Community Practices Towards Sustainable Waste Management: A Case Study in Nepal

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Abstract

Attempts to enact legislation and develop a sustainable waste management system in the capital city Kathmandu, Nepal has stalled over the past two decades, mainly due to an unstable political situation and a lack of commitment among various stakeholders. As solid waste poses an increasing threat to public health and the environment, neighborhoods in Kathmandu have recognized the need for capacity building among stakeholders. This article reports on a recycling initiative led by women in one community of Kathmandu and presents the findings from a pilot survey focusing on awareness level and attitudes towards collaboration at the community level. A total of 50 respondents were sampled using a structured questionnaire. Mean age of the respondents was 26.5 years with a standard deviation of 8.80. It was revealed that most of the respondents have basic awareness about environmental degradation and believe in the need for initiating joint efforts from all sectors. However, behavioral action is still lacking and can be enhanced through environment education and economic enterprise through women’s initiatives at the community level.

1. Introduction

Nepal, like many developing countries is facing increasing environmental and human health problems due to the ineffective and unsanitary disposal of solid waste. This issue is most apparent in urban areas where the human population is expanding, while financial resources and management systems are not being upgraded. In the case of Nepal’s capital city Kathmandu, per capita waste generation averages approximately .4 kilograms per day with only 60% of the total solid waste being collected and disposed by a municipal waste management system. Another 10% to 15% is being collected privately door-to-door or scavenged directly from the municipal dumping site for recycling, while the remainder is either discarded on city streets, vacant lots or burned openly. One of the most problematic types of waste to deal with is the growing quantity of thin plastic shopping bags. Once used, they are often left on street corners clogging up open drains, posing health threats to animals and humans and despoiling the surrounding environment.

In developed cities a number of strategies have been implemented with varying degrees of success for reducing the use of plastic bags. These include an eco-point card awarded by the retail shop as an incentive to its customers who carry their own bag when shopping, an eco-tax where consumers are charged at the checkout counter for each bag consumed, and an outright ban on the
use of plastic bags by way of government legislation. However in developing cities like Kathmandu where the impact from the use of plastic bags is felt most, such strategies are not usually feasible. Most consumers cannot afford to pay an eco-tax, an eco-card is not economically viable for retail shops, and governments resist enforcing policies due to the significant role the plastic factories play in emerging economies.

So given the lack of a “top-down” approach, what practices can best address waste management at the community level in Kathmandu? The paper addresses this question through a case study focusing on one community (Ward 4) in the city. A pilot study was conducted in the form of a questionnaire, distributed to 50 respondents including retail owners, teachers, homemakers and students. The study, conducted jointly by university professors and students from Musashi Institute of Technology (Mi-Tech), Yokohama, Japan and National College, Kathmandu aims at identifying the environmental awareness level of stakeholders and their attitudes towards cross-sector collaboration in the management of waste. Findings will be used to develop a future model for capacity building towards the sustainable management of waste in the community.

2. The Urban Environment and Management of Waste in the Context of Kathmandu

Kathmandu, the capital and largest city in Nepal, is located in the eastern half of the country in the valley of the same name at an altitude of 1,300 meters. The city proper covers an area of approximately 50 square kilometers with a population of approximately 800,000. It shares the valley with 2 other cities, Lalitpur and Bhaktapur, all three dating back to around 300AD. Kathmandu possesses a wealth of historical buildings and sites among several Cultural Heritage Sites designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO). Although one can still get a sense of the city’s rich history and cultural background, it is quickly losing it’s identity due to a human population influx and the natural process of development. Within the last 20 years the population has tripled, and over recent years, the city has experienced an annual human population growth rate of over six percent. This population explosion is mainly due to rural migration, particularly from western regions of Nepal where the Maoist insurgency has driven many families from their homes in the remote hills to the capital city for safety. Because of the accompanying haphazard building, city planning has become unmanageable and many families are coping with overcrowded living conditions and unmanaged community resources. As a result, the city faces increasingly severe problems of air, water and land pollution, and a lack of adequate sanitation and basic hygiene.

