

SOLID WASTE MANAGEMENT PRACTICES AND PROBLEMS: A STUDY AT UTTARA (SECTOR 10) IN DHAKA CITY

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ABSTRACT

Solid waste management has become one of the most concerning issues for municipal authorities in developing countries. The drastic growth of population and industrialization is degrading the urban environment and posing serious threats to natural resources, which undermines sustainable development. Improper management and disposal of solid waste is an obvious cause of environmental degradation in most metropolitan cities like Dhaka. Although Dhaka North City Corporation (DNCC) has acknowledged the importance of proper collection, resource recovery, recycling, and disposal of solid waste, it is mostly beyond its capacity to manage effectively with the growing amount of solid waste generated by the fast-growing cities. Consequently, solid waste is dumped indiscriminately on roads and into open drains, leading to serious health risks and the degradation of the living environment. The present study finds an effective way for managing waste generation and disposal to diminish its adverse impacts on the environment. It is found from the data collection that the total amount of waste (kg) produced by each building (on average, 10 units) varies from day to day. It shows us that on Wednesday and Friday, the amount of waste (kg) is higher than on the other days of the week. It is suggested from this study that if we send more collector vans in these two days rather than sending them in a particular amount every day, our waste collection system will take much less time and effort, and thus we can boost the waste management system.

Keywords: *Waste management systems, Recyclable materials, Waste disposal, Sustainable development*

INTRODUCTION

The proper definition of "solid waste" is important to constructing a sustainable plan for waste management. Definitions that result from this condition could, however, be in conflict with waste prevention objectives because something that already existing cannot be prevented from arising. The theory of solid waste management represents a more in-depth account of the domain and contains conceptual analyses of waste, activity upon waste, and a comprehensive view of the waste management goals. A radically new approach is presented to define the fundamental concepts of waste management that is based on an object-oriented modeling language (program) (Pongrácz, 2004).

Bangladesh's urban waste generation rate was estimated at 5,650 tons per day, or 2.06 million tons per year, in 2003. The daily waste generation is projected to be 8,280 tons, and the annual generation will be 3.02 million tons by 2010. By 2021, the daily and annual generation will amount to 15,110 tons per day and 5.52 million tons per year. There is an increasing rate of waste generation in Bangladesh, and it is anticipated to reach 47,064 tons per day by 2025 (Islam, 2016). In 2025, the waste generation rate is expected to rise to 0.6 kg/cap/day. As a result, it is critical to investigate the issues and govern the facts concerning

the safety of our community from rotten waste dumps and their consequences in order to ensure a safe and clean environment (Hai and Ali, 2005).

A significant portion of the population has no access to proper waste disposal services, which will ultimately result in waste mismanagement problems. The total waste collection rate in Dhaka, the capital city of Bangladesh, is only 37% (Abedin and Karim, 2022). When waste is not properly collected, the unauthorized disposal of waste causes major environmental and health risks to Bangladeshis. Uncollected and mismanaged solid waste provides breeding grounds for vermin and insects that proliferate and contribute to airborne and waterborne diseases (Sohana, 2015). Four types of waste streams, i.e., domestic (49%), commercial (21%), industrial (24%), and hospital (6%) waste, constitute the total solid waste of Dhaka city (Islam, 2016). This study mainly focuses on the present status of solid waste management practices, including solid waste collection, transportation, storage, and disposal systems in Uttara (Sector 10) to find a suitable way to prevent the mixing of waste so that the disposal of waste can be done within a short period of time and with less effort.

MATERIALS AND METHODS

PRIMARY DATA COLLECTION

In order to find out the solid waste management practices in the study area, the primary data was collected in November 2020 from various types of households through a questionnaire survey from day laborers, van pullers, and house security to assess the exact situation of solid waste management with direct field observation and also by visiting the waste collection process and the selected dumping area.

SECONDARY DATA COLLECTION

Secondary data about population (demographic features), household size, types, income level, the volume of waste generation, and activities existing on solid waste management at Uttara (Sector-10) in Dhaka were collected from total plots of land of 3,700 approx., total families of 15,000 approx., and total household members (population) of 85,000, with house security, guards (security), drivers, and guests of the population of 12,000 (Islam et al., 2019). Other related information was collected from different sources. The methods (primary and secondary) of data collection are shown in Figure 1.

