangement would be achieved. For favorable and durable participatory management practices, it is important to make sure that all relevant actors have the roles to play in the entire process of SWM.

People participation is not easy. On the one hand, this requires changes in people's attitude and behavior and on the other hand it demands from the municipality recognition of the importance of people. For municipal officials to involve the general public in SWM

there are some pertinent questions that need to be answered: do municipality officials have the political will? Do they understand the benefits of people's participation in SWM? Do they have the technical know-how to facilitate participation process? Similar research in some cities in developing countries has shown that the prevailing attitude among government officials toward non-state initiatives is mostly negative (Kolavalli and Kerr, 2002; Ahmed and Ali, 2004). However, this study found that the attitude among the municipality officials was different. They had political will and perceived the importance of people's participation. The fact is that they lacked an understanding of much of the meaning and the necessary concepts that Plummer (2000) described as essential to facilitating meaningful participation.

It was found that the lack of knowledge and skills could lead to implementation of ill-conceived SWM scheme that would eventually fail. In deed the municipality's role in the participation process is not a simple one, hence, the municipality needs to prepare itself sufficiently for the part it must play in the partnership. Ideologically the goal is attainable, but achieving this goal requires knowledge and skills. This finding is in agreement with other studies. For example, a report from the World Bank (2000) identified the lack of technical and institutional capacity in the public sector as barriers to forming partnerships with community organizations. For municipality to change their practices, they need management skills and the capacity to fulfill the new role of service partner (Papageorgiou, 2006).

The SWM requires the involvement not only of a technical staff with knowledge of SWM but also of the whole of civil society. The necessary condition is the people to have awareness regarding SWM. However, it appeared that in Bagan, even though awareness is central in getting the people to participate in SWM, this awareness appears not to necessarily translate into practicing pro-environmental behavior. As mentioned earlier, many people were aware of the solid waste problems, but majority got accustomed to throwing their waste on the streets or in public spaces. They did not realize the impacts of their behavior and did not have a sense of personal responsibility. Therefore, this study argues that it is wrong to assume that people who are aware of the SWM problems are more likely to change their behavior. Failure to translate awareness knowledge into practice would limit people's participation.

Awareness information alone is not enough to encourage a change in behavior. This is because information is understood as unreflected data or knowledge. It can make the people aware of solid waste problems that affect them, but it does not guarantee that their actual behavior will correspond to their knowledge. A common phenomenon observed in the study is that the better behavior was dismissed in favor of accustomed behavior or comfort. In this respect, behavior changes are more likely to happen when conviction drives the individual. Such conviction happens through understanding (Jensen, 2002). Therefore, it is important to make people understand the problem, not merely make them aware of it. They should understand what solid waste is, what it does to the environment and public health and what their roles and responsibilities are in terms of fixing the problem.

Moreover, it is unquestionable that effective communication and motivation measure are worthwhile. People's participation is directly related to the information available. Lack of information substantially affects the quality of people's participation. To participate effectively, people need access to information that what exercise is happening and how they can get involved. This finding is in agreement with Coad (2005), who noted that for participation to be effective people need quality information they can use and understand. The most effective way to ensure that the right messages reach the people is to carry out a house-to-house motivational visit. There is evidence that the motivation builds the confidence of the people, who begin to believe that the project means to deliver better SWM

service. It also gives the people a chance to clear doubt and ask question about SWM, which leads to expand more effort on the given task.

Power inequalities within participants represent an equally important barrier to meaningful engagement. It is therefore necessary to consider how inequalities can be overcome to enable all parties to participate on a level playing field. For example, intensively encouraging marginalized populations and building a platform for dialogue and interaction enhances self-worth, trust and relationships among marginalized groups as well as all stakeholders. In addition, imparting knowledge relevant to SWM causes a change in people attitude, resulted in more correct behavior. By explicitly dealing with issues of power and trust in this way, it is possible for the marginalized to demand that their needs be met, exchange ideas, plan together and implement accordingly. This increases the likelihood that the participation process is perceived to be inclusive, valid and meaningful.

CONCLUSION

This study documented that raising public awareness is important, but simply creating awareness is not enough to promote the people's participation in SWM in Myanmar. The participatory management approach cannot be achieved if the municipality fails to share critical decision-making power with the people and fails to facilitate the participation process. Therefore, building capacity of the municipality is a key to facilitating the participation process and fostering longer term sustainability. Equally, there should be a strategy that involves educating people, developing the knowledge and confidence that is necessary for them to actively participate in the entire management process of solid waste. Together, effective communication and motivational measure are worthwhile as people's participation is directly related to the information available. Finally, it must be pointed out that in the development of a participatory management approach, the role of an external actor such as a researcher is significant. The external actor can assist both of the primary actors, the municipality and the people, to break down existing patterns of behavior and arrive at a new set of relationships and roles.