While the foremost challenge is population growth, the management of solid waste has been identified by the city’s government as one of the most immediate threats for citizens and the urban environment. Out of the total daily waste in the city, approximately 60% is biodegradable, the majority being kitchen waste, with non-degradable making up the rest. And while most of the non-degradables including paper, glass and metal parts could be recycled or re-used, due to a lack of technology, limited recycling facilities...
and a general lack of awareness about the potential of waste as a resource, most of the city’s waste over the past 6 years has been dumped unseparated along the banks of the Bagmati River running through the city. The World Conservation Union in Nepal has warned that the country’s most sacred river, the Bagmati, is in danger of being destroyed by pollution (Belbase, 2002).

At present households have the option of either taking their bagged waste to the drop off point where the waste collection truck picks it up, or they can pay a small fee to have it collected using a door-to-door pick-up system. Unfortunately, not everyone follows this system and waste can be found littering streets and vacant lots, clogging drainage pipes, polluting rivers and estuaries, and generally creating an aesthetically unpleasing environment.

Although a National Policy for Solid Waste Management was adopted in 1997 with the aim of modernizing waste management, attempts to enact legislation and develop a sustainable system stalled due mainly to a variety of reasons, including an unstable political situation and a lack of financial resources. As a way to reduce the financial burden on the central government, responsibility for waste management shifted to the city government in 1999. As was expected, resources available at the municipal level could neither finance adequate levels of service nor cope with the increasing amount of waste generated by the rapidly increasing population. In addition, operational inefficiencies, including institutional structures, as well as inefficient organizational procedures and management capacities further impeded the implementation of strategies set up for the collection, separation, re-use, recycling and final disposal of waste.

From 1999 until present, technical experts from outside Nepal have worked with the central government to establish landfill sites in several locations in the valley, however technology and waste management equipment provided by external donors have not been practical, and the lack of collaboration and planning at the ground level between the experts and locals has resulted in only limited success. Further social resistance to the handling of waste, especially for the higher caste in society, combined with a general lack of awareness and knowledge about the possibilities for recycling and re-use, has made waste management one of the most prominent issues in the city.

3. Addressing the Plastic Bag Issue

Although polythene bags have been in circulation in Kathmandu since the early 1970s, the impact on the environment has become more visible over the past few years as shopkeepers have begun to pack items separately as a sign of courtesy to their customers. Shoppers now expect this service but seldom realize or consider the consequences they bring to the environment and their own health when they discard them. Today, plastic bags made of High Density Polyethylene (HDPE) are used extensively for every conceivable purpose, but because of their light weight and thinness (2 to 4 micron) they cannot be re-used and are often discarded on street corners, in open drains or burned in vacant lots. According to some estimates, Nepal produces 30 thousand tonnes of bags per year (Ghimire, 1999) with a total of between 40 and 50 kilograms of plastic consumed per person per year. Among this, 60 to 70% is used for industrial purposes and 30 to 40% for domestic purposes (Nepal, 2002).

Before the advance in technology, plastic bags were thicker (more than 20 micron) and when discarded were picked up from the streets of the capital by rag-pickers or migrants and sold to plastic industries. The city corporation also bought them as landfill material. But due to intense competition in the plastic industry, the "revenge affect" has taken place and now, bags have be-
come so thin they now have no value to recyclers. Efforts by the central government to ban the HDPE bag began with the Environmental Protection Act (1997) with a provision for control of pollution under section 7(3) and 7(4). The Department of Cottage and Small Industries of Nepal also issued a public notice (1998) to manufacturers, importers, distributors and users not to manufacture, sell or use plastic bags less than 20 micron. As manufacturing did not cease, a further attempt to eliminate the plastic bag began in 2000 when the then Ministry of Population and Environment drafted a bill to ban thin black polythene bags. Several environmental and health threats were cited including: harmful effects of dioxins when bags are left to rot, increased risk of cancer for people producing the bags, degradation of productive land due to dumping, and the threat to animals who may consume them by mistake. As an alternative, the government encouraged a return to traditional biodegradable bags made from jute, cloth and paper. Since that time however, the municipal government has compromised due to the economic revenue generated by the plastic industry, and still today in more than 30 small factories located within the city limits, thin plastic bags are still being manufactured with little or no government monitoring.