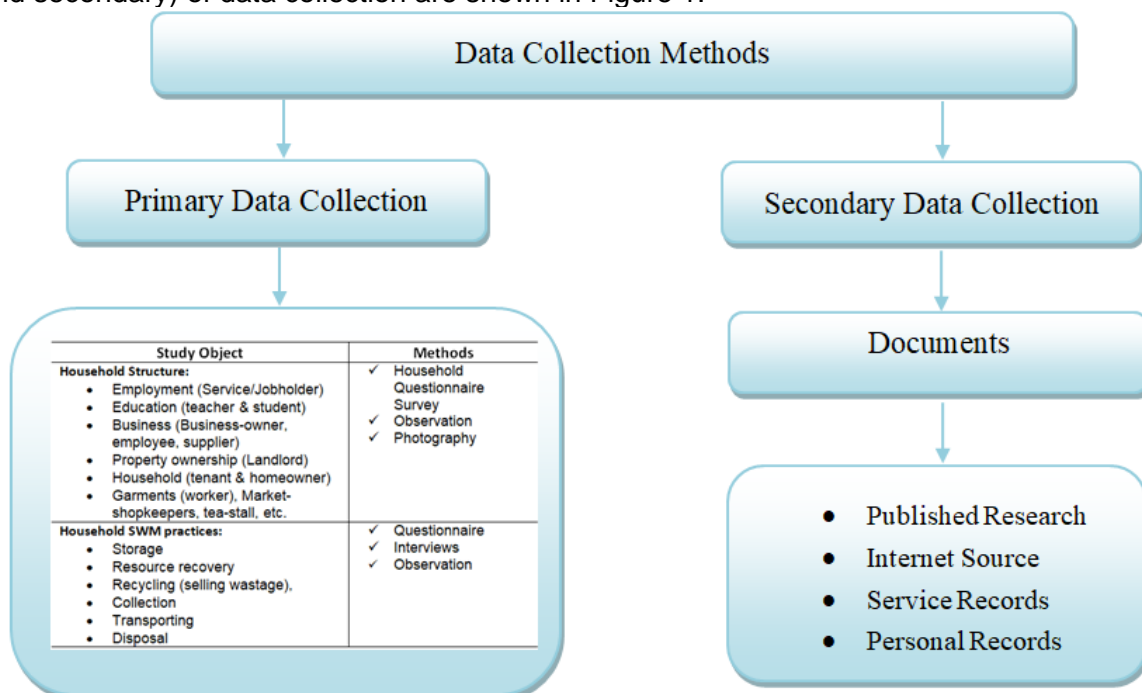


Figure 1. Primary and Secondary data collection methods

MSW MANAGEMENT SYSTEM IN UTTARA (SECTOR 10)

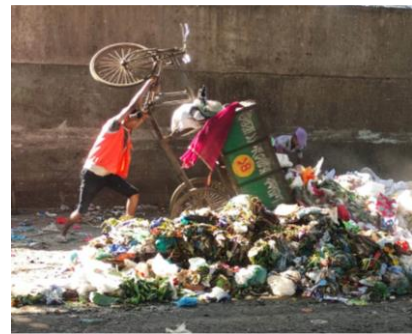
In this study area, solid waste collected from buildings (door to door) was transported to secondary storage using a van on a regular basis. At secondary storage, some people collected and separated the plastic and other recyclable and reused waste. After separating the waste, the people sold them to the nearby shops. The remaining biodegradable waste in secondary storage was loaded into trucks and disposed of at a nearby landfill.



Collecting wastes from household



Waste Carried by Van



Waste deposit to secondary storage



Collecting recyclable waste



Storage of recyclable waste for selling



Putrisible waste loaded into truck for disposal in landfill

Figure 1. Existing solid waste management system

DATA ANALYSIS AND DISCUSSIONS

After analyzing the data, it was discovered that while awareness and participation (both financial and active engagement) in solid waste management programs are at that level of satisfaction and updated, recycling issues and the use of individual bins for each type of waste (not or less amount of mixed waste) at the household (at the point of origin) and at the primary deposit (or collection) point are still in the dark, are not acknowledged, or have few participants. By ignorance, a group of housekeepers or maids is still dumping or pouring kitchen waste into the sanitary sewer system.