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REFERENCES

Ahmed, S.A. and M. Ali, 2004. Partnerships for waste management in developing countries: linking theories to realities. Habitat Int., 28: 467-479.

Ali, M., J. Olley and A. Cotton, 1999. Public sector delivery of waste management services cases from the Indian sub-continent. Habitat Int., 23: 495-510.

Anand, P.B., 1999. Waste management in Madras revisited. Environ. Urban., 11: 161-176.

Arnstein, S., 1969. A ladder of citizen participation. AIJ., 35: 216-224.

Baud, I. and J. Post, 2001. New Partnerships in urban solid Waste Management and their Contribution to Sustainable Development Experiences in Accra and Chennai. University of Amsterdam Press, Amsterdam.

Bernardo, E.C., 2008. Solid waste management practices of households in Manila, Philippines. N. Y. Acad. Sci., 1140: 420-424.

Coad, A., 2005. Private sector involvement in solid waste management. Deutsche Gesellschaft fur, Technische Zusammenarbeit (GTZ), Deutschland. http://www2.gtz.de/dokumente/bib/05-0412.pdf.

Evison, T. and A.D. Read, 2001. Local authority recycling and waste awareness publicity/promotion. Resour. Conserv. Recy., 32: 275-292.

Hardoy, J.E., D. Mitlin and D. Satterthwaite, 2001. Environmental Problems in an Urbanizing World. Earthscan, Landon.

Jensen, B., 2002. Knowledge action and pro-environmental behavior. Environ. Edu. Res., 8: 325-334.

Joseph, K., 2006. Stakeholder participation for sustainable waste management. Habitat Int., 30: 863-871.

Kolavalli, S. and J. Kerr, 2002. Scaling up participatory watershed development in India. Dev. Change, 33: 213-235.

McDonald, S. and R. Ball, 1998. Public participation in plastics recycling schemes. Resour. Conserv. Recycl., 22: 123-141.

Mongkolchaiarunya, J., 2005. Promoting a community-based solid-waste management initiative in local government: Yala municipality, Thailand. Habitat Int., 29: 27-40.

Ogu, V.I., 2000. Private sector participation and municipal waste management in Benin City, Nigeria. Environ. Urban., 12: 103-117.

Papageorgiou, M., 2006. Public Community Partnerships for Waste Collection in three Indian Cities an Exercise in World Making Best Student Essays of 2005–06. Institute of Social Studies, The Hague, Netherlands, pp: 104-117.

Plummer, J., 2000. Municipalities and Community Participation a Source Book for Capacity Building. Earthscan, London.

Poerbo, H., 1991. Urban solid waste management in Bandung towards an integrated resource recovery system. Environ. Urban., 3: 60-69.

Rakodi, C., 1999. Urban Governance Partnership and Poverty a Preliminary Exploration of the Research Issues. International Development Department, School of Public Policy, University of Birmingham, UK.

Rathi, S., 2006. Alternative approaches for better municipal solid waste management in Mumbai, India. Waste Manage., 26: 1192-1200.

Reams, M. and B. Ray, 1993. The effects of three promoting methods on recycling participation rates a field study. J. Environ. Syst., 22: 371-379.

Reed, M.S., 2008. Stakeholder participation for environmental management a literature review. Biol. Conserv., 141: 2417-2417.

Rowe, G. and L.J. Frewer, 2000. Public participation methods a framework for evaluation in science. Tech. Hum. Val., 25: 3-29.

Sujauddin, M., S.M.S. Huda and A.T.M.R. Hoque, 2008. Household solid waste characteristics and management in Chittagong, Bangladesh. Waste Manage., 28: 1688-1695.

Unite Nations Environment Program, 2005. Integrated Waste Management Scoreboard a Tool to Measure Performance in Municipal Solid Waste Management. UNEP, USA., ISBN: 92-807-2648-X..

United Nations Centre for Human Settlements (Habitat), 2001. The state of the world's cities report 2001. Nairobi, Kenya. UNCHS (Habitat).

World Bank, 2000. World Development Report: Attacking Poverty. Oxford University Press, New York.

Zia, H. and V. Devadas, 2007. Municipal solid waste management in Kanpur India obstacles and prospects. Manage. Environ. Qual., 18: 89-108.