4. Women’s Roles towards Environmental Management

One of the most important outputs of the Earth Summit (United Nations Conference on Environment and Development) in 1992 was Agenda 21: an action plan for the 1990s and well into the twenty-first century, elaborating strategies and integrated program measures to halt and reverse the effects of environmental degradation and to promote environmentally sound and sustainable development in all countries (UNCED, 1992). Agenda 21 included an action plan for cities which included institutionalizing a participatory approach to raising awareness and improving the urban environment by promoting social organization with an emphasis on the full participation of women. The need to strengthen and expand waste re-use and recycling systems was also recognized within Agenda 21 for both the developed and developing world.

By tradition, women in Nepal are widely accepted as caregivers and maintainers of the domestic environment. Although women of certain castes and ethnic groups have always played an active role outside the home, for the most part, women up until recently have been in a disadvantaged position in society. With restricted access to education, lack of ownership rights and exclusion from powers of position outside their homes, the opportunities for women to take initiative in the community or workforce have been limited by culture and tradition. More recently, however, women, particularly in urban communities are joining together to improve their community living conditions, and are developing small, informal enterprises with the explicit aim of creating livelihoods and maintaining a clean and health living environment (Bushell and Goto, 2006). In Kathmandu women are cognizant of the impact of waste generated in households and city offices, including plastic bags, newspapers and other paper waste and are forming strong alliances in city neighborhoods, known as ”Wards” regardless of class or caste to create projects to address the problem. At the same time women through their keen initiation empower other women and their counterparts in defining an urban environmental agenda. As a result, women’s roles in the mobilization of a cleaner environment are now being recognized and the outcomes of their initiatives exemplify they are effective managers of household and community waste (Plummer and Slater, 2001).
5. Women in Sustainable Development

Regarded as a pioneer in mobilizing women’s efforts in solid waste management at the grassroots level in Kathmandu, the NGO “Women in Sustainable Development (WSD), first established in 1998, is focusing on the 3Rs - reduce, reuse and recycle. The goals of WSD are to enable people of Kathmandu to have a clean and healthy environment through local initiatives and to support the development of the nation by uplifting the socio-economic status of the women.

One of WSD’s main projects since 2003 has been to find an acceptable substitute to the plastic bag under the project title “Creation for the Environment” (CFE). Over the past three years WSD has been working with shopkeepers and small businesses in Ward 4, gathering waste newspaper from homes and office paper from various businesses door-to-door, recycling them into the traditional style of shopping bag known as the thunga and marketing them as an alternative for shopkeepers to offer their customers. The project also involves the production of cloth bags made from Nepali hand-loomed cotton marketed at the consumer. To date 45 member shops buy the paper bags to use in place of the plastic bags, and on average, each shop uses approximately 20 per day. WSD sells 100 paper bags for 15 Nepal rupees (25 Japanese yen). In addition, the CFE project provides skill training and part or full time employment opportunities for women in various sectors of society ranging from homemakers to students. It gives priority to those who are in need of small income activities. Presently CFE has four staff members and four volunteers.

6. Pilot Study

A survey in the form of a 14 point questionnaire was conducted in March 2006 to identify awareness levels and behavioral action towards environmental protection and waste management in Ward 4 of Kathmandu. A hypothetical scale was used to measure the level of knowledge of the respondents assigning -2 for complete disagreement, -1 hardly agree, 0 for so-so, +1 a bit agreement and +2 for complete agreement (Appendix 1). The collected data were field and centrally edited with analysis, including descriptive statistics such as frequency, percentage, mean, median and standard deviation. Additional questions were included to determine the acceptance
for the paper bag as a viable alternative to the plastic bag. This pilot study is part of an ongoing collaborative project on waste management and environment education between Mi-Tech, Yokohama, Japan and National College, Kathmandu, Nepal.

7. Results and Discussion

Though the environment in Kathmandu is degrading, there are key actors in this sector who are involved in nurturing their communities. Women, the most vulnerable population in Nepal, are taking various initiatives, particularly in the management of waste. One such example is the NGO WSD and their project CFE. The following is a summary of results from the survey connected to the activities of WSD, including a brief discussion.

Results from question 1 reveal that most of the respondents in Ward 4 have some agreement on the need for concerted efforts towards environmental protection (Table 1). The findings clearly demonstrate an understanding by community members about the importance of cooperation for environmental protection. This may be a reflection of the outcomes from the project CFE organized by WSD. As local shopkeepers and customers are encouraged to work together to reduce plastic waste through the CFE, they may recognize how their combined efforts can make a difference.

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Hardly</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Some</td>
<td>5</td>
<td>10.0</td>
</tr>
<tr>
<td>Agree</td>
<td>43</td>
<td>86.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

In addition, findings from question 2 inform us that both males and females regard the responsibilities of stakeholders, including retail and industry owners important for the protection of the local environment. A significant number of both males and females were found to have complete agreement (Figure 1). This illustrates a general level of awareness regarding the need for social responsibility on the part of citizens towards environmental management at the community level. However in one case, a female respondent did not agree on this point. Upon further investigation it was found that the respondent was not familiar with WSD activities and had few opportunities to communicate with other women in the community due to various social factors.
Results from question 3 inform us that the majority of both males and females completely agree about the need for increased awareness for environmental action. However, a proportion of females were found to be in complete disagreement (Figure 2). The mean value in most of the cases was two. A total of 44 respondents have complete agreement in the need for raising awareness for the environment while the remaining 6 respondents showed a lower degree for the need in awareness-raising.

Figure 3 represents the desire of respondents to join environmental organizations for gaining knowledge and skills to act positively for the environment. Findings reveal once again while the majority of both males and females agree with this statement, one male and one female respondent hardly agrees and one male respondent completely disagrees with the need to join environmental organizations. These findings may indicate the need for community–based environment education activities and the further promotion of waste reduction initiatives conducted by WSD.
Figure 3. Relationship between sex of the respondents and their needs to join the organizations related to environmental management.

The data in Figure 4 illustrates that the majority of female respondents agree it is necessary to collaborate for the improvement of the environment and without joint efforts by males and females vis-a-vis developmental organizations, goals cannot be achieved. The modal value in level of agreement for environmental protection is 2 for female respondents and 1.8 for corresponding male respondents.

Figure 4. Relationship between sex and the joint efforts towards environmental management

An important difference can be seen between males and females when asked if they believe environmental destruction is unavoidable for economic gain. The mean value of female respondents was found to be 0.53 while that of males was 0.58 (Figure 5). This data may reflect the fact that females have more knowledge about the impacts of environmental destruction and that they might be more likely to conduct economic activities that would avoid degrading the environmental base.
On the other hand, however, when asked if the environment must be destroyed for a more comfortable lifestyle, both males and females disagreed equally. The data also indicates that they are willing to invest extra money for environmental enhancement (Table 2).

Table 2. Perception of the respondents towards environmental ingredients.

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percent</th>
<th>Frequency</th>
<th>Percent</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>36</td>
<td>73.5</td>
<td>16</td>
<td>32</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Hardly</td>
<td>2</td>
<td>4.1</td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>So–so</td>
<td>1</td>
<td>2.0</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Agree a bit</td>
<td>5</td>
<td>10.2</td>
<td>3</td>
<td>6</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Agree</td>
<td>5</td>
<td>10.2</td>
<td>23</td>
<td>46</td>
<td>27</td>
<td>54</td>
</tr>
</tbody>
</table>

In a similar line, most of the respondents expressed a desire to know more about the environmental work of WSD. Qualitative data gathered from the questionnaire reveal that 73.3% of respondents favored the use of paper bags produced by the CFE project. Asked for reasons why, 70% of respondents replied it was environmentally friendly, while 6.6% replied it was a good way to reduce both the amount of plastic and paper waste in their community, with another 15% stating that using the paper bag provided employment opportunities for local women.