RESULT AND DISCUSSIONS

Uttara (Sector 10) was surveyed, involving people from different aspects and the existing situation, and we came to know that they all are united and agree to protect their environment, except for a few. Yet we also found that if they use vans with lids for waste collection and transportation with the permission of Dhaka North City Corporation, our environment can be kept safe from air pollution, and the environment of Sector 10 will be environmentally friendly. Currently, a conventional approach to solid waste management is practiced with a few material recovery facilities (MRF) or energy recovery options, as shown

in Figure 2. People's involvement in finance and willingness to adopt best practices can improve overall performance in sustainable waste (solid) management.



Figure 2. Current practices on material recovery from municipal solid waste include (a) manually separating the solid waste, (b) segregating the solid waste, (c) packaging the solid waste, and (d) transporting the solid waste for sale.

It was found that the total amount of waste (kg) produced by each building (on average, 10 units) varies from day to day, as shown in Figure 4-11. On Wednesday and Friday, the amount of waste (in kg) was higher than on the other days of the week. It was observed that food waste had a higher content than plastic and paper waste in all three buildings. If these food wastes are disposed of in landfills, they can be the source of harmful greenhouse gases such as methane and carbon dioxide, which are responsible for global warming.

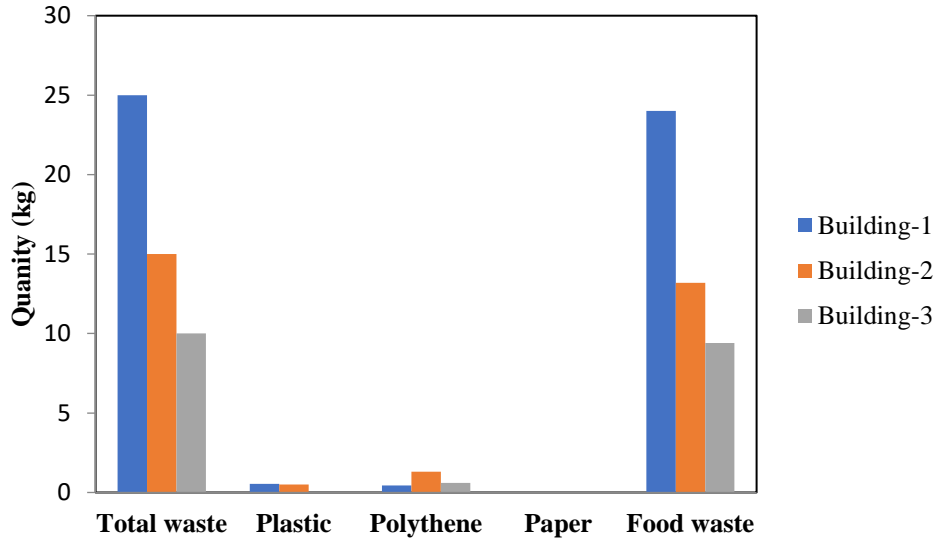


Figure 4. Quantity of waste (kg) on Saturday

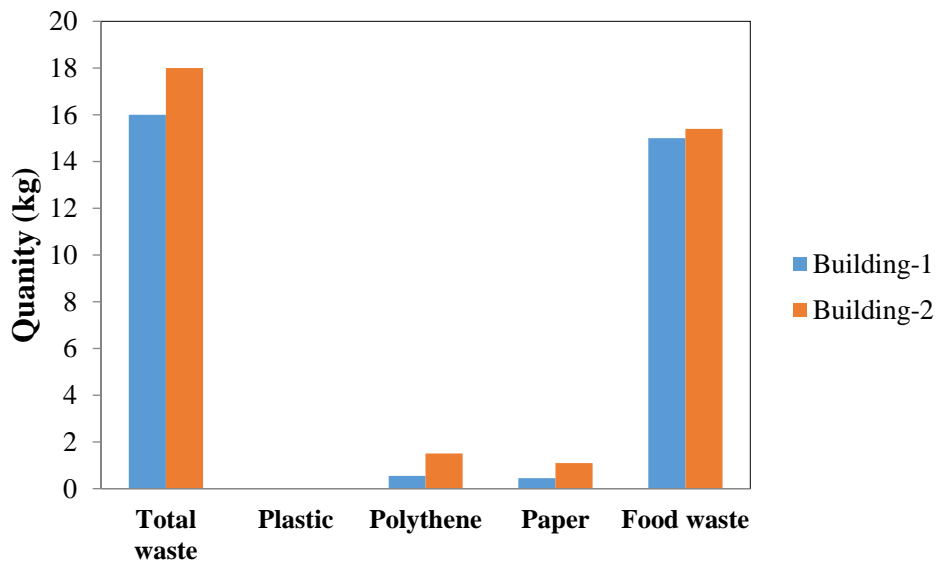


Figure 5. Quantity of waste (kg) on Sunday

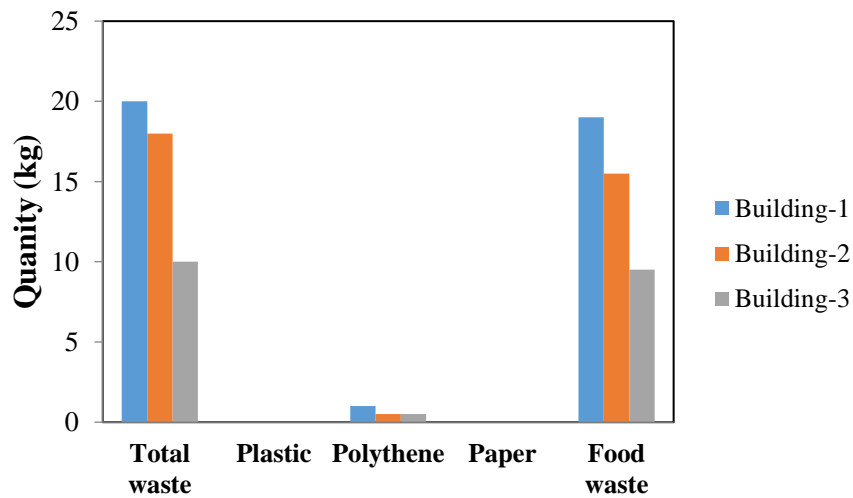


Figure 6. Quantity of waste (kg) on Monday

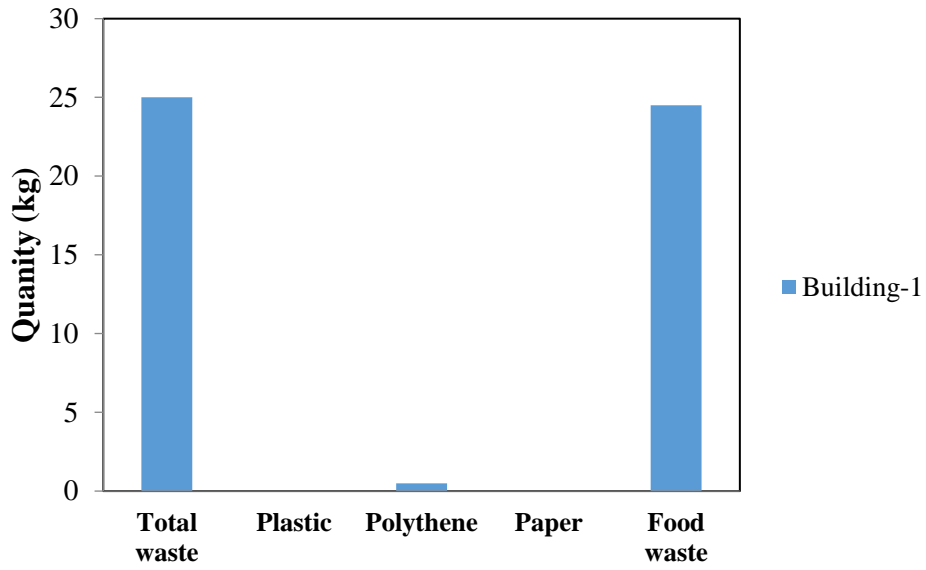


Figure 7. Quantity of waste (kg) on Tuesday

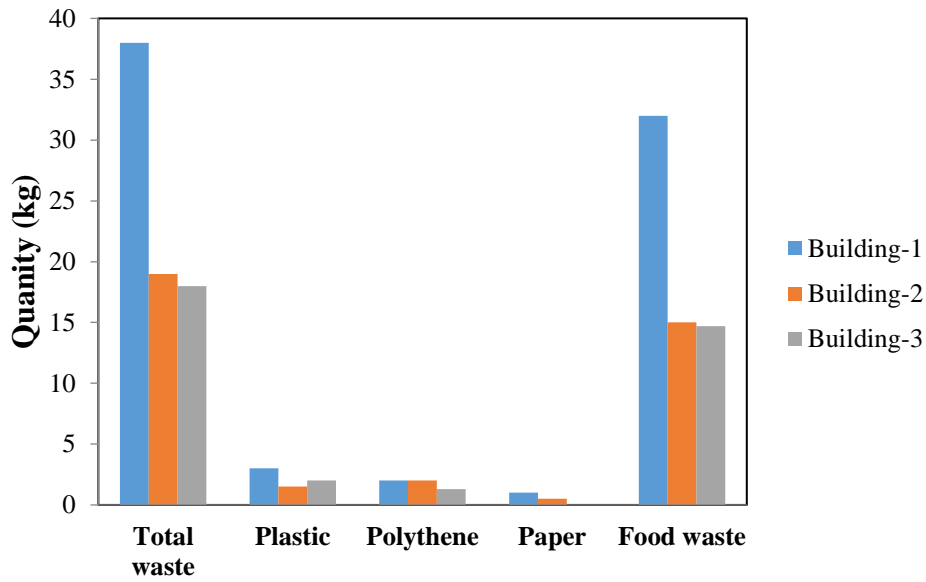


Figure 8. Quantity of waste (kg) on Wednesday

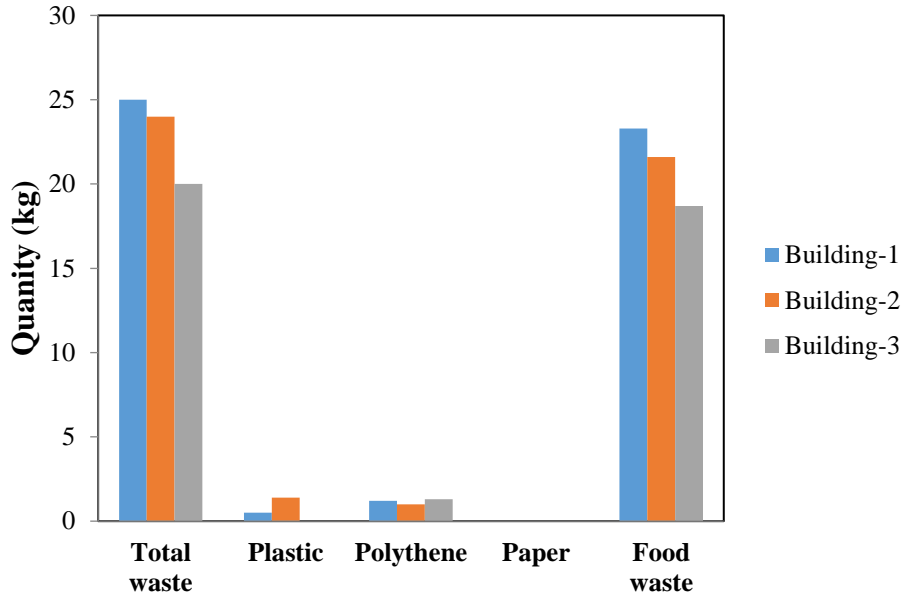


Figure 9. Quantity of waste (kg) on Thursday

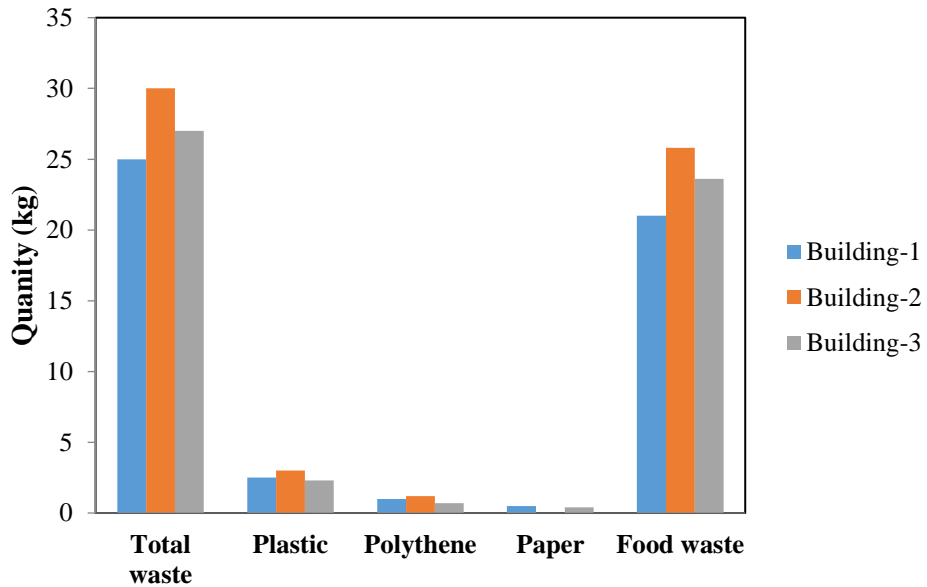


Figure 10. Quantity of waste (kg) on Friday

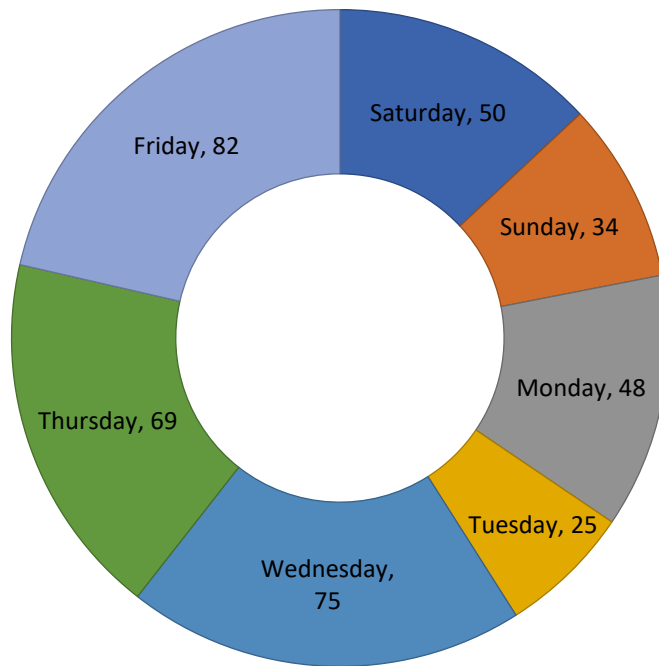


Figure 11. Amount of waste (kg) in a week of our selected buildings

CONCLUSIONS AND RECOMMENDATIONS

An easy method to deal with regular household waste should be introduced or practiced to avoid clogging sewerage systems (especially in high-rise buildings). A chute system in a tall structure (building) to deliver the waste (solid and other) wrapped or bagged in garbage bags or containers can be introduced and practiced with monitoring, as appropriate. Our waste