Although there were various limitations to the pilot survey, including question type, target population sample and inaccurate responses due to lack of literacy on the part of some respondents, the results indicate that while the majority of respondents want to improve their livelihoods, they are aware that it can be achieved only if the environment is protected. Their willingness, particularly on the part of women to join environmental organizations and cooperate for better management of the environment was evident from the survey findings. However, the need for more education related to local environmental issues and further support for capacity building leading to
sustainable behavioral practices is deemed critical to success.

8. Reflections and Future Challenges

There are an immense number of examples showing women’s initiatives in environmental protection in Nepal. CFE represents one exemplary model of how women can play a key role in the reduction of waste at the community level. It also illustrates the possibilities for green enterprise for women in need of economic income, and highlights how important women’s voices are in the process of achieving sustainable development in Nepal. However, many in the community remain uninformed about the activities of WSD. Out of the 50 respondents asked whether they know about the WSD activities, 56% replied no, 20% replied yes, while the remaining replied maybe. At the same time, 36% of the respondents were found working with WSD with keen interest and 48% showed interest to some extent. This pinpoints future challenges to be addressed within the community targeted. The following elements should be highlighted for consideration:

- Successful initiatives result from a mixture of public, private and community involvement, whether by evolution or by deliberate design.
- Minimizing and managing plastics at source, including shopkeepers and households is critical to a healthy and clean environment.
- While initiating any programs related to environmental management, involvement of women and their empowerment should be taken into special consideration.
- As women in most cases are managing home resources, they have the potential to educate their families about the issue of plastic waste, thus awareness can be created in the community as a whole.
- There is also a strong need to mobilize men to contribute in the "practical" management of waste.
- Community-based organizations should be adequately supported and trained for social mobilization.
- Women’s roles (in this case WSD) should be duly acknowledged and their participation in decision-making recognized within the political community.
- The government should play a vital role in discouraging the use of plastic bags from a policy level. Therefore it is suggested an excise duty should be imposed on the use of plastic bags by the government.
- There is a need to strengthen inter-sectoral partnerships in support of a shared long-term vision of the goals of waste management in the city as a whole. This goal should be to achieve a system which is sustainable over time, beneficial to society, the economy and the environment.

9. Conclusions

By reducing the total amount of solid waste headed for the landfill or left lying on the streets, recycling is a land saving and pollution-reducing strategy. Waste re-use also plays a valuable resource conserving role, thus helping to minimize the ecological footprint of the city. By reducing the use of plastic bags, community by community, a large percent of city waste could be eliminated, hence pollution could be controlled. For such achievements, all members of society must make joint and concerted efforts.
Note
1 Maoist Insurgency, also known as the "People’s War” was launched in February of 1996 by the Communist Party of Nepal-Maoist (CPN-Maoist). The Maoist People’s War seeks to destroy constitutional monarchy and aims to establish a Maoist people’s democracy.

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References


Appendix
Nepal Project Waste Management Investigation

Occupation [ ]
Sex { M F } Age [ ]

1. What is your opinion about the environment and its protection?

<table>
<thead>
<tr>
<th>Questions</th>
<th>Disagree</th>
<th>Hardly</th>
<th>So-so</th>
<th>A bit</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>All humans should work on environmental protection</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>The companies and shops should do some activities for environmental protection</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>We should have more awareness for the environment</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>You want to join some activities of environmental organizations</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>We should protect the environment by cooperating with each other</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>Environmental destruction is necessary or unavoidable for economic purposes</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>For a comfortable life, the environment must be damaged</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>It’s not worth it to destroy the environment for making my life comfortable</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>I want to accept the extra cost to protect our environment</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>I want to know the evaluation of environmental activities if I do it.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>I want to use plastic bags</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>We should think and work on how to live a comfortable life without destroying the environment</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>If I know a better way to protect our environment, I want to do it.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>In the future, I want to work on environmental protection.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
</tbody>
</table>

2. Could you pay extra money for eco friendly products? { Yes, Maybe, No }
3. Do you know about the activities of WSD? { Yes, Maybe, No }
4. Do you want to join the activities of WSD? { Yes, Maybe, No }
5. Which is better for you paper bags or plastic bags? { paper bags, plastic bags, cannot decide }
6. What is the reason for your answer to the above question?

Thank you very much for your cooperation.