collection system will take much less time and effort if more collector vans are sent during these two days rather than a specific number every day. Also, household key players must have better knowledge about the bad effects of waste mixing and practice a separate dumping system. To prevent the misuse of waste, all the authorities must provide capable and practical personalities in this sector. Overall, the following recommendations are given based on this study and other studies (Islam, 2019; Islam, 2016):

- Open dumping should be stopped, and a specific location should be selected for waste dumping.
- Proper positioning of dumping stations allows for easy collection and carrying of waste to the sites.
- Sector 10, where the problem will occur, requires a complaint center.
- Justifiable fee for each household to support the solid waste management team and initiatives to comply with all rules and regulations that can support an integrated sustainable solid waste management system for sector 10, Uttara, as well as DNCC and DSCC.
- Emergency notification and response groups for solid waste-related issues should be established and maintained.
- Increase in salary and the safety of the work are required for workers.
- Registered doctor's cell or paramedics should be provided by the Dhaka North City Corporation for the workers' first aid.
- Improving the collection system (covered-van use should be encouraged if it is free of annoyances and health risks).
- Digitalize the transportation system, i.e., networking, scheduling, and some sirens or whistles while collecting waste and fees associated with it.

- Billing for waste collection should be transparent (with additional fees for specialties when needed).
- Encourage the use of separate colored bins for recyclables and other materials instead of the mixed waste bin. It is preferable to collect waste on a daily basis and transport it to specific locations.
- Develop reuse criteria for special products (clothes, baskets, plastic toys, tin cans, etc.), recycle bins (paper, plastic, glass, food containers, etc.) at sites (household storage and preliminary storage), and develop sorting systems as a recovery option in secondary storage and less in landfill waste dumping.
- Public awareness and motivational training for volunteers and professionals should be increased. Putting bags, bins, and drums with the recycle logo in a specific location without causing any disruption
- Promotional activities for good practitioners and neighbors should require special consideration.
- Combine government and private agencies, entrepreneurs, and communities' efforts should be increased